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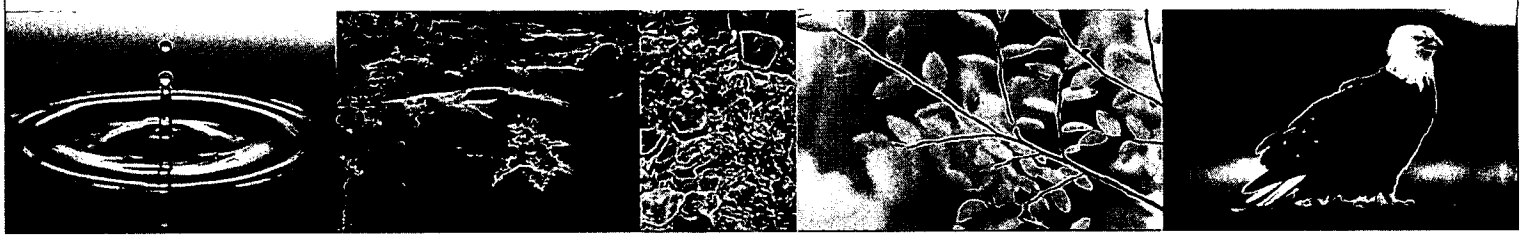

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Resource Conservation and Recovery Act Facility Investigation Report
for
Building 106 Pond (SWMU 8)

Naval Surface Warfare Center Crane
Crane, Indiana

Contract Task Order 0331

January 2008

NAVFAC
Naval Facilities Engineering Command
Midwest
201 Decatur Avenue
Great Lakes, Illinois 60088

TETRA TECH NUS, Inc.

REVISION 0
JANUARY 2008

RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT FOR BUILDING 106 POND (SWMU 8)

NAVAL SURFACE WARFARE CENTER, CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
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Midwest
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ACRONYMS

°C	Degrees Celsius
°F	Degrees Fahrenheit
µg/dL	Micrograms per deciliter
µg/L	Micrograms per liter
µg/kg	Micrograms per kilogram
ACH	Air changes per hour
AET	Apparent effects threshold
amsl	Above mean sea level
AR	Air rotary
AWQC	Ambient Water Quality Criteria
ATSDR	Agency for Toxic Substances and Disease Registry
BAF	Bioaccumulation factor
BaP	Benzo(a)pyrene
bgs	Below ground surface
BERA	Baseline ecological risk assessment
BSAF	Biota sediment accumulation factors
CA EPA	California Environmental Protection Agency
CCME	Canadian Council of Ministers of the Environment
CDI	Chronic daily intake
CFU	Colony-forming unit
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm/sec	Centimeters per second
CMS	Corrective measures study
COC	Chemical of concern
COPC	Chemical of potential concern
CSF	Cancer slope factor
CTE	Central tendency exposure
CTO	Contract Task Order
DI	Deionized
DNAPL	Dense non-aqueous phase liquid
DO	Dissolved oxygen
DPT	Direct-push technology
DQI	Data Quality Indicator
EC	Environment Canada

Eco-SSL	Ecological soil screening level
EEQ	Ecological effects quotient
EMR	Environmental Monitoring Report
EP	Extraction Procedure
EPC	Exposure point concentration
EPD	Environmental Protection Department
ERA	Ecological risk assessment
ER-L	Effects-range low
ESL	Ecological screening level
EU	Exposure unit
FOL	Field Operations Leader
gpm	Gallons per minute
HASP	Health and Safety Plan
HEAST	Health Effects Assessment Summary Table
HHRA	Human health risk assessment
HI	Hazard Index
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7- tetrazocine
HQ	Hazard quotient
HSA	Hollow stem auger
IA	Installation assessment
IAS	Initial Assessment Study
ID	Inside diameter
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	Incremental Lifetime Cancer Risk
IDW	Investigation-derived waste
IRIS	Integrated Risk Information System
K	Hydraulic conductivity
K_d	Soil-water partition coefficient
K_{oc}	Organic matter-water partition coefficient
LCS	Laboratory control sample
LEL	Lowest effects level
LOAEL	Lowest observable adverse effect level
MATC	Maximum acceptable toxicant concentration
MCL	Maximum contaminant level
mg/kg	Milligrams per kilogram

mL	Milliliter
MRL	Minimal risk level
MS	Matrix spike
MSD	Matrix spike duplicate
mV	Millivolt
NAD27	1927 North American Datum
NAD83	North American Datum of 1983
NAVD88	1988 North American Vertical Datum
NAVFAC EFD SOUTH	Naval Facilities Engineering Command, Engineering Field Division South
NCEA	National Center for Environmental Assessment
NEESA	Naval Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No observable adverse effects level
NSWC	Naval Surface Warfare Center
NTU	Nephelometric turbidity unit
OD	Outside diameter
OLQ	Office of Land Quality
OMOE	Ontario Ministers of the Environment
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
ORNL	Oak Ridge National Laboratory
ORP	Oxidation-reduction potential
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCP	Pentachlorophenol
PEC	Probable Effects Concentration
PID	Photoionization detector
Plz	Lower Pennsylvanian water-bearing zone
Pmz	Middle Pennsylvanian water-bearing zone
ppb	Parts per billion
PPE	Personal protective equipment
PPRTV	Provisional Peer Reviewed Toxicity Value
ppm	Part(s) per million
PRG	Preliminary Remediation Goal
Puz	Upper Pennsylvanian and overburden water-bearing zone
PVC	Polyvinyl chloride
QA	Quality assurance

QAPP	Quality Assurance Project Plan
QC	Quality control
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-based Concentration
RBTL	Risk-based target level
RCRA	Resource Conservation and Recovery Act
RD	Reductive dechlorination
RDA	Recommended daily allowance
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RfD	Reference Dose
RFI	RCRA Facility Investigation
RISC	Risk Integrated System of Closure
RME	Reasonable Maximum Exposure
RPD	Relative percent difference
RQD	Rock quality designation
RS	rotosonic
SDWA	Safe Drinking Water Act
SERA	Screening-level ecological risk assessment
SMWU	Solid Waste Management Unit
SOP	Standard operating procedure
SQG	Soil quality guideline
SSL	Soil Screening Level
S.U.	Standard units
SUF	Site use factor
SV	Screening value
SVOC	Semivolatile organic compound
SWMU	Solid Waste Management Unit
TCA	Trichloroethane
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TEL	Threshold effects level
TNT	2,4,6-trinitrotoluene
TOC	Total organic carbon
TOM	Task Order Manager
TPAH	Total PAH
TRV	Toxicity reference value
TRW	Technical Review Workgroup

TtNUS	Tetra Tech NUS, Inc
U.S. EPA	United States Environmental Protection Agency
UCL	Upper confidence limit
UET	Upper effects threshold
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
UTL	Upper tolerance limit
VDEQ	Virginia Department of Environmental Quality
VF	Volatilization factor
VOC	Volatile organic compound
WQC	Water quality criteria
WQS	Water quality standards

EXECUTIVE SUMMARY

This report documents the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for Solid Waste Management Unit (SWMU) 8, Building 106 Pond, located at the Naval Surface Warfare Center (NSWC), Crane, Indiana. Tetra Tech NUS, Inc. (TtNUS) prepared this report for the Department of the Navy (Navy) Naval Facilities Engineering Field Division South (NAVFACEFD South) under Contract Task Order (CTO) 0331, Comprehensive Long-Term Environmental Action Navy (CLEAN) III, Contract Number N62467-94-D-0888.

PURPOSE OF RFI REPORT

This report summarizes RFI fieldwork conducted from December 2004 through October 2006, describes the nature and extent of contamination, describes the baseline human health and ecological risk assessments, and provides recommendations for future action.

SWMU 8 DESCRIPTION

Buildings 106 and 107 and the Building 106 Pond area are located in the “Load and Fill Area” in the west-central portion of NSWC Crane, near the intersection of Highways 45 and 101. All surface runoff from the SWMU drains south and southeast into several gullies which enter an unnamed, intermittent stream. This main tributary then flows eastward and enters Boggs Creek. The Boggs and Turkey Creek Drainage Basin is one of five major drainage basins that carry surface water off the installation and eventually drain into the East Fork of the White River and then to the Wabash River to the southwest.

Buildings 106 and 107 have historically been involved with the overhaul of projectile casings. Building 106 housed a cleaning process consisting of caustic wash, a Trichloroethylene (TCE) degreaser, and a hydrochloric acid wash. Prior to 1972, splash out and overflows of wastewater from Buildings 106 and 107 were discharged into a small unlined pond (i.e., the Building 106 Pond) that subsequently drained into ditches. Sometime after 1972, the pond was connected to a neutralizing system (located on the south side of the pond) that discharged to the sanitary sewer [Naval Energy and Environmental Support Activity (NEESA), 1983]. The discharge solutions from the pond had an extremely high pH (11.0) and contained explosives, heavy metals, oil, and grease. The floor drains in Building 107 previously discharged to the pond (Reid et al., 1987). Floor drain discharges may have contained TCE, pentachlorophenol (PCP), paint residue, and heavy metals. Also, oily wastewater from leaking compressors in Building 107 entered the pond via several drainage pipes (A.T. Kearny, Inc., 1987).

In the mid-1970s, phosphatizing of steel was conducted in Building 106. The phosphatizing process involved applying a zinc phosphate coating to projectiles and also included a conditioning rinse step that used a dilute solution of either chromic acid or chromic and phosphoric acids.

Activities at Buildings 106 and 107 also included the application of coatings to Hawk missile containers in paint booths. One of the paint booths applied a zinc chromate coating containing 40 weight percent toluene, whereas another paint booth applied an olive drab coating containing 22 percent naphtha. Each of the paint booths utilized approximately 500 gallons of coating material per year. Prior to coating, the Hawk missile containers were silica sandblasted, which produced approximately 800 to 1,000 pounds of baghouse residue per day.

Building 107 included refinishing of wooden and metal boxes. For metal boxes, the cleaning portion of the process utilized approximately 712 gallons of TCE per year. Painting was done in paint booths equipped with water washes for particulate control. The amount of dust collected daily from the accumulator/baghouse was approximately 300 to 400 pounds. For wooden boxes, there was an additional treatment step consisting of dipping the wooden boxes in a 5-percent solution of PCP in a “dip tank” for 5 minutes followed by partial drying of the boxes in a “dip pan.” Approximately 8,800 gallons of PCP was used annually. Currently, repair operations are intermittently performed in Buildings 106 and 107.

In 1972, approximately 47 samples were collected from effluent discharging from the Building 106 Pond. These samples were selectively analyzed for water quality parameters [total organic carbon (TOC), turbidity, dissolved oxygen (DO), etc.], metals, and explosives. Analytical results indicated high heavy metals concentrations, with values as high as 20 parts per million (ppm) for lead, 3.5 ppm for chromium, 1 part per billion (ppb) for mercury, 20 ppm for zinc, and 0.2 ppm for cadmium (Kent et al., 1973).

The Initial Assessment Study (IAS) (NEESA, 1983) recommended two soil samples from the Building 106 Pond be collected and analyzed for mercury, chromium, phosphorus, and TCE. In 1985, two samples were analyzed for heavy metals via the Extraction Procedure (EP) Toxicity test and for oil/grease content and TCE. Phosphorus was not a target analyte. Measured concentrations were less than Toxicity Characteristic Leaching Procedure (TCLP)/EP Toxicity Regulatory Action Levels. In 1987, a visual site inspection conducted by A.T. Kearny, Inc. noted that the edges of the pond were oil stained and the surface of the pond exhibited an oily sheen.

As part of the Phase I Environmental Monitoring Report (EMR) (Halliburton NUS, 1992a), background data and site observations were reviewed to determine the likelihood of a release posing a potential

threat to human health and/or the environment. Available data and observations of current site conditions at SWMU 8 were reviewed to assess the potential for contaminant releases to groundwater, surface water, air, and soil. The data evaluation and site observations were made according to the approach described in RCRA Facility Assessments Guidance (U.S. EPA, 1986). Based on the operational history of Buildings 106 and 107 and the waste characteristics of materials used in the buildings, potential releases to groundwater, soil and air were deemed likely. Based on analytical records and reports, releases to surface water have occurred.

FIELD AND ANALYTICAL PROGRAM FOR SWMU 8

Four rounds of RFI field activities have been conducted at SWMU 8. Round 1 was completed in December 2004/January 2005, Round 2 was completed in May/June 2005, Round 3 was completed in September/October 2005, and Round 4 was completed in October 2006. All work was conducted in accordance with the procedures and methodologies described in the United States Environmental Protection Agency (U.S. EPA)-approved Quality Assurance Project Plan (QAPP) (TtNUS, 2004) and two QAPP Addenda (TtNUS, 2005c, 2005d). Standard operating procedures (SOPs) that governed the field work are included in Appendix E of the approved QAPP (TtNUS, 2004).

Soils

A total of 65 soil borings were drilled during the four rounds of sampling. From these 65 boreholes, a total of 44 surface soil samples were collected from a depth interval of 0 to 2 feet below ground surface (bgs) and 64 subsurface soil samples were collected from a depths of 2 to 18 feet bgs. Most soil samples were analyzed for volatile organic compounds (VOCs). Many of the samples were also analyzed for energetic compounds, perchlorate, metals, and semivolatile organic compounds (SVOCs). A few samples were analyzed for pesticides, herbicides, and polychlorinated biphenyls (PCBs).

Soils collected in Rounds 3 and 4 were only analyzed for VOCs because it became clear after two rounds of sampling that VOCs were the primary contaminants at the site and VOCs had migrated farther than the other contaminants.

Surface Water/Seeps

A total of 32 surface water samples were collected from one seep, the Building 106 pond, and 16 other surface water sampling locations during Rounds 1 through 3, including drainage ditches and one sump. All of these samples were analyzed for VOCs. Many of the samples were also analyzed for energetic compounds, perchlorate, metals, SVOCs, and PCBs. Surface water samples collected during Round 3

were only analyzed for VOCs, because it became clear after two rounds of sampling that VOCs were the primary contaminants at the site and VOCs had migrated farther than the other contaminants.

Sediment

A total of 24 sediment samples were collected from the gullies, the unnamed tributary stream, and the Building 106 Pond. These samples were analyzed primarily for VOCs, SVOCs, perchlorate, and energetics. During Round 1, four of the samples were analyzed for PCBs. During Round 2, many of the sediment samples were also analyzed for metals.

Groundwater

During RFI Rounds 1 through 4, a total of fourteen permanent and seventeen temporary monitoring wells were installed. Eleven of the permanent monitoring wells were installed and sampled as part of the Round 2 fieldwork. Results from Round 2 groundwater sampling indicated that additional monitoring wells were required to fully delineate groundwater contamination; therefore, Round 3 included the addition of three new monitoring wells. Subsequent to Round 3, further analysis of the sampling results suggested there might be a source of contamination south of Building 106 that is not related to the high TCE associated with the pond. As a result, Round 4 samples, south of Building 106, were collected and analyzed for VOCs and SVOCs. A total of 35 groundwater samples were collected from the wells during Rounds 1 through 4.

Four samples collected from temporary wells during Round 1 were analyzed for a wide variety of contaminants: energetic compounds, perchlorate, total and dissolved metals, SVOCs, VOCs, and fecal coliform. In Rounds 2, 3, and 4, analyses of groundwater samples were limited to SVOCs, and VOCs.

NATURE AND EXTENT OF CONTAMINATION

The degree and extent of contamination at SWMU 8 is rather limited and reasonably well bounded. The primary contaminants are select chlorinated VOCs in pond sediments, pond water, and groundwater and 1,4-dioxane in groundwater. Groundwater contaminant concentrations suggest that a source of VOC and 1,4-dioxane contamination other than the Building 106 Pond may exist in the area immediately south of Building 106, but such a source was not found in soils. Based on the extent of contamination observed in soils and groundwater, this contaminant source is smaller in magnitude than the Building 106 Pond contamination.

Several groundwater metals concentrations exceeded screening values (SVs) and upgradient concentrations, yet no link to SMWU 8 for the elevated metals concentrations was found. Slightly elevated concentrations of some metals were detected in the Building 106 Pond, but the elevated concentrations were not nearly as extreme as the chlorinated VOC concentrations. Metals in Tributary and Main Stream samples appear to reflect natural conditions, and metals do not appear to be significant site-related contaminants for SWMU 8 Tributaries and Main Stream. Surface water and sediment contamination are limited and well bounded. Location 15SW/SD006 had the overall greatest degree of surface water and sediment contamination. Surface water and sediment contamination is essentially limited to polycyclic aromatic hydrocarbons (PAHs) and metals near locations 15SW/SD006 and 15SW/SD015 through 15SW/SD017. Some surface water and sediment locations were not sampled due to lack of water at the time of sampling or because it was not part of the sampling design. Nevertheless, the available data indicate the surface water and sediment in drainage channels is relatively contaminant free and the surface water and sediment in the Building 106 Pond are by far the most contaminated media at SWMU 8.

The greatest number of surface water SV exceedances for metals occurred in the seep sample (location 08SP002) located southwest of the Building 106 Pond. At the seep, groundwater is expressed as surface water. Except for this sample, metals concentrations were comparable throughout the tributary system for the locations that had enough water to be sampled. Counts of coliform units (CFUs) for total coliform bacteria exceeded 2,400 units per 100 milliliter (mL) in surface water. Fecal coliform counts exceeded 5 CFUs per 100 mL in groundwater. This was evidence of a sewer line break that was identified and repaired at about the same time as the RFI. Thus, the source of the fecal coliform has been eliminated.

A comparison of metals concentrations from filtered and unfiltered surface water samples reveals that the majority of the following metals results are associated with the solid portion of the surface water: aluminum, arsenic, chromium, cobalt, copper, iron, lead, tin, vanadium, and zinc. A similar comparison for groundwater reveals that the majority of the following metals results are associated with the solid portion of groundwater: aluminum, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, mercury, tin, vanadium, and zinc.

CONCEPTUAL SITE MODEL

For SWMU 8, the building floor drains, the drain lines leading away from the buildings, the pond, the treatment plant sump and subsurface piping, and the paint lockers are all potential sources of site-related contaminants. Surface and subsurface soils are contaminated to a slight extent. It is not clear whether there are any vadose zone soils near the buildings, the drain lines, or the pond that could constitute a

significant potential source for chemicals of potential concern (COPCs) to leach out and continue to enter the surface water or groundwater systems.

Contaminants originate primarily in pond water and pond sediments and have been migrating downward and entering the shallow groundwater flow system, probably since the beginning of SWMU 8 operations in the 1940s. In the past, contaminants have also entered the shallow groundwater system (Puz) from the building floor drains, subsurface drain lines, paint lockers, or other locations where solvents may have been used or spilled. Based on the distribution and types of contaminants found in the pond and groundwater, there is a strong likelihood that there have been releases of contaminants to the subsurface from areas other than the pond.

The Upper-Pennsylvanian groundwater-bearing zone (Puz) groundwater and associated contaminants are migrating laterally to the east, southeast, and south. Much of the groundwater in this zone eventually reaches the edge of the hillside and is taken up by vegetation, discharges to the surface as seeps or springs, or continues downslope as seepage through the thin veneer of soil that blankets the hillside.

Some groundwater in the Puz is seeping vertically downward into the Middle Pennsylvanian water bearing zone (Pmz) and is moving southeastward and southward. The Pmz groundwater intercepts the land surface along the middle portions of the ridge. The groundwater in the Pmz that reaches the outcrop area will react similarly to the groundwater discharging from the Puz; it will either be taken up by vegetation, discharge as a seep to the land surface (e.g., seep 08SP002), or migrate downhill on the top of bedrock.

A very small portion of the groundwater in the Pmz migrates downward through a shale and siltstone aquitard and enters the deeper groundwater flow system in the Lower Pennsylvanian water bearing zone (Plz). This deeper groundwater is flowing primarily toward the main stream south of SWMU 8. However, the primary and secondary permeability of this water-bearing zone is less than the Puz and Pmz, and the groundwater flow velocities are consequently slower in the deeper groundwater system.

During storms and high flow events, most of the surface water flowing down the hillside probably enters the main unnamed stream as overland flow in the drainageways. As the surface water reaches the valley bottom, it slows down and some of the surface water will infiltrate into the soils and alluvial deposits and continue to flow toward the creek as subsurface flow. Contaminants moving down Tributary 8-03 and entering the shallow groundwater system may account for the low concentrations of contaminants detected in well 08MWT011 near the base of the ridge.

Ultimately the creek, when flowing, will have water from several different sources: surface water from upvalley (i.e., upstream of sampling location 08SW/SD010), surface water discharge from the gullies, and groundwater emanating from the sides of the ridge. This section of main stream is dry for a good portion of the year, but groundwater may still be traveling down the valley as underflow in the valley bottom deposits even when the creek bed is dry.

The main stream (unnamed tributary of Boggs Creek) flowing past the southern side of SWMU 8 receives all surface water and groundwater discharges from the SWMU, and therefore is the ultimate receptor of contaminants emanating from the site. No site-related contaminants have been detected in the main stream surface water. Very low concentrations [≤3 micrograms per kilogram (µg/kg)] of TCE and 1,1,1-TCA were detected in sediment samples collected from sites 08SW/SD008 and 08SW/SD009. The data from the main stream indicate that virtually no contaminant mass is leaving the SWMU and moving downvalley.

HUMAN HEALTH RISK ASSESSMENT

The baseline human health risk assessment (HHRA) for the SWMU 8 was performed to characterize the potential risks to likely human receptors under current and potential future land use. Potential receptors under current land use are maintenance workers, occupational workers, and adolescent trespassers (Table ES-1). Potential receptors under future land use are construction workers, child and adult recreational users, and hypothetical child and adult residents. Although future land use is likely to be the same as current land use, the potential future receptors were evaluated in the baseline HHRA primarily for decision-making purposes.

Risk Assessment Results - Exposure to Soil

Quantitative estimates of noncarcinogenic and carcinogenic risks (hazard indexes (HIs) and incremental lifetime cancer risks (ILCRs), respectively) were developed for potential human receptors. Target organ-specific HIs for the all receptors assumed to be exposed to surface soil and subsurface soil under the reasonable maximum exposure (RME) scenario are less than or equal to unity (1).

ILCRs for all receptors exposed to surface and subsurface soil were less than or within U.S. EPA's target risk range of 1×10^{-4} to 1×10^{-6}.

Risk Assessment Results - Exposure to Surface Water and Sediment

Target organ-specific HIs for all receptors assumed to be exposed to surface water and sediment under the RME scenario are less than or equal to unity.

ILCRs for all receptors exposed to surface water and sediment were less than or within U.S. EPA's target risk range of 1×10^{-4} to 1×10^{-6}.

Although the risks calculated for direct contact with surface water and sediment in the Building 106 Pond were acceptable, the contamination from the pond, especially VOCs, has likely impacted other site media. For example, the sediment in the pond is the likely source of the COPCs that were identified for groundwater. This is one reason why remediation of the pond is warranted.

Risk Assessment Results - Exposure to Groundwater

HIs for the potable use of the shallow and intermediate zone groundwater by occupational workers, child recreational users, hypothetical child residents and hypothetical adult residents exceeded unity. Manganese, 1,1-DCE, TCE, aluminum, arsenic, iron, and nickel were the major contributors to the HI. High turbidity readings were reported for the sample on which risks to shallow groundwater were based; the elevated concentrations of aluminum, arsenic, iron, and vanadium in the sample are likely due to the presence of suspended matter in the sample. The concentrations of arsenic in most shallow groundwater samples and the average arsenic concentration in the shallow overburden/bedrock were less than the maximum contaminant level (MCL).

ILCRs for domestic use of shallow and intermediate zone groundwater by occupational workers and hypothetical future residents exceeded U.S. EPA's target risk range. TCE was the major contributor to the ILCRs for intermediate zone groundwater (ILCR greater than 1×10^{-4}); several other VOCs, 1,4-dioxane, and arsenic (ILCRs less than 1×10^{-4} but greater than 1×10^{-6}) were minor contributors to the ILCRs. Arsenic was the major contributor to the ILCRs for shallow groundwater (ILCR greater than 1×10^{-4}); vinyl chloride (ILCR greater than 1×10^{-5}), TCE, and 1,4-dioxane (ILCRs between 1×10^{-5} and 1×10^{-6}) were minor contributors to the ILCRs.

HIs for the potable use of deep zone groundwater by hypothetical future child residents exceeded unity. Iron and manganese were the major contributors to the HI for the child resident. ILCRs for domestic use of deep zone groundwater for all potential receptors evaluated were within U.S. EPA's target risk range.

In summary, no significant potential human health risks are expected for exposures to surface soil, surface water, and sediment under current or future land use at SWMU 8. Noncarcinogenic and/or carcinogenic risks exceeded U.S. EPA risk benchmarks for occupational workers, child and adult recreational users, and hypothetical child and adult residents using groundwater as a potable water supply. VOCs, 1,4-dioxane, and several metals were the major contributors to the risks for shallow and intermediate zone groundwater. Iron and manganese were the major contributors to the risks for deep zone groundwater. As discussed in the risk assessment, the risk estimates were subject to a number of significant uncertainties. Among these is the fact that groundwater is not currently used at SWMU 8 nor is it expected to be used in the future. In addition, it is expected that the Building 106 Pond, which is considered to be the primary source of soil, surface water, sediment, and groundwater contamination at SWMU 8, will be remediated in the near future.

ECOLOGICAL RISK

A screening ecological risk assessment (SERA) was performed for SWMU 8, Building 106 Pond Area. Several chemicals were retained as COPCs as a result of the initial screening of surface soil, sediment, and surface water sample results. In summary, the list of chemicals initially selected as COPCs were further evaluated in Step 3a, the first step of the baseline ecological risk assessment (BERA). After a review of alternate toxicity information (based on soil invertebrates, plants, and aquatic receptors) for the initial COPCs was completed, maximum and average concentrations were compared to the alternate toxicity information. For the soil and gravel surface soil samples, no chemicals were retained as COPCs because all concentrations were less than alternate benchmarks or soil background values. For the pond surface soil samples, several concentrations were greater than the screening levels, but because the pond will be excavated, these analytes were not retained as COPCs.

Similarly, the list of chemicals initially selected as COPCs in sediment and surface water were further evaluated in Step 3a, the first step of the BERA. After a review of alternate toxicity information (based on aquatic organisms) and other Step 3a factors, maximum and average concentrations of COPCs were compared to the alternate toxicity information. No chemicals were retained as COPCs for further evaluation for benthic and aquatic organisms, largely because concentrations were less than alternate screening levels and upgradient concentrations, because concentrations in surface soil were not site-related, and because analytes were less than screening levels in filtered samples.

The chemicals selected as COPCs for risks to wildlife were also further evaluated in Step 3a. No chemicals were retained as COPCs for further evaluation for several reasons. For the woodcock, the zinc no observable adverse effects level (NOAEL) ecological effects quotient (EEQ) was greater than 1.0 for

site soil concentrations and for background zinc concentrations. Also, the location of the maximum zinc concentration has poor habitat for insectivorous birds. For the mink, a site use factor (SUF) of 10 percent was used, which in itself is likely conservative. Also, the body weight scaling used for large mammals is conservative. Because the NOAEL EEQs are only slightly greater than 1.0 for the Tributary and Main Stream, risks are acceptable.

SUMMARY OF RECOMMENDATIONS FOR FURTHER ACTIONS

B-106 Pond Waters and Sediments: Proceed to corrective measures study (CMS) or conduct interim remedial action to remove pond sediments, which are serving as a source of groundwater contamination.

Metal-Contaminated Groundwater: Proceed to CMS.

Organic-Contaminated Groundwater: Proceed to CMS

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Current/Future Maintenance Worker	Surface Soil near Building 106 Pond	5E-07	0.02	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	8E-07	0.02	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	4E-07	0.01	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	1E-05	0.02	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	1E-06	0.04	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	1E-06	0.04	N/A	N/A	N/A	NFA
Current/Future Occupational Worker	Surface Soil near Building 106 Pond	5E-06	0.2	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	9E-06	0.2	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	4E-06	0.1	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Groundwater - Shallow	1E-04	4	N/A	N/A	N/A	NFA
	Groundwater - Intermediate					Groundwater Ingestion TCE and manganese Inhalation TCE	Proceed to CMS
	Groundwater - Deep	3E-05	1	N/A	N/A	N/A	NFA

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Current/Future Trespasser (Adolescent)	Surface Soil near Building 106 Pond	4E-07	0.03	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	6E-07	0.04	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	3E-07	0.02	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	2E-05	0.3	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	2E-06	0.4	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	9E-07	0.07	N/A	N/A	N/A	NFA
Future Construction Worker (Adult)	Surface/Subsurface Soil near Building 106 Pond	3E-07	0.3	N/A	N/A	N/A	NFA
	Surface/subsurface Soil - Grass and Gravel Areas	5E-07	0.4	N/A	N/A	N/A	NFA
	Surface/subsurface Soil - Building 106	3E-07	0.3	N/A	N/A	N/A	NFA
	Surface/subsurface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Groundwater - Shallow	3.E-08	0.2	N/A	N/A	N/A	
	Groundwater - Intermediate	N/A	N/A	N/A	N/A	N/A	NFA
	Groundwater - Deep	N/A	N/A	N/A	N/A	N/A	NFA

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Future Recreational User (Child)	Surface Soil near Building 106 Pond	1E-06	0.2	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	2E-06	0.2	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	1E-06	0.1	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	5E-05	2	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	5E-06	2.4	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	3E-06	0.4	N/A	N/A	N/A	NFA
	Groundwater - Shallow	3E-05	4	N/A	N/A	N/A	NFA
	Groundwater - Intermediate	5E-05	6	N/A	N/A	Groundwater Ingestion Manganese	Proceed to CMS
	Groundwater - Deep	6E-06	0.9	N/A	N/A	N/A	NFA
Future Recreational User (Adult)	Surface Soil near Building 106 Pond	6E-07	0.02	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	1E-06	0.02	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	6E-07	0.01	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	2E-05	0.7	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	2E-06	0.7	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	1E-06	0.06	N/A	N/A	N/A	NFA
	Groundwater - Shallow	3E-05	0.9	N/A	N/A	N/A	NFA
	Groundwater - Intermediate	5E-05	1	N/A	N/A	N/A	NFA
	Groundwater - Deep	5E-06	0.2	N/A	N/A	N/A	NFA

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Future Recreational User (Lifelong)	Surface Soil near Building 106 Pond	2E-06	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	3E-06	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	2E-06	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	7E-05	N/A	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	7E-06	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	4E-06	N/A	N/A	N/A	N/A	NFA
	Groundwater - Shallow	6E-05	N/A	N/A	N/A	N/A	NFA
	Groundwater - Intermediate	1E-04	N/A	N/A	N/A	N/A	NFA
	Groundwater - Deep	1E-05	N/A	N/A	N/A	N/A	NFA

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Future Resident (Child)	Surface Soil near Building 106 Pond	2E-05	2.3	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	2E-05	2.7	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	1E-05	1.6	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	5E-05	2.2	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	5E-06	2.4	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	3E-06	0.4	N/A	N/A	N/A	NFA
	Groundwater - Shallow	3E-04	43	No unacceptable exposure to lead	N/A	Groundwater Ingestion Aluminum, arsenic, iron, manganese, vanadium, and vinyl chloride There is a great amount of uncertainty in the risks for metals.	Proceed to CMS
	Groundwater - Intermediate	6E-04	60	N/A	N/A	Groundwater Ingestion Iron, manganese, nickel, TCE vinyl chloride, and 1,1-DCE Inhalation TCE, vinyl chloride, and 1,1-DCE There is a great amount of uncertainty in the risks for metals.	Proceed to CMS
	Groundwater - Deep	6E-05	10	N/A	N/A	N/A	NFA

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Future Resident (Adult)	Surface Soil near Building 106 Pond	7E-06	0.2	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	1E-05	0.3	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	5E-06	0.2	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	2E-05	0.7	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	2E-06	0.7	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	1E-06	0.05	N/A	N/A	N/A	NFA
	Groundwater - Shallow	4E-04	12	No unacceptable exposure to lead	N/A	Groundwater Ingestion Aluminum, arsenic, iron, and manganese. There is a great amount of uncertainty in the risks for metals.	Proceed to CMS
	Groundwater - Intermediate	7E-04	18	N/A	N/A	Groundwater Ingestion Manganese, TCE, and vinyl chloride Inhalation TCE and vinyl chloride There is a great amount of uncertainty in the risks for metals.	Proceed to CMS
	Groundwater - Deep	7E-05	3	N/A	N/A	N/A	NFA

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Future Resident (Lifelong)	Surface Soil near Building 106 Pond	2E-05	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	3E-05	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Building 106	2E-05	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Building 106 Pond	7E-05	N/A	N/A	N/A	Although risks for direct contact with surface water and sediment in the Pond were acceptable, the Pond is considered to be the source of groundwater and surface water VOC contamination at SWMU 8.	Proceed to CMS
	Surface Water/Sediment - Tributaries	7E-06	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Mainstream	4E-06	N/A	N/A	N/A	N/A	NFA
	Groundwater - Shallow	7E-04	N/A	N/A	N/A	Groundwater Ingestion Arsenic and vinyl chloride. There is a great amount of uncertainty in the risks for arsenic.	Proceed to CMS
	Groundwater - Intermediate	1E-03	N/A	N/A	N/A	Groundwater Ingestion TCE, and vinyl chloride Inhalation TCE and vinyl chloride There is a great amount of uncertainty in the risks for metals.	Proceed to CMS
	Groundwater - Deep	1E-04	N/A	N/A	N/A	N/A	NFA

TABLE ES-1

SUMMARY OF RECEPTOR-SPECIFIC HUMAN RISKS, AND HAZARDS AND ECOLOGICAL RISKS, AND RECOMMENDATIONS
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Receptor Population	Environmental Media	Overall Carcinogenic Risk (Human Health)	Overall Hazard Index (Human Health)	Lead Exposure (Human Health)	Overall Risk (Ecological)	Critical Pathways & Chemicals of Concern	Recommendations
Terrestrial Plants and Invertebrates	Surface Soil near Building 106 Pond	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Grass and Gravel Areas	N/A	N/A	N/A	Acceptable	N/A	NFA
	Surface Soil - Building 106	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Soil - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
Mammals and Birds	Insectivorous/Herbivorous Wildlife - Grass and Gravel Areas	N/A	N/A	N/A	Acceptable	N/A	NFA
	Insectivorous/Herbivorous Wildlife - Building 106 Pond	N/A	N/A	N/A	N/A	N/A	NFA
	Insectivorous/Herbivorous Wildlife - Building 106	N/A	N/A	N/A	N/A	N/A	NFA
	Insectivorous/Herbivorous Wildlife - Building 107	N/A	N/A	N/A	N/A	N/A	NFA
	Piscivorous Wildlife - Tributaries	N/A	N/A	N/A	Acceptable	N/A	NFA
	Piscivorous Wildlife - Mainstream	N/A	N/A	N/A	Acceptable	N/A	NFA
Aquatic Organisms	Surface Water/Sediment - Building 106 Pond	N/A	N/A	N/A	N/A	N/A	NFA
	Surface Water/Sediment - Tributaries	N/A	N/A	N/A	Acceptable	N/A	NFA
	Surface Water/Sediment - Mainstream	N/A	N/A	N/A	Acceptable	N/A	NFA

N/A = Not Applicable
NFA - No Further Action

1.0 INTRODUCTION

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report for the Load and Fill Area Building 106 Pond was prepared for the Naval Surface Warfare Center (NSWC) Crane facility, located in Crane, Indiana, through the Naval Facilities Engineering Command, Engineering Field Division South (NAVFAC EFD SOUTH) under Contract Task Order (CTO) 0331 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) III Contract Number N62467-94-D-0888. The Load and Fill Area Building 106 Pond is also known as Solid Waste Management Unit (SWMU) 8. The RFI investigation at SWMU 8 was conducted as part of a RFI Phase III investigation in accordance with applicable RCRA Corrective Action requirements and the Quality Assurance Project Plan (QAPP) for RCRA Facility Investigation at Building 106 Pond (SWMU 8), Roads and Grounds Area (SWMU 15) and Environmental Indicator Investigation for SWMU 18 (Load and Fill Area Buildings), SWMU 19 (Pyrotechnic Test Area), SWMU 20 (Crane Army Ammunition Activity Quality Assurance/Quality Control Test Area), and the Old Gun Tub Storage Lot [Tetra Tech NUS, Inc. (TtNUS), 2004].

In the mid-1970s, Building 106 was used for the phosphatizing of steel. The phosphatizing process involved the application of a zinc phosphate coating to projectiles. Building 106 was also used for a cleaning process that consisted of a caustic wash, a degreaser, and an acid wash. Prior to 1972, untreated wastewater from the cleaning process in Building 106 was pumped into the Building 106 Pond, which was unlined. Malfunctions of the wastewater pumping system reportedly caused the pond to overflow into a neutralizing system and then flow into the sanitary sewage system. In 1981, cooling water from the degreasers, which contained high concentrations of heavy metals, was discharged to a storm drain. SWMU 8 also includes Building 107, which was originally used to refinish wooden and metal boxes. The metal boxes were cleaned with trichloroethylene (TCE). Wooden boxes were treated with pentachlorophenol (PCP). Metal and wooden boxes were painted in paint booths within Building 107. Overflow and floor drainage from Buildings 106 and 107 flowed into the Building 106 Pond. In addition, spills or leaching from drums potentially containing metals, organic solvents and fuels, pesticides, herbicides, and polychlorinated biphenyls (PCBs) to surface soil are suspected in the area of a former drum storage area south of Building 106.

1.1 PURPOSE

The purpose of this RFI Report is to describe the site investigation activities conducted at SWMU 8 and to present the results and interpretation thereof for the Building 106 Pond. This report provides information regarding concentrations of organic and inorganic chemicals measured in surface soils, subsurface soils,

sediment, surface water, and groundwater at SWMU 8. In addition, human health and ecological risks associated with SWMU 8 were evaluated by way of a baseline human health risk assessment (HHRA) and a screening-level ecological risk assessment (SERA). The risk assessments were performed using the data collected during all investigations conducted in 2004, 2005, and 2006.

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

NSWC Crane is located in a rural, sparsely populated region of south-central Indiana, approximately 75 miles southwest of Indianapolis, 60 miles northwest of Louisville, Kentucky, and immediately east of Burns City and Crane Village, Indiana. A location map of the NSWC Crane facility is provided as Figure 1-1. NSWC Crane encompasses approximately 62,463 acres or approximately 98 square miles of the northern portion of Martin County and smaller portions of Greene, Daviess, and Lawrence Counties.

The Building 106 Pond is located in the Load and Fill Area near the western boundary of NSWC Crane, approximately midway between the northern and southern boundaries of the facility. The SWMU is located within the Boggs and Turkey Creek Drainage Basin, which is one of five drainage basins that carry surface water off the installation and eventually drain into the East Fork of the White River and then to the Wabash River to the southwest (see Figure 1-2). Site features associated with SWMU 8 are included in Figure 1-3.

1.2.2 Site History

Buildings 106 and 107 have historically been involved with the overhaul of projectile casings. Building 106 housed a cleaning process consisting of caustic wash, a TCE degreaser, and a hydrochloric acid wash. During World War II, the ignition ends of smokeless powder bag charges were colored red in Building 106 using naphthalene sulfonic acid sodium salt family dyes. Reportedly the small usage rate of these dyes would preclude environmental impacts (Halliburton, 1992a).

Prior to 1972, splash out and overflows of wastewater from Buildings 106 and 107 were discharged into a small unlined pond that subsequently drained into ditches. Sometime after 1972, the pond was connected to a neutralizing system that discharged to the sanitary sewer [Naval Energy and Environmental Support Activity (NEESA), 1983]. The discharge solutions from the pond had an extremely high pH (11.0) and contained explosives, heavy metals, oil, and grease. The floor drains in Building 107 previously discharged to the pond (Reid et al., 1987). Floor drain discharges may have

contained TCE, PCP, paint residue, and heavy metals. Also, oily wastewater from leaking compressors in Building 107 entered the pond via several drainage pipes (A.T. Kearny, Inc., 1987).

In the mid-1970s, phosphatizing of steel was conducted in Building 106. The phosphatizing process involved applying a zinc phosphate coating to projectiles and also included a conditioning rinse step that used a dilute solution of either chromic acid or chromic and phosphoric acids.

Activities at Buildings 106 and 107 also included the application of coatings to Hawk missile containers in paint booths. One of the paint booths applied a zinc chromate coating containing 40 weight percent toluene, whereas another paint booth applied an olive drab coating containing 22 percent naphtha. Each of the paint booths utilized approximately 500 gallons of coating material per year. Prior to coating, the Hawk missile containers were silica sandblasted, which produced approximately 800 to 1,000 pounds of baghouse residue per day.

Building 107 included refinishing of wooden and metal boxes. For metal boxes, the cleaning portion of the process utilized approximately 712 gallons of TCE per year. Painting was done in paint booths equipped with water washes for particulate control. The amount of dust collected daily from the accumulator/baghouse was approximately 300 to 400 pounds. For wooden boxes, there was an additional treatment step consisting of dipping the wooden boxes in a 5-percent solution of PCP in a “dip tank” for 5 minutes followed by partial drying of the boxes in a “dip pan”. Approximately 8,800 gallons of PCP was used annually.

Currently, repair operations are intermittently performed in Buildings 106 and 107.

1.3 PREVIOUS INVESTIGATIONS

In 1972, approximately 47 samples were collected from effluent discharging from the Building 106 Pond. These samples were selectively analyzed for water quality parameters [total organic carbon (TOC), turbidity, dissolved oxygen (DO), etc.], metals, and explosives. Analytical results indicated high heavy metals concentrations, with values as high as 20 parts per million (ppm) for lead, 3.5 ppm for chromium, 1 part per billion (ppb) for mercury, 20 ppm for zinc, and 0.2 ppm for cadmium (Kent et al., 1973).

The Initial Assessment Study (IAS) (NEESA, 1983) recommended two soil samples from the Building 106 Pond be collected and analyzed for mercury, chromium, phosphorus, and TCE. In 1985, two samples were analyzed for heavy metals via the Extraction Procedure (EP) Toxicity test and for oil/grease content and TCE. Phosphorus was not a target analyte. Measured concentrations were less than Toxicity

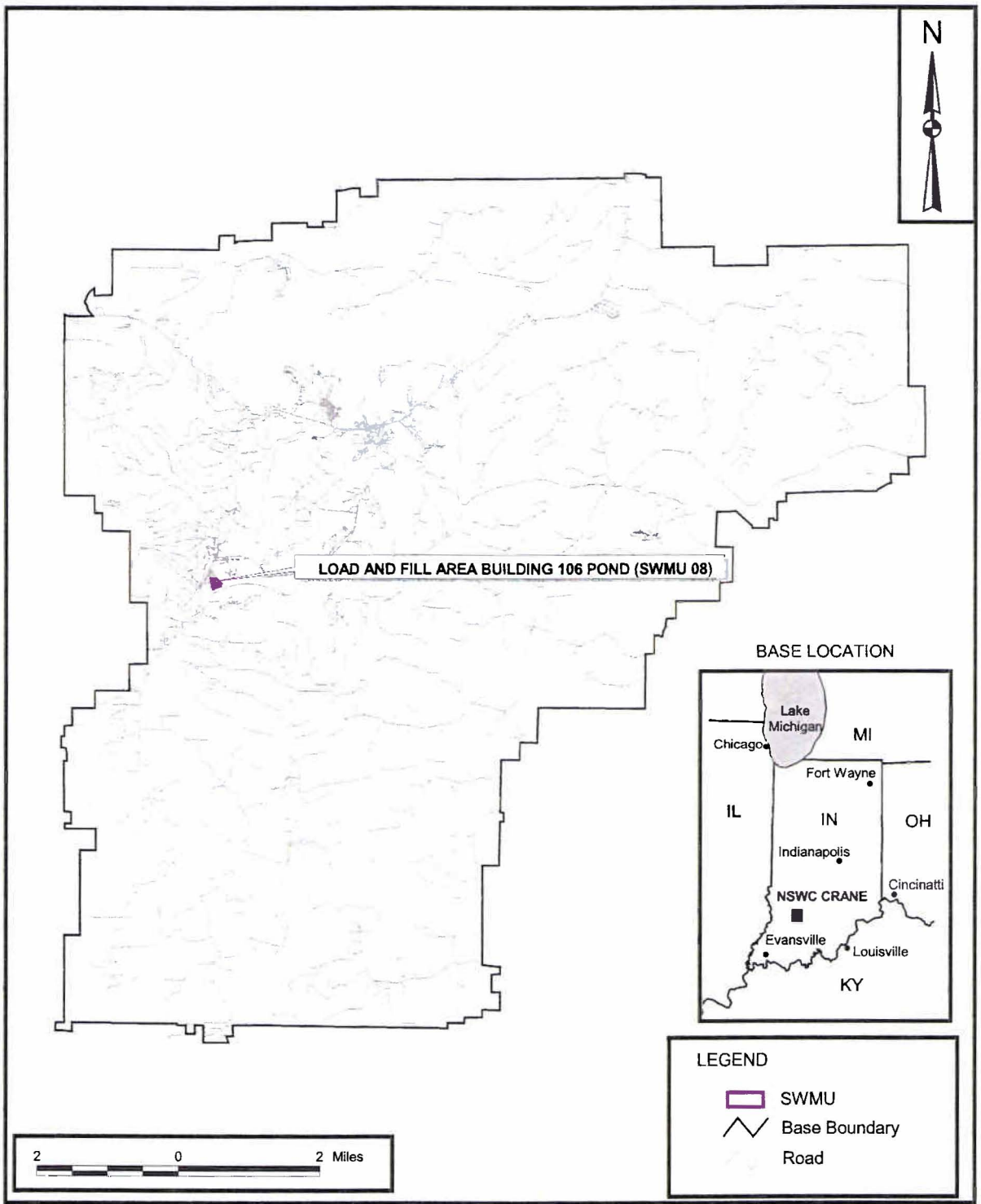
Characteristic Leaching Procedure (TCLP)/EP Toxicity Regulatory Action Levels. In 1987, a visual site inspection conducted by A.T. Kearny, Inc. noted that the edges of the pond were oil stained and the surface of the pond exhibited an oily sheen.

As part of the Phase I Environmental Monitoring Report (EMR) (Halliburton NUS, 1992a), background data and site observations were reviewed to determine the likelihood of a release posing a potential threat to human health and/or the environment. Available data and observations of current site conditions at SWMU 8 were reviewed to assess the potential for contaminant releases to groundwater, surface water, air, and soil. The data evaluation and site observations were made according to the approach described in RCRA Facility Assessments Guidance (U.S. EPA, 1986). Based on the operational history of Buildings 106 and 107 and the waste characteristics of materials used in the buildings, potential releases to groundwater, soil and air were deemed likely. Based on analytical records and reports, releases to surface water have occurred.

1.4 REPORT ORGANIZATION

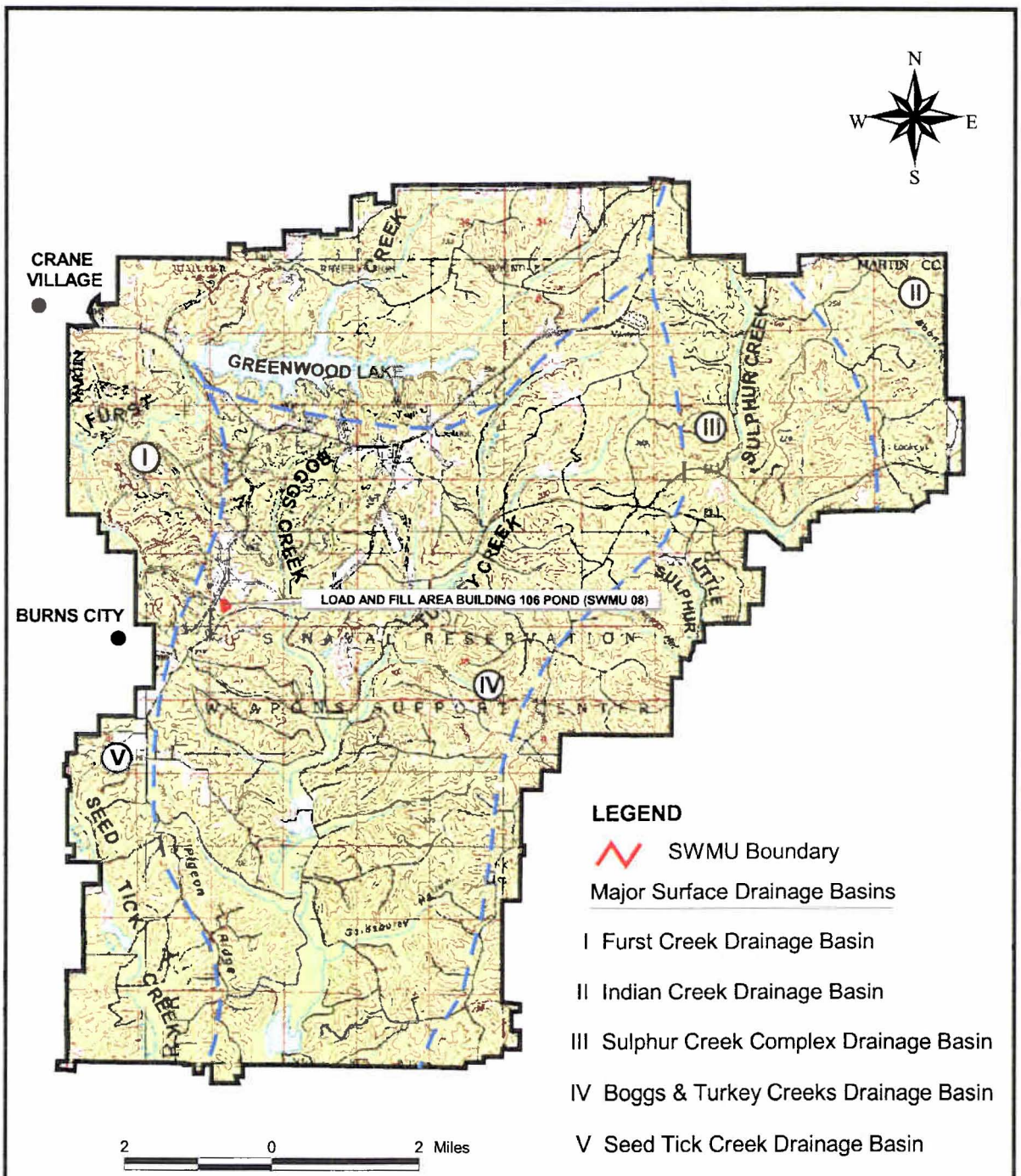
Section 1.0 of this report is the introduction, including the purpose, site background, site description, site history, previous investigations, and report organization. Section 2.0 describes the study area field sampling activities and procedures associated with the data collection. Section 3.0 discusses data presentation and data quality review. Section 4.0 describes the physical characteristics of SWMU 8. Section 5.0 presents an evaluation of the nature and extent of contamination detected at SWMU 8 in this field investigation. Section 6.0 presents a discussion of the fate and transport of the contaminants and the conceptual site model. Section 7.0 identifies the chemicals of concern (COCs) and presents the results of the HHRA. Section 8.0 presents the results of the SERA. Supporting documentation for this report is attached as Appendices A through J. The information included in each appendix is as follows:

- Appendix A – Photographs and Photograph Direction Figure
- Appendix B - Boring Logs, Well Construction Diagrams, and Related Materials
- Appendix C - Sample Log Sheets and Other Field Forms
- Appendix D - Miscellaneous Field Documentation (log books and land survey data)
- Appendix E – Aquifer Characteristics, Calculations, and Records
- Appendix F - Health and Safety Documentation
- Appendix G - Analytical Data
- Appendix H - Data Quality Review
- Appendix I – Supporting Documentation for the Human Health Risk Assessment
- Appendix J - Supporting Documentation for the Ecological Risk Assessment



DRAWN BY	DATE			CONTRACT NUMBER
S. STROZ	03/29/06		SITE LOCATION MAP SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CTO 0331
CHECKED BY	DATE			APPROVED BY / DATE
G. ZIMMERMAN	03/27/06			APPROVED BY / DATE
COST/SCHEDULE-AREA				DRAWING NO. / REV
SCALE		NAVFAC		FIGURE 1-1 / 0
AS NOTED				

P:\GIS\CRANE_NWSC\CRANE_REPORTFIGURES.APR UPDATED SWMU08 SITE LOCATION 03/30/05 SS

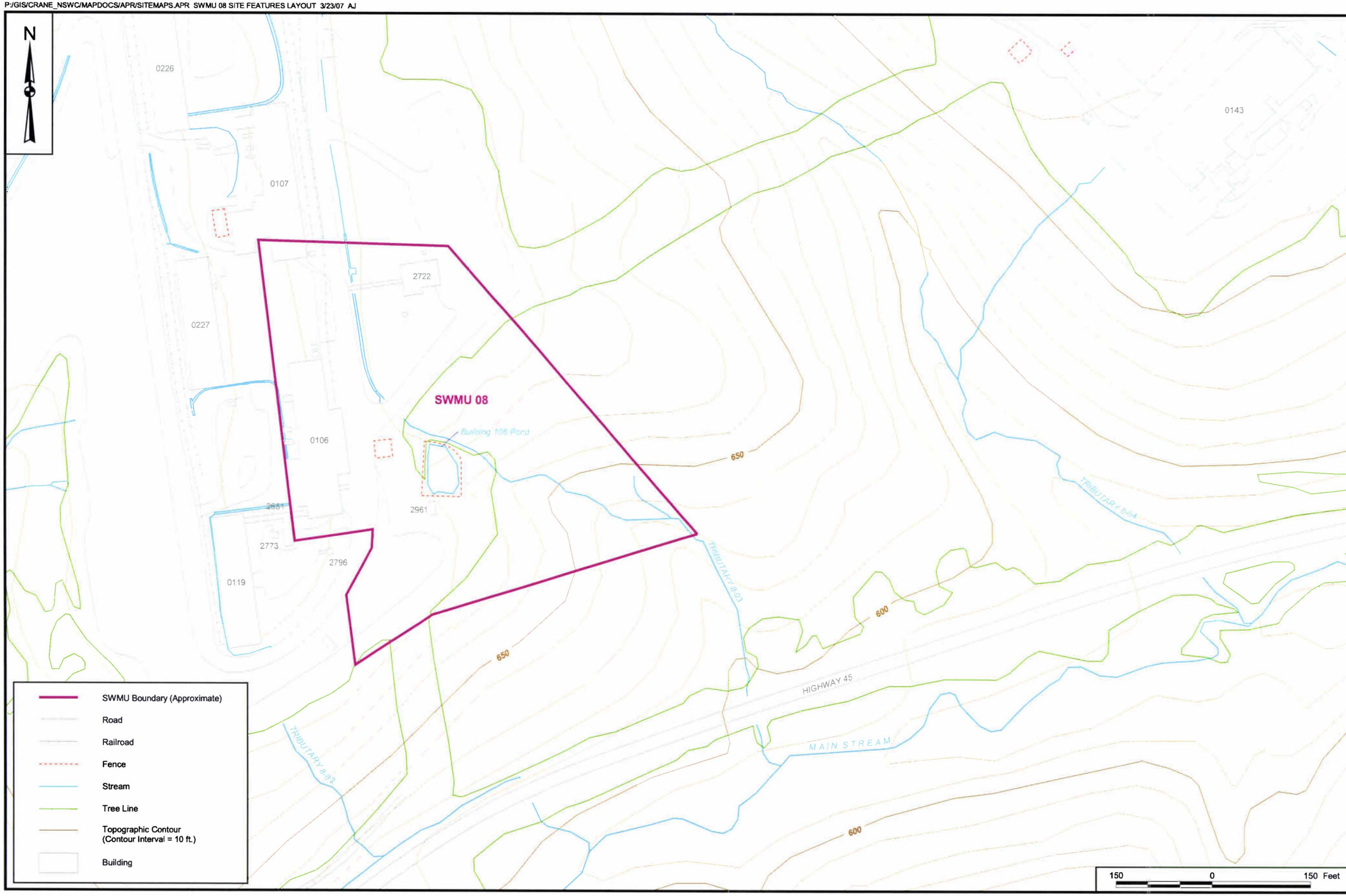


SOURCE: "Initial Assessment of Study of Naval Weapons Support Center Crane, Indiana." Naval Energy and Environmental Support Activity, May 1983.

DRAWN BY S. STROZ	DATE 3/29/06	LOCATION AND DRAINAGE BASINS SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY G. ZIMMERMAN	DATE 3/27/06		APPROVED BY — DATE —
COST/SCHEDULE AREA			APPROVED BY — DATE —
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 1- 2 REV 0

P:\GIS\CRANE_NWSC\CRANE_REPORTFIGURES.APR UPDATED SWMU 08 DRAINAGEBASIN 03/31/06 SS

P:/GIS/CRANE_NSWC/MAPDOCS/APR/SITEMAPS.APR SWMU 08 SITE FEATURES LAYOUT 3/23/07 AJ



CONTRACT NO.
CTO 0331

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO. FIGURE 1 - 3 REV 0

SITE FEATURES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY K. PEILA DATE 10/19/05

CHECKED BY J. GOERDT DATE 3/23/07

COST/SCHED-AREA

SCALE AS NOTED

2.0 FIELD INVESTIGATION

This section presents sampling activities, procedures, and documentation utilized during field operations performed for NSWC Crane SWMU 8.

2.1 OVERVIEW

RFI field activities for SWMU 8 were conducted over several separate field investigation events. These investigations include the following:

- Round 1: Groundwater, surface water, sediment, and soil sampling: December 2004/January 2005.
- Round 2: Groundwater, surface water, seep, and sediment sampling: May/June 2005.
- Round 3: Groundwater, surface water, seep, and soil sampling: September/October 2005.
- Round 4: Groundwater and soil sampling: October 2006.

All work performed for Round 1, Round 2, and Round 3 was conducted in accordance with the procedures and methodologies described in the U.S. EPA-approved QAPP (TtNUS, 2004). Work performed for Round 4 was conducted in accordance with a revised sampling plan submitted to the Indiana Department of Environmental Management (IDEM) on August 29, 2006 and approved electronically by IDEM on September 13, 2006. Standard operating procedures (SOPs) that governed the field work are included in Appendix E of the approved QAPP (TtNUS, 2004). Select photographs of SWMU 8, copies of all field forms, records, field logbooks, and health and safety documentation associated with the field investigation are provided in Appendices A through D of this document.

Work performed for the PCB delineation investigations were done in accordance with correspondence sent to the U.S. EPA regarding additional sampling at SWMU 13 to adequately delineate PCB contamination for an accurate estimation of the quantity of soils for possible removal.

2.2 MOBILIZATION/DEMOBILIZATION

Following approval of the respective QAPP, TtNUS began mobilization activities. All field team members reviewed the approved QAPP, associated appendices, and the Health and Safety Plans (HASPs) prior to the start of project activities. In addition, the Field Operations Leader (FOL) held field team orientation meetings prior to each round to ensure that personnel were familiar with the scope of the field activities. Health and safety documentation is contained in Appendix F.

Prior to the initiation of fieldwork for each round, the FOL arrived at the site and began on-site mobilization activities. These activities included coordination with base personnel and utility clearance of all proposed boring locations through the NSWC Crane Public Works Office. The equipment required for the field activities was shipped to the site. At the conclusion of each round of field activities, the FOL directed the decontamination and demobilization of all equipment.

2.3 SUBSURFACE INVESTIGATION METHODOLOGIES AND PROCEDURES

2.3.1 Drilling

All borings were installed in accordance with SOP CTO331-04 and logged in accordance with SOP CTO331-07. Boring logs can be found in Appendix B.1. Groundwater monitoring well installation dates, depths, and drilling methods used, and depth intervals for soil sampling can be found in Table 2-1. Figure 2-1 shows the locations of all soil borings completed as part of the RFI at SWMU 8.

Round 1

Fourteen borings for soil sampling and four borings for temporary groundwater monitoring wells were drilled using direct-push technology (DPT). DPT soil borings were advanced to total depths of 18 feet, to the water table, or to refusal.

Round 2

A hand auger was used to advance three soil borings in which temporary groundwater monitoring wells were placed. Eleven permanent groundwater monitoring wells were installed during Round 2 utilizing the Rotosonic drilling method.

Round 3

Thirty-one borings for soil sampling were completed by either DPT or hand augering. Three additional permanent groundwater monitoring wells were drilled by hollow stem auger (HSA) and air rotary (AR).

Round 4

Seventeen borings for soil sampling were completed by either DPT. Ten of these borings were converted to temporary wells.

2.3.1.1 Direct-Push Technology

DPT involves pushing small-diameter sampling tools hydraulically and/or mechanically downward into the ground to the desired depth. Soil samples were collected from DPT borings for chemical analyses and for lithologic logging. All samples obtained from the boreholes were screened with a photoionization detector (PID) immediately upon opening. All PID readings were recorded on the boring logs (Appendix B.1). Soil sample collection information is provided in Section 2.5.1.

2.3.1.2 Rotosonic Drilling

For Rotosonic drilling, the drill bit was attached to the base of the 4-inch inside diameter (ID), 4.5-inch outside diameter (OD), 10-foot-long core barrel. The core barrel was connected to a drill pipe of the same ID. When the core barrel reached the desired depth, a larger 6-inch OD drill pipe was centered on the core barrel and advanced to the same depth to act as a temporary outer casing. Core runs were limited to 5 feet to maximize sample recovery. The inner core barrel and drill pipe were retrieved, and the core was extruded from the inner core barrel using vibration and/or hydraulic pressure. Each sampled interval was extruded into a clear plastic sleeve. This technique facilitated lithologic classification, environmental sample collection, and vapor monitoring using a PID. All PID readings were recorded on the boring logs. This process was repeated to the termination point of each well boring. The drill cuttings not retained for analytical or classification purposes were disposed in accordance with the approved QAPP (TtNUS, 2004). See Section 2.14 for more information regarding the handling of investigation-derived waste (IDW). The final hole diameter produced by Rotosonic drilling was approximately 6 inches. As a result, these boreholes were sufficiently large in diameter after coring to install a monitoring well without additional reaming.

In Rotosonic borings where continuous coring was not required, a 4-inch ID displacement bit was attached to the base of the core barrel. This technique used both vibration and water to drill through the overburden and bedrock.

Controlled amounts of water were added where necessary to remove cuttings from the borehole. Any excess water generated during this process was collected in a container and transported to and disposed at an NSWC Crane-approved sanitary sewer. Boring depths are listed in Table 2-1.

2.3.2 Borehole and Sample Logging

A TtNUS geologist maintained a log for each boring in accordance with SOP CTO331-07 (Borehole and Soil Sample Logging). The boring logs for each round can be found in Appendix B.1 and contain the following information as appropriate:

- Well identification (where applicable)
- Boring identification
- Name of geologist logging the boring
- Name of drilling contractor
- Sample number and type
- Sample depth
- Sample recovery and sample interval
- Soil density or cohesiveness
- Soil color
- Unified Soil Classification System (USCS) material descriptions
- Rock type and description, recovery, and rock quality designation (RQD)
- Location of boring
- Drilling and/or well construction problems or deviations from the project-specific approved QAPP
- Date(s) of drilling
- Screening instrument readings

In addition, depths of changes in lithology, sample moisture observations, depth to water, drilling methods, and total depth of each borehole were included on each log, as well as any other pertinent observations.

2.3.3 Borehole Abandonment

All soil borings at SWMU 8 were backfilled with bentonite chips that were hydrated in accordance with the manufacturer's specifications. The ground surface at each boring location was restored to its original condition.

2.4 MONITORING WELL INSTALLATION AND DEVELOPMENT

2.4.1 Well Installation

Temporary monitoring wells were installed during Round 1, Round 2, and Round 4 field operations at SWMU 8. After borings were drilled by DPT or hand augering to the desired depth and groundwater was encountered, a 1-inch-diameter, polyvinyl chloride (PVC), Schedule 40 well screen and riser pipe was lowered into the boring. Well screens ranged in length from 5 to 10 feet, depending on well depth, with a slot size of 0.20 inch. A cap or duct tape was placed on the top of each riser pipe. After sampling was complete, each temporary well was pulled from the boring and the hole was backfilled with bentonite chips that were subsequently hydrated.

A well construction log was completed for each temporary and permanent well and are presented in Appendix B.1.

During Round 1, four temporary wells were installed in soil borings where water was encountered. During Round 2, three more temporary wells were installed at SWMU 8 in the vicinity of the pond. During Round 4, temporary wells were installed at 10 soil borings where water was encountered (See Figure 2-1).

Permanent monitoring wells were not installed at SWMU 8 during Round 1 field activities; however, 11 wells (08MWT01 through 08MWT11) were installed during Round 2, and three wells (08MWT12 through 14) were installed during Round 3.

2.5 SAMPLING OPERATIONS

This section discusses the methodology for soil, surface water/seep, sediment, and groundwater sampling activities at SWMU 8. Prior to the initiation of sampling activities, a synoptic round of water level measurements were collected at all permanent groundwater monitoring wells and staff gauge locations (see Table 2-2). Table 2-3 provides a summary of all proposed versus actual samples collected and a list of the analyses performed.

2.5.1 Soil Sample Collection

Round 1

During Round 1 RFI activities, 34 soil samples were collected from 14 soil borings in accordance with SOP CTO331-08. See Figure 2-1 for soil boring locations. Soil sample log sheets are included in Appendix C.1 of this document.

Section 3.4.1.1 of the approved QAPP (TtNUS, 2004) indicated that four soil borings at the Building 106 Pond would be drilled at an angle directed from ground surface near the edge of the pond towards the center of the pond. Due to the topography of the pond sides and the limitations of the drill rig, soil boring 08SB007 was slightly angled toward the pond (see photo A-1g in Appendix A), and the other three locations were drilled vertically approximately 10 to 15 feet away from the pond.

Round 2

No soil samples were collected from the three soil borings drilled during Round 2.

Round 3

Fifty-seven soil samples were collected from 31 soil borings during Round 3. Five of these borings were located inside Building 107 and eight were located inside Building 106.

Round 4

Seventeen soil samples were collected from the 17 soil borings during Round 4. The samples were collected at the depth of highest PID reading or 2 feet above bedrock.

2.5.1.1 Surface Soil Sampling

Surface soil samples were collected from the ground surface to a maximum depth of 2 feet below ground surface (bgs) or until refusal was reached using DPT. Upon retrieval, all samples were monitored for the presence of VOCs using a PID. The results of this screening were recorded on boring logs and/or soil sample log sheets (included in Appendix B.1 and Appendix C.1, respectively, of this document). Samples for VOC analyses were collected first from the 0.5- to 1.0- or 2.0-foot bgs interval that had the highest PID reading. Samples to be analyzed for VOCs were collected using 5-gram EnCore™ samplers. Sample aliquots for the other analyses were collected from the remaining soil core within the 0- to 2-foot depth interval and placed in the appropriate containers following homogenization.

Round 1

All 14 of the proposed surface soil samples were collected at SWMU 8 during Round 1. One surface soil sample was collected from each of the 14 soil borings from the ground surface to depths of 1 to 2 feet bgs using DPT.

Round 2

No surface soil samples were proposed at SWMU 8 during Round 2.

Round 3

All 31 of the proposed surface soil samples were collected at SWMU 8 during Round 3. One surface soil sample was collected from each of the 31 soil borings from the ground surface to depths of 1 to 2 feet bgs utilizing DPT or hand augering.

Round 4

No surface soil samples were proposed at SWMU 8 during Round 4.

2.5.1.2 Subsurface Soil Sampling

Upon retrieval, all subsurface samples were monitored for the presence of VOCs using a PID. The results of this screening were recorded on the boring logs and/or soil sample log sheets. Samples for VOC analyses were collected first from the interval that had the highest PID reading using 5-gram EnCore™ samplers. The remaining soil core material was then homogenized, and soil to be analyzed for other parameters was placed into the required containers. Subsurface soil sample intervals for SWMU 8 are listed in Table 2-1.

Round 1

Twenty of the proposed 42 subsurface soil samples were collected at SWMU 8 during Round 1. The remaining 22 proposed subsurface soil samples were not collected due to refusal while drilling (see Table 2-3).

Round 2

Three soil borings were advanced using a hand auger to install temporary groundwater wells during Round 2. All soils obtained from the boreholes were immediately screened with a PID. Discretionary subsurface soil samples were initially scheduled in the QAPP (TtNUS, 2004) based on PID results. No positive PID readings were detected; therefore, no subsurface soil samples were collected during Round 2.

Round 3

Twenty-six of the proposed 62 subsurface soil samples were collected at SWMU 8 during Round 3. As in Round 1, the remaining proposed subsurface soil samples were not collected due to refusal while drilling (see Table 2-3).

Round 4

All 17 of the proposed subsurface soil samples were collected at SWMU 8 during Round 4 (see Table 2-3).

2.5.2 Surface Water/Seep Sampling

Surface water samples were collected from intermittent streams, drainage ditches, sumps, and surface runoff locations throughout SWMU 8. All sample locations were marked with a labeled, wooden survey stake. Fluorescent flagging was tied to the stake and to a nearby tree (if available) to facilitate relocation of the sample location for surveying purposes. The surface water samples were collected in accordance with the approved QAPP (TtNUS, 2004). Surface water samples 08SW02201, 08SW02301, and 08SW02401 were collected from the Pond itself and sampled for cyanide to determine if the water drained from the pond during future remediation could be sent to the Crane wastewater plant for treatment. All pertinent field data including water quality parameter measurements, sampling methods, and locations were recorded on a surface water sample log sheet (see Appendix C.3). See Figure 2-2 for all surface water and seep locations.

Round 1

Ten of the 11 proposed surface water samples were collected at SWMU 8 during Round 1. Sample 08SW00201 was not collected due to the absence of water. Two surface water samples were collected from locations 08SW/SD004 and 08SW/SD005, which were located within the Building 106 Pond. The

surface water sample was collected by direct fill of the sample bottle, and a second sample was collected at a depth of 5 feet using a peristaltic pump and tubing.

Round 2

Nine of the 13 proposed surface water samples were collected at SWMU 8 during Round 2. This included 08SU00101, which was collected from the concrete sump located just to the southwest of the Building 106 Pond.

Four seeps were located and marked at SWMU 8 immediately after a rainfall event. However, when the locations were revisited for sampling, only location 08SP002 had water available for sample collection.

Round 3

Fifteen of the 20 proposed surface water samples were collected at SWMU 8 during Round 3. Locations 08SW/SD005, 006, 007, 016, and 019 were dry at the time of sampling.

Proposed Round 2 seep locations 08SP001 through 005 were revisited, and again only location 08SP002 contained water for sampling.

Round 4

No surface water samples were proposed at SWMU 8 during Round 4.

2.5.3 Sediment Sampling

Sediment samples were collected from intermittent streams, drainage ditches, and surface runoff locations at SWMU 8. The samples were collected in depositional areas that contained predominantly fine (clay and silt) particles. All sediment samples were collected in accordance with the approved QAPP (TtNUS, 2004). All sediment samples were collected at depths of 0 to 6 inches bgs, except locations 08SW/SD004 and 08SW/SD005 where an upper sediment sample was collected at 0 to 12 inches and the second was collected at 12 to 24 inches. Where possible, locations were marked with a labeled, wooden survey stake. Fluorescent flagging was tied to the stake and to a nearby tree (if available) to facilitate relocation of the sample location for surveying purposes. All pertinent field data including sampling methods, depths, descriptions, and locations were recorded on sediment sample log sheets (see Appendix C.2). See Figure 2-2 for all sediment sampling locations.

Round 1

Eleven of the 13 proposed sediment samples were collected at SWMU 8 during Round 1. Sediment sample locations at the bottom of the Building 106 Pond (08SW/SD004 and 08SW/SD005) were originally proposed to be collected at three separate depths (0 to 6 inches, 6 to 12 inches, and 12 to 24 inches); however, based on field conditions, samples were only collected at two depths (0 to 12 inches and 12 to 24 inches).

Round 2

Thirteen of 14 proposed sediment samples were collected at SWMU 8 during Round 2. This included sample 08SD015010006, which was collected as an additional discretionary sample based on field observations. No sediment was located at the bottom of the concrete sump; therefore, sample 08SL001010006 was not collected.

Round 3

No sediment samples were proposed for collection at SWMU 8 during Round 3.

Round 4

No sediment samples were proposed for collection at SWMU 8 during Round 4.

2.5.4 Groundwater Purging and Sampling

Purging and stabilization of permanent wells prior to sampling was accomplished using low-flow techniques in accordance with SOP CTO166-15 and SOP CTO166-16. Due to low water levels in some of the temporary wells, not all were purged prior to sampling. Sampling was accomplished in accordance with SOP CTO166-05. Sample analytes are provided in Table 2-3.

The permanent wells were purged prior to sampling using a peristaltic pump or bladder pump, depending on the static water level, well depth, and recharge information obtained during well development. In general, bladder pumps were used to sample wells with static water levels greater than 28 feet bgs, and peristaltic pumps were used to sample wells with static water levels less than 28 feet bgs.

Groundwater quality parameters including pH, specific conductance, temperature, DO, and oxidation-reduction potential (ORP) were measured during purging at 5- to 10-minute intervals using a YSI Model

600 series multi-parameter water quality meter and flow-through cell. Longer intervals were used for slower pumping wells. Turbidity readings were measured using a LaMotte 2020 turbidity meter. Water levels and pumping rates were also measured during purging at 5- to 10-minute intervals. Purging continued until a minimum of one well volume was removed and the above parameters stabilized, or until the well had been purged for 4 hours, in accordance with SOP CTO166-16 and SOP CTO166-15. To the extent possible, the pumping rates were adjusted to prevent drawdown from exceeding 0.3 foot during purging. Copies of the monitoring well low-flow purge data sheets and groundwater sample log sheets are provided in Appendix C.4 of this document.

The permanent monitoring wells were sampled with the same pump (peristaltic or bladder) and tubing used during well purging. Immediately following the purging process and before sampling, the temperature, pH, specific conductance, DO, ORP, and turbidity were measured and recorded on the groundwater sample log sheets (included in Appendix C.4).

Sample containers were filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. Samples for VOC analysis were collected by the straw method when using the peristaltic pump and by direct pumping when using the bladder pump. These samples were immediately sealed in 40-milliliter (mL) vials so that no headspace existed. Samples for SVOCs, total metals, and dissolved metals were collected next and in the order listed (when applicable). Samples with turbidity values greater than 10 nephelometric turbidity units (NTUs) were field filtered for dissolved metals analyses prior to sample preservation using a 0.45-micron in-line filter. All pertinent field data including sampling methods, purge information, pump intake depths, and locations were recorded on low-flow purge data sheets and groundwater sample log sheets (see Appendix C). See Figure 2-3 for all groundwater sampling locations.

Round 1

Four temporary wells were installed in soil borings that encountered groundwater and were sampled at SWMU 8. The temporary wells were installed at soil boring locations 08SB006, 08SB007, 08SB010, and 08SB013. See Figure 2-1 for locations.

Round 2

Eleven permanent groundwater monitoring wells were installed during Round 2 utilizing the Rotosonic drilling method. Three temporary wells were also set in hand augered boring locations. When the three temporary wells were revisited for sampling, only location 08GWTW006 contained water, and although

enough sample was collected for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), the well went dry before a metals sample could be collected.

Round 3

Three permanent groundwater monitoring wells were installed during Round 3 utilizing HSA and AR drilling. These three deep wells ranged in depth from 72 to 115 feet bgs.

Round 4

Ten temporary wells were installed in soil borings that encountered groundwater at SWMU 8. The temporary wells were installed at soil boring locations 08SB47, 48, 53, 55, 56, 57, 59, 60, 61, and 62. Sampling of the wells was attempted within two days of installation. Several of the wells (08TW08, 09, 11, 16, and 18) never produced enough water for sample collection. Temporary well 08TW12 only produced enough water for VOC analyses, and proposed temporary well 08TW10 was never installed due to shallow refusal of the soil boring. See Figure 2-1 for locations.

2.6 FIELD SAMPLE DOCUMENTATION

Sample documentation consisted of the completion of boring logs, matrix-specific sample log sheets, sample bottle tags, chain-of-custody records, equipment calibration log sheets, field logbooks, and health and safety documentation. Field documentation was completed as per SOP CTO 331-03. The sample log sheets contain information such as sample location and sample ID, container requirements and analyses to be performed, sample type, time, date, and method of sample collection. Any unusual circumstances encountered during sample collection were noted on the form. Sample log sheets can be found in Appendix C of this document. Chain-of-custody records (see Appendix C.5) were used to track each sample from collection to receipt and analysis at the laboratory. Equipment calibration log sheets are discussed in Section 2.9.1 and can be found in Appendix C.6 of this document.

2.7 SAMPLE HANDLING, PACKAGING, AND SHIPPING

Sample handling activities included field-related considerations concerning the selection of sample containers, preservatives, allowable holding times, sample custody, and maintaining samples at the appropriate storage temperature. Sampling containers were sealed in Ziploc® plastic bags, and glass containers were wrapped in plastic bubble wrap to minimize the possibility of breakage during transport. The sample containers were then placed in a cooler lined with a large plastic garbage bag. The cooler was packed with a cushioning material (bubble wrap) to prevent container breakage. Samples were

cooled immediately after collection with ice placed over the sample containers. A temperature blank was placed in each cooler prior to shipment. The plastic garbage bag was sealed with a knot, and the chain-of-custody form was sealed in a Ziploc® bag and taped to the inside of the cooler lid. A signed and dated custody seal was applied to each end of the cooler and then covered with strapping tape to provide a tamper-evident seal. A Federal Express® airbill was applied to the shipping cooler. TtNUS maintained custody of the samples until they were relinquished to Federal Express®. The Federal Express® tracking number (airbill number) was recorded on the chain-of-custody form, and the sender's copy of the airbill was maintained for shipment tracking, if needed. All samples were shipped to the laboratory for overnight delivery and were received within sample holding times. Sample bottle tags were removed from each sample bottle by laboratory personnel and forwarded to the NSWC Environmental Protection Department (EPD).

2.8 QUALITY CONTROL SAMPLES

Quality assurance (QA)/quality control (QC) samples were generated and collected during sampling activities to monitor both field and laboratory procedures. These procedures are detailed in the approved QAPP and QAPP Addenda. QA/QC samples included field duplicates, equipment rinsate blanks, trip blanks, source water blanks, and temperature blanks. Field duplicate results are tabulated in Appendix G of this document. These types of QA/QC samples are briefly described below.

- Field Duplicates - Field duplicates consisted of two samples collected either independently at a sampling location at approximately the same time in the case of soil or sediment VOC samples, groundwater, and surface water samples or as a single sample split into two portions in the case of non-VOC soil and sediment samples. Field duplicates were collected at the rate of 1 in 20 per medium and were used to assess the overall precision of the sampling and analysis program.

- Equipment Rinsate Blanks - Equipment rinsate blanks were obtained under representative field conditions by collecting the rinse water generated by running analyte-free water through or over sample collection equipment after decontamination and before use. When pre-cleaned, dedicated, or disposable sampling equipment was used (no decontamination was required), one equipment rinsate blank was collected as a batch blank. Equipment rinsate blanks were analyzed for the same chemical constituents as the associated environmental samples.

- Trip blanks - Trip blanks were used to determine whether contamination of VOC samples had occurred during transit or storage. Trip blanks consisted of analyte-free water taken from the

laboratory to the site and returned to the laboratory. One trip blank was submitted to the laboratory in each cooler that contained samples for VOC analyses and was analyzed for VOCs only.

- Source water blanks - Source water blanks were obtained by sampling the analyte-free water and potable water source(s) used for decontamination of sampling equipment. Source water blanks were used to determine whether analyte-free water or potable water (used for steam cleaning, etc.) contributed to sample contamination.

- Temperature blanks - Temperature blanks were used to determine if samples were adequately cooled during shipment. Temperature blanks consisted of analyte-free water poured into a clean sample container at the site or supplied by the fixed-base laboratory. One temperature blank was submitted to the laboratory in each cooler, and the temperature was checked upon receipt at the laboratory.

2.9 FIELD INSTRUMENT MEASUREMENTS

Field measurements taken and recorded during field sampling operations included water temperature, pH, specific conductance, ORP, DO, turbidity, and groundwater level measurements. Ambient air measurements included monitoring of organic vapors in the breathing zone during intrusive field investigation activities and monitoring of organic vapors emanating from site sources such as soil samples and well casings. Several instruments were used during field activities to obtain these measurements, including the following:

- PID
- Multi-parameter, water-quality meter
- Turbidity meter
- M-scope water level indicator

2.9.1 Equipment Calibration

Instruments used in the field were calibrated daily prior to use according to manufacturers' requirements and in accordance with applicable SOPs. Equipment calibration logs can be found in Appendix C.6.

2.9.2 Field Investigation Preventive Maintenance Procedures/Schedule

Field instruments for this project included the PID, YSI water-quality meter, LaMotte 2020 turbidity meter, and water level indicator. The specific preventive maintenance procedures followed for field equipment were those recommended by the equipment manufacturers.

An appropriate maintenance check was performed daily on each piece of equipment. If damaged or defective parts were identified during the maintenance check, and it was determined that the damage could have an impact on the instrument's performance, the instrument was removed from service until the defective parts were repaired or replaced. Critical spare parts were kept on site to reduce downtime. Spare parts included batteries, a DO probe membrane kit (membranes and a bottle of solution), and air particle filters for the PID. Back-up instruments and equipment were available on site or were shipped within 1 day via overnight courier to avoid delays in the field schedule.

2.10 SURVEYING

All permanent and temporary groundwater wells, soil boring, and surface water/sediment sampling locations were surveyed. For all soil boring and surface water/sediment locations, the ground surface elevation was surveyed to the nearest 0.1 foot. Vertical elevations were referenced to the 1988 North American Vertical Datum (NAVD88). Existing survey monuments at NSWC Crane were used as reference points. Horizontal locations of samples were surveyed to Indiana State Plane coordinates to the nearest 0.1 foot and referenced to the 1927 North American Datum (NAD27). All surveying was performed by a surveyor professionally licensed in the State of Indiana. Copies of the survey data can be found in Appendix D.3.

2.11 DECONTAMINATION

The nondedicated, nondisposable equipment involved in field sampling activities was decontaminated before beginning work, during drilling and sampling activities, and at the completion of each round of RFI activities in accordance with SOP CTO331-17. This equipment included drilling rigs, down-hole tools, and soil, sediment, and water sampling equipment.

2.11.2 Sampling Equipment

All nondedicated (reusable) equipment used for collecting samples was decontaminated before field sampling, between sample collections, and at the end of each sampling event. This equipment included

stainless steel trowels, stainless steel mixing bowls, etc. The following decontamination steps were taken:

- Potable water and phosphate-free detergent wash (scrub if necessary)
- Potable water rinse
- Deionized (DI) water rinse
- Air dry (if possible)
- Wrap in aluminum foil (if not to be used immediately)

An isopropanol rinse was not necessary because no oily residue was evident on the sampling equipment.

Field analytical equipment such as pH, conductivity, and temperature probes were rinsed first with analyte-free water then with the sample prior to making measurements. Water level measurement devices were rinsed with DI water.

2.12 WATER LEVEL MEASUREMENTS

2.12.1 Groundwater Level Measurements

Water level measurements were obtained from each permanent and temporary monitoring well prior to sampling. The water level measurements were recorded to the nearest 0.01 foot and can be found on the sample log sheets provided in Appendix C of this document.

2.12.2 Estimation of Stream Flow

Stream flow estimates were made based on visual observations and can be found on the surface water sample log sheets located in Appendix C.3. Due to shallow depths, dense grassy cover, and/or natural features interfering with adequate unrestricted stream/drainage ditch runs, stream flow measurement SOP CTO331-21 could not be followed at all sampling locations.

2.12.3 Aquifer Testing

Slug tests were performed at SWMU 8 to determine the hydraulic characteristics of the formation in the immediate vicinity of the wells. Slug tests were performed in seven monitoring wells (08MWT01, 03, 04, 05, 07, 09, and 11) at SWMU 8 during Round 3 (see Appendix E). Slug test data evaluation results are discussed in Section 4.6.

During slug testing, the change in water level in each well was induced by withdrawing (rising head) or introducing (falling head) a solid PVC slug with a volume equivalent to approximately 2 to 3 feet of displacement in a 2-inch well. In some instances, one or two bailers (one bailer induces approximately 1.5 feet of displacement in a 2-inch well) were used to withdraw water to initiate the water level change. Monitoring wells with a water level below the top of the well screen were tested using the rising head method and in most cases using a bailer to induce the water level change. Monitoring wells with 3 feet or less of standing water were not slug tested.

Prior to performing each slug test, the static water level in the monitoring well was measured using an electronic water level indicator. Water levels during each test were recorded with a pressure transducer at linear and logarithmic intervals of time via a programmed electronic data logger as the water level returned to the original static water level. The time and rate of change required for the water level to return to the original static water level are functions of the transmissivity and hydraulic conductivity (K) of the aquifer. The resulting drawdown data from the slug tests were evaluated using the Hvorslev Method (Fetter, 1988). The geometric mean is the best measure of central tendency; therefore, the average hydraulic conductivity for the site was presented as the geometric mean of the test results.

2.13 FIELD CORRECTIVE ACTION

Corrective action includes the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or "out of QC" performance that can affect data quality, and the process of modifying procedures to address unexpected/unusual field conditions encountered.

Corrective action in the field resulted when substantive changes were made to the sampling network (i.e., more/fewer samples collected, sampling locations other than those specified, etc.) and when sampling procedures or field analytical procedures required modification. Project personnel reported all suspected technical or QA nonconformance or suspected deficiencies of any activity or issued document to the FOL or designee. The Task Order Manager (TOM) was responsible for assessing the suspected problems in consultation with the project QA/QC Manager and for making a decision based on the potential for the situation to affect the quality of the resulting data. If it was determined that the situation warranted a reportable nonconformance requiring corrective action, a nonconformance report was initiated by the TOM.

The only nonconformance that occurred at SWMU 8 was during Round 4 regarding numbering of temporary wells. Originally the wells were to begin with 08TW07; however, the correct numbering

sequence was changed to begin with 08TW08 since a previous set of temporary wells at SWMU 8 included well ID 08TW07. A Field Task Modification Form was completed and is located in Appendix D.4. gu

2.14 INVESTIGATION-DERIVED WASTE HANDLING

The field investigations generated several types of potentially contaminated wastes including personal protective equipment (PPE), decontamination fluids from the sampling equipment decontamination fluids, DPT plastic sleeves, development and purge water, and soil cuttings. Management of each residue was performed as follows:

PPE, Pump Tubing, and DPT Plastic Sleeves – All PPE, tubing, and plastic sleeves were decontaminated, double bagged, and placed in NSWC Crane trash receptacles (i.e., dumpsters).

Purge Water and Drilling and Sampling Equipment Decontamination Fluids – All purge waters and equipment decontamination fluids were collected and discharged to the NSWC Crane permitted waste treatment plant.

Waste Cuttings from Drilling Activities – For each boring, the cuttings produced were scanned for VOCs. VOC readings were at background levels for all borings, and cuttings were therefore used as backfill if the boring terminated above the water table. Any remaining cuttings were spread on the ground in the immediate vicinity of the boring.

2.15 SITE MANAGEMENT AND FACILITY SUPPORT

The FOL was designated as the lead in coordinating all day-to-day activities during the investigation. The FOL was responsible for ensuring that all field team members (including subcontractors) were familiar with the approved QAPP and the HASP. Additionally, the FOL was responsible for all sampling operations, QA/QC, field documentation requirements, and field change orders. The FOL reported to the TOM on a daily basis regarding the status of fieldwork.

All site preparation, mobilization/demobilization, and sampling activities were coordinated through NSWC Crane personnel through pre-visit communication and daily meetings during field work.

2.16 RECORDKEEPING

Various hardcover, bound record books or electronic logs were maintained for each field activity in accordance with SOP CTO331-03. The Master Site Logbook served as the overall record of field

activities. Information recorded daily in the Master Site Logbook included daily field activities, weather conditions, identity and arrival and departure times of personnel, management issues, etc. Various field notebooks were also maintained. For example, the site geologist supervising monitoring well installation operations maintained a field notebook. Copies of field log books are included in Appendix D.

The FOL was responsible for the maintenance and security of all field records. Eventually, all field records, chain-of-custody forms, sample log sheets, field forms, logbooks, and notebooks were docketed and incorporated in the central project file for CTO 0331.

2.17 RESTORATION AND REVEGETATION

At the conclusion of the field activities, TtNUS performed site restoration in all areas impacted by drilling activities at SWMU 8.

TABLE 2-1

INSTALLATION DATES AND DEPTHS OF MONITORING WELLS AND SOIL BORINGS, AND DEPTHS OF SOIL SAMPLES COLLECTED
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Boring No.	Total Depth (feet bgs)	Drilling Method	Date Drilled[1]	Depth Interval(s) of Soil Samples (feet bgs)
SWMU 8 Soil Borings (Round 1)				
08SB001	2.5	DPT	11-Dec-04	0-2
08SB002	3	DPT	11-Dec-04	0-2
08SB003	3	DPT	11-Dec-04	0-2
08SB004	6	DPT	11-Dec-04	0-2, 2-6
08SB005	4	DPT	11-Dec-04	0-2, 2-4
08SB006	8	DPT	12-Dec-04	0-2, 2-6, 6-8
08SB007	17	DPT	12-Dec-04	0-2, 2-6, 6-10, 10-13
08SB008	10	DPT	12-Dec-04	0-2, 2-6, 6-10
08SB009	9	DPT	12-Dec-04	0-2, 2-6, 6-9
08SB010	18	DPT	12-Dec-04	0-2, 2-6, 6-10, 10-13
08SB011	6	DPT	12-Dec-04	0-2, 2-6
08SB012	19	DPT	12-Dec-04	0-2, 2-6, 6-10, 10-18
08SB013	19	DPT	12-Dec-04	0-2, 2-6, 6-10, 10-13
08SB014	2	DPT	12-Dec-04	0-2
SWMU 8 Soil Borings (Round 3)				
08SB015	6	DPT	3-Oct-05	0-2, 4-6
08SB016	3	HA	4-Oct-05	0-2, 2-3
08SB017	2	DPT	3-Oct-05	0-2
08SB018	4	DPT	3-Oct-05	0-2, 4-6
08SB019	2	DPT	3-Oct-05	0-2
08SB020	4	DPT	3-Oct-05	0-2, 2-4
08SB021	4	DPT	3-Oct-05	0-2, 2-4
08SB022	8	DPT	29-Sep-05	0-2, 2-6, 6-8
08SB023	2	HA	4-Oct-05	0-2
08SB024	3	DPT	3-Oct-05	0-2, 2-3
08SB025	8	DPT	29-Sep-05	0-2, 2-6, 6-8
08SB026	6	DPT	29-Sep-05	0-2, 4-6
08SB027	6	DPT	29-Sep-05	0-2, 4-6
08SB028	6	DPT	29-Sep-05	0-2, 4-6
08SB029	6	DPT	29-Sep-05	0-2, 4-6
08SB030	2	DPT	2-Oct-05	0-2
08SB031	6	DPT	29-Sep-05	0-2, 4-6
08SB032	7	HA	4-Oct-05	0-2, 2-6, 6-7
08SB033	6	HA	4-Oct-05	0-2, 4-6
08SB034	6	DPT	2-Oct-05	0-2, 4-6
08SB035	5	DPT	2-Oct-05	0-2, 3-5
08SB036	2	DPT	27-Sep-05	0-2
08SB037	2	DPT	27-Sep-05	0-2
08SB038	2	DPT	27-Sep-05	0-2
08SB039	2	DPT	27-Sep-05	0-2
08SB040	4	HA	4-Oct-05	0-2, 2-4
08SB041	6	DPT	2-Oct-05	0-2, 4-6

TABLE 2-1

INSTALLATION DATES AND DEPTHS OF MONITORING WELLS AND SOIL BORINGS, AND DEPTHS OF SOIL SAMPLES COLLECTED
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Boring No.	Total Depth (feet bgs)	Drilling Method	Date Drilled[1]	Depth Interval(s) of Soil Samples (feet bgs)
SWMU 8 Soil Borings (Round 3)				
08SB042	6	DPT	2-Oct-05	0-2, 4-6
08SB043	5	DPT	2-Oct-05	0-2, 3-5
08SB044	4	DPT	2-Oct-05	0-2, 2-4
08SB045	4	DPT	2-Oct-05	0-2, 2-4
SWMU 8 Soil Borings (Round 4)				
08SB046	8	DPT	24-Oct-06	6-8
08SB047	8	DPT	24-Oct-06	6-8
08SB048	7	DPT	24-Oct-06	5-7
08SB049	7	DPT	24-Oct-06	5-7
08SB050	8	DPT	24-Oct-06	6-8
08SB051	4	DPT	24-Oct-06	2-4
08SB052	3	DPT	24-Oct-06	1-3
08SB053	7	DPT	23-Oct-06	5-7
08SB054	4	DPT	23-Oct-06	2-4
08SB055	9	DPT	23-Oct-06	7-9
08SB056	9	DPT	23-Oct-06	7-9
08SB057	8	DPT	23-Oct-06	6-8
08SB058	9	DPT	24-Oct-06	7-9
08SB059	9	DPT	23-Oct-06	7-9
08SB060	9	DPT	23-Oct-06	7-9
08SB061	7	DPT	23-Oct-06	5-7
08SB062	6	DPT	23-Oct-06	4-6
SWMU 8 Permanent Monitoring Wells (Round 2)				
08MWT001	55	RS	15-May-05	NA
08MWT002	14.5	RS	11-May-05	NA
08MWT003	60	RS	16-May-05	NA
08MWT004	12	RS	12-May-05	NA
08MWT005	60	RS	16-May-05	NA
08MWT006	18	RS	12-May-05	NA
08MWT007	33	RS	13-May-05	NA
08MWT008	30	RS	15-May-05	NA
08MWT009	30	RS	17-May-05	NA
08MWT010	30	RS	24-May-05	NA
08MWT011	30	RS	23-May-05	NA
SWMU 8 Permanent Monitoring Wells (Round 3)				
08MWT012	72	HSA/AR	10/09/05	NA
08MWT013	123	HSA/AR	10/11/05	NA
08MWT014	115	HSA/AR	10/10/05	NA
SWMU 8 Temporary Monitoring Wells (Round 1)				
08TW001 / 08SB006	8	DPT	12-Dec-04	NA
08TW002 / 08SB007	17	DPT	12-Dec-04	NA
08TW003 / 08SB010	18	DPT	12-Dec-04	NA

TABLE 2-1

INSTALLATION DATES AND DEPTHS OF MONITORING WELLS AND SOIL BORINGS, AND DEPTHS OF SOIL SAMPLES COLLECTED
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Boring No.	Total Depth (feet bgs)	Drilling Method	Date Drilled[1]	Depth Interval(s) of Soil Samples (feet bgs)
08TW004 / 08SB013	19	DPT	12-Dec-04	NA
SWMU 8 Temporary Monitoring Wells (Round 2)				
08TW005	8.0	HSA	24-May-05	NA
08TW006	6.0	HSA	24-May-05	NA
08TW007	1.5	HSA	25-May-05	NA
SWMU 8 Temporary Monitoring Wells (Round 4)				
08TW008 / 08SB048	8.2	DPT	24-Oct-06	NA
08TW009 / 08SB053	7.0	DPT	23-Oct-06	NA
08TW010	NOT INSTALLED			
08TW011 / 08SB055	8.8	DPT	23-Oct-06	NA
08TW012 / 08SB056	8.9	DPT	23-Oct-06	NA
08TW013 / 08SB057	7.5	DPT	23-Oct-06	NA
08TW014 / 08SB059	9.0	DPT	23-Oct-06	NA
08TW015 / 08SB060	8.7	DPT	23-Oct-06	NA
08TW016 / 08SB061	6.5	DPT	23-Oct-06	NA
08TW017 / 08SB062	6.0	DPT	23-Oct-06	NA
08TW018 / 08SB047	8.0	DPT	24-Oct-06	NA

bgs - Below ground surface.
DPT = Direct-push technology.
HA = Hand augering.
HSA/AR = Hollow stem auger/air rotary coring and reaming.
NA - Not applicable; no soil samples collected.
RS = Rotosonic drilling.
1 - Date drilled for permanent monitoring wells represents date when well was completed.

TABLE 2-2

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Installation Date[1]	Northing (feet) (NAD27)	Easting (feet) (NAD27)	Ground Elevation (feet amsl) (NAVD88)	Top of Riser or Reference Point Elevation (feet amsl)	Total Depth (feet bgs)[(2)]	Screened Interval				Water-Bearing Zone	June 2-4, 2005		December 17, 2005		March 1, 2006		October 24, 2006	
							Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
Permanent Monitoring Wells																			
08MWT001	5/15/05	1306612.22	3015096.71	682.84	684.62	55.0	35.00	55.00	647.84	627.84	Pmz	50.00	634.62	50.71	633.91	50.26	634.36	NM	NM
08MWT002	5/11/05	1306611.21	3015090.07	683.76	685.88	14.5	4.50	14.50	679.26	669.26	OB	9.90	675.98	7.24	678.64	7.28	678.60	NM	NM
08MWT003	5/16/05	1306595.51	3015055.82	685.56	687.66	60.0	50.00	60.00	635.56	625.56	Pmz	53.22	634.44	53.9	633.76	53.27	634.39	NM	NM
08MWT004	5/12/05	1306601.17	3015055.05	685.51	688.14	12.0	7.00	12.00	678.51	673.51	OB	8.15	679.99	7.19	680.95	7.9	680.24	NM	NM
08MWT005	5/16/05	1306438.87	3014963.79	685.85	687.82	60.0	50.00	60.00	635.85	625.85	Pmz	52.00	635.82	55.35	632.47	54.77	633.05	NM	NM
08MWT006	5/12/05	1306442.25	3014968.67	686.00	688.36	18.0	8.00	18.00	678.00	668.00	OB	18.21	670.15	18.81	669.55	18.49	669.87	NM	NM
08MWT007	5/13/05	1306840.18	3014993.62	699.73	701.31	33.0	18.00	33.00	681.73	666.73	Puz	14.43	686.88	15.79	685.52	14.79	686.52	NM	NM
08MWT008	5/15/05	1306739.74	3014736.53	695.60	697.59	30.0	15.00	30.00	680.60	665.60	Puz	11.35	686.24	9.2	688.39	10.17	687.42	NM	NM
08MWT009	5/17/05	1306185.27	3015006.81	635.49	637.61	30.0	15.00	30.00	620.49	605.49	Pmz	18.86	618.75	20.34	617.27	18.04	619.57	NM	NM
08MWT010	5/24/05	1306174.25	3015302.10	601.97	604.22	30.0	15.00	30.00	586.97	571.97	Plz	15.44	588.78	16.15	588.07	15.52	588.70	NM	NM
08MWT011	5/23/05	1306329.81	3015534.85	600.55	602.91	30.0	15.00	30.00	585.55	570.55	Plz	9.16	593.75	7.52	595.39	7.26	595.65	NM	NM
08MWT012	10/09/05	1306319.65	3014841.62	683.33	685.86	72	52.00	72.00	631.33	611.33	Pmz	NA	NA	53.51	632.35	52.29	633.57	NM	NM
08MWT013	10/11/05	1306588.38	3015057.03	685.68	688.25	123	103.00	123.00	582.68	562.68	Plz	NA	NA	101.86	586.39	101.46	586.79	NM	NM
08MWT014	10/10/05	1306435.64	3014956.87	685.86	688.53	115	100.00	115.00	585.86	570.86	Plz	NA	NA	108.25	580.28	99.05	589.48	NM	NM
Temporary Monitoring Wells																			
08TW001	12/12/04	1306658.71	3015014.79	685.93	NM	8.0	3.00	8.00	682.93	677.93	OB	NM	NM	NM	NM	Abd.	NA	NM	NM
08TW002	12/12/04	1306635.29	3015085.32	683.17	NM	17.0	7.00	17.00	676.17	666.17	OB	NM	NM	NM	NM	Abd.	NA	NM	NM
08TW003	12/12/04	1306537.90	3015024.73	687.56	NM	17.5	7.00	17.00	680.56	670.56	OB	NM	NM	NM	NM	Abd.	NA	NM	NM
08TW004	12/12/04	1306446.71	3014961.65	685.46	NM	19.0	9.00	19.00	676.46	666.46	OB	NM	NM	NM	NM	Abd.	NA	NM	NM
08TW005	5/24/05	1306642.86	3015097.96	678.49	680.54	8.0	5.00	8.00	673.49	670.49	OB	Dry	NA	NM	NM	9.7	670.84	NM	NM
08TW006	5/24/05	1306652.51	3015115.42	670.46	672.72	6.0	1.00	6.00	669.46	664.46	OB	NM	NM	NM	NM	5.4	667.32	NM	NM
08TW007	5/25/05	1306642.36	3015121.14	666.37	667.92	1.5	0.80	1.50	665.57	664.87	OB	Dry	NA	NM	NM	Dry	NA	NM	NM
08TW008	10/24/06	1306511.26	3014770.50	693.50	NA	8.2	3.00	8.00	690.50	685.50	OB	NA	NA	NA	NA	NA	NA	Dry	NA
08TW009	10/23/06	1306450.81	3014772.73	692.53	NA	7.0	2.00	7.00	690.53	685.53	OB	NA	NA	NA	NA	NA	NA	Dry	NA
08TW010	Not Installed	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
08TW011	10/23/06	1306491.02	3014938.08	687.64	NA	8.8	3.80	8.80	683.84	678.84	OB	NA	NA	NA	NA	NA	NA	Dry	NA
08TW012	10/23/06	1306443.78	3014901.61	686.23	NA	8.9	3.90	8.90	682.33	677.33	OB	NA	NA	NA	NA	NA	NA	NM	NM
08TW013	10/23/06	1306392.77	3014778.02	688.75	NA	7.5	2.50	7.50	686.25	681.25	OB	NA	NA	NA	NA	NA	NA	NM	NM
08TW014	10/23/06	1306376.73	3014866.98	684.92	NA	9.0	5.00	9.00	679.92	675.92	OB	NA	NA	NA	NA	NA	NA	NM	NM
08TW015	10/23/06	1306382.66	3014886.08	684.64	NA	8.7	3.70	8.70	680.94	675.94	OB	NA	NA	NA	NA	NA	NA	NM	NM
08TW016	10/23/06	1306459.37	3014807.58	693.10	NA	6.5	1.50	6.50	691.60	686.60	OB	NA	NA	NA	NA	NA	NA	Dry	NA
08TW017	10/23/06	1306440.54	3014840.83	686.84	NA	6.0	1.00	6.00	685.84	680.84	OB	NA	NA	NA	NA	NA	NA	NM	NM
08TW018	10/24/06	1306543.78	3014795.09	694.28	NA	8.0	0.00	8.00	694.28	686.28	OB	NA	NA	NA	NA	NA	NA	Dry	NA

TABLE 2-2

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Installation Date[1]	Northing (feet) (NAD27)	Easting (feet) (NAD27)	Ground Elevation (feet amsl) (NAVD88)	Top of Riser or Reference Point Elevation (feet amsl)	Total Depth (feet bgs)[(2)]	Screened Interval				Water-Bearing Zone	June 2-4, 2005		December 17, 2005		March 1, 2006		October 24, 2006	
							Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
Staff Gauges																			
08SG001	6/4/05	1305356.06	3014589.12	NM	629.38	NA	NA	NA	NA	NA	Plz	NM	NM	5.00	624.38	5.02	624.36	NM	NM
08SG002	6/4/05	1305718.11	3014599.61	NM	621.90	NA	NA	NA	NA	NA	Plz	NM	NM	4.58	617.32	4.54	617.36	NM	NM
08SG003	6/4/05	1306182.83	3015170.28	NM	609.23	NA	NA	NA	NA	NA	Plz	NM	NM	1.98	607.25	2.00	607.23	NM	NM
08SG004	6/4/05	1306309.48	3015518.64	NM	598.80	NA	NA	NA	NA	NA	Plz	NM	NM	2.08	596.72	Dry	-	NM	NM
08SG005	6/4/05	1306762.44	3014957.35	NM	688.08	NA	NA	NA	NA	NA	NA	NM	NM	Dry	-	Dry	-	NM	NM
08SG006	6/4/05	1306678.68	3017413.97	NM	551.64	NA	NA	NA	NA	NA	Plz	NM	NM	9.47	542.17	9.52	542.12	NM	NM
08SG007	6/4/05	1306625.46	3015034.80	681.22	683.62	NA	NA	NA	NA	NA	Plz	NM	NM	2.45	681.17	1.71	681.91	NM	NM

Notes:

1 - Represents the date when the well was completed.
2 - Total depth of boring, total depth of well may be less.
Abd. = Abandoned
amsl = Above mean sea level (NAVD88).
bgs = Below ground surface.
btor = Below top of riser/reference point.
NA = Not applicable.
NAD83 = North American Datum of 1983.
NAVD88 = 1988 North American Vertical Datum.
NM = Not measured.
OB = Overburden Soil.
Plz = Lower Pennsylvanian water-bearing zone.
Pmz = Middle Pennsylvanian water-bearing zone.
Puz = Upper Pennsylvanian water-bearing zone.

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
SWMU 8 Groundwater																		
Round 2 (May/June 2005)																		
08GWT00101				X			X	X										
08GWT00201				X			X	X										
08GWT00301				X			X	X										
08GWT00401				X			X	X										
08GWT00501				X			X	X										
08GWT00601				X			X	X										
08GWT00601-F						X												
08GWT00701				X			X	X										
08GWT00701-F						X												
08GWT00801				X			X	X										
08GWT00901				X			X	X										
08GWT01001				X			X	X										
08GWT01101				X			X	X										
08GWT01101-F						X												
Analyzed				**11**		**3**	**11**	**11**										
Omitted																		
Round 3 (September/October 2005)																		
08GWT00102							X	X										
08GWT00202							X	X										
08GWT00302							X	X										
08GWT00402							X	X										
08GWT00502							X	X										
08GWT00602							X	X										
08GWT00702							X	X										
08GWT00802							X	X										
08GWT00902							X	X										
08GWT01002							X	X										
08GWT01102							X	X										
08GWT01201							X	X										
08GWT01301							X	X										

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08GWT01401							X	X										
08GWT01501							O	O										Well not installed
08GWT01601							O	O										Well not installed
08GWT01701							O	O										Well not installed
Analyzed							**14**	**14**										
Omitted							**3**	**3**										

SWMU 8 Groundwater (Temporary Wells)
Round 1 (December 2004/January 2005)

08GWTW01	X	X		X			X		X	X				X				
08GWTW01-F						X												
08GWTW02	X	X		X			X		X	X				X				
08GWTW02-F						X												
08GWTW03	X	X		X			X		X	X				X				
08GWTW03-F						X												
08GWTW04	X	X		X			X		X	X				X				
08GWTW04-F						X												
08GWTW05				O			O	O										Not installed
08GWTW06				O			O	O										Not installed
Analyzed	**4**	**4**		**4**		**4**	**4**		**4**	**4**				**4**				
Omitted				**2**			**2**	**2**										

Round 2 (May/June 2005)

08GWTW05							O	O										Dry
08GWTW06							X	X										
08GWTW07							O	O										Dry
Analyzed							**1**	**1**										
Omitted							**2**	**2**										

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
Round 4 (October 2006)																		
08GWTW08							O	O										Dry well
08GWTW09							O	O										Dry well
08GWTW10							O	O										Not installed due to refusal
08GWTW11							O	O										Dry well
08GWTW12							X	O										Well dried out
08GWTW13							X	X										
08GWTW14							X	X										
08GWTW15							X	X										
08GWTW16							O	O										Dry well
08GWTW17							X	X										
08GWTW18							O	O										Dry well
Analyzed							**5**	**4**	**4**	**4**				**4**				
Omitted							**6**	**7**										
SWMU 8 Surface Water																		
Round 1 (December 2004/January 2005)																		
08SW00101	X	X	X				X	X	X	X								
08SW00101-F					X													
08SW002	O	O	O				O	O	O	O								Dry
08SW00301	X	X	X				X	X	X	X								
08SW00301-F					X													
08SW00401*	X	X	X				X	X	X	X								*Shallow
08SW00401-F					X													
08SW00402*	X	X	X				X	X	X	X								*Deep
08SW00402-F					X													
08SW00501*	X	X	X				X	X	X	X								*Shallow
08SW00501-F					X													
08SW00502*	X	X	X				X	X	X	X								*Deep
08SW00502-F					X													
08SW00601	X	X	X				X	X	X	X			X					

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SW00601-F					X													
08SW00701	X	X	X				X	X	X	X			X					
08SW00701-F					X													
08SW00801	X	X	X				X	X	X	X			X					
08SW00801-F					X													
08SW00901	X	X	X				X	X	X	X			X					
08SW00901-F					X													
Analyzed	**10**	**10**	**10**		**10**		**10**	**10**	**10**	**10**			**4**					
Omitted	**1**	**1**	**1**				**1**	**1**	**1**	**1**								
Round 2 (May/June 2005)																		
08SW001				O		O	O	O										Dry
08SW002				O		O	O	O										Dry
08SW00302				X			X	X										
08SW00302-F						X												
08SW006				O		O	O	O										Dry
08SW00702				X			X	X										
08SW00702-F						X												
08SW00802				X			X	X										
08SW00802-F						X												
08SW00902				X			X	X										
08SW00902-F						X												
08SW01001				X			X	X										
08SW01001-F						X												
08SW011				O		O	O	O										Dry
08SW01201				X			X	X										
08SW01201-F						X												
08SW013				O		O	O	O										Dry
08SW01401				X			X	X										
08SW01401-F						X												
08SW01501				X			X	X										
08SW01501-F						X												
08SU00101				X			X	X						X				

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SU00101-F						X												
Analyzed				**9**		**9**	**9**	**9**						**1**				
Omitted				**5**		**5**	**5**	**5**										
Round 3 (September/October 2005)																		
08SW00102						X												
08SW00201						X												
08SW00303						X												
08SW00403						X												
08SW005						O												Dry
08SW006						O												Dry
08SW00703						O												Dry
08SW00803						X												
08SW00903						X												
08SW01002						X												
08SW01101						X												
08SW01301						X												
08SW01402						X												
08SW01502						X												
08SW016						O												Dry
08SW01701						X												
08SW01801						X												
08SW019						O												Dry
08SW02001						X												
08SW02101						X												
08SW02201															X			Samples collected to determine if pond water can be sent to Crane water treatment plant
08SW02301															X			
08SW02401															X			
Analyzed						**15**									**3**			
Omitted						**5**												

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs						Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs	Pesticides	Herbicides	PCBs	Fecal Coliform	Cyanide	CEC	TOC	
SWMU 8 Seep																		
Round 2 (May/June 2005)																		
08SP001				O		O	O	O						O				Dry
08SP00201				X		X		X						X				
08SP00201-F							X											
08SP003				O		O	O	O						O				Dry
08SP004				O		O	O	O						O				Dry
Analyzed				**1**		**1**	**1**	**1**						**1**				
Omitted				**3**		**3**	**3**	**3**						**3**				
Round 3 (September/October 2005)																		
08SP001							O							O				Dry
08SP00202							X							X				
08SP003							O							O				Dry
08SP004							O							O				Dry
Analyzed							**1**							**1**				
Omitted							**3**							**3**				
SWMU 8 Sediment																		
Round 1 (December 2004/January 2005)																		
08SD001010006	X	X					X		X	X								
08SD002010006	X	X					X		X	X								
08SD003010006	X	X					X		X	X								
08SD004010006	O	O					O		O	O								Combined with 0012 sample
08SD004010012	X	X					X		X	X								
08SD004011224	X	X					X		X	X								
08SD005010006	O	O					O		O	O								Combined with 0012 sample
08SD005010012	X	X					X		X	X								
08SD005011224	X	X					X		X	X								
08SD006010006	X	X					X		X	X			X					
08SD007010006	X	X					X		X	X			X					

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SD008010006	X	X					X		X	X			X					
08SD009010006	X	X					X		X	X			X					
Analyzed	**11**	**11**					**11**		**11**	**11**			**4**					
Omitted	**2**	**2**					**2**		**2**	**2**								
Round 2 (May/June 2005)																		
08SD001020006								X										
08SD002020006								X										
08SD003020006								X										
08SD006020006								X										
08SD007020006								X										
08SD008020006								X										
08SD009020006								X										
08SD010010006				X			X	X										
08SD011010006				X			X	X										
08SD012010006				X			X	X										
08SD013010006				X			X	X										
08SD014010006				X			X	X										
08SD015010006				X			X	X										Field discretionary sample
08SL001010006				O			O	O						O				Solid bottom/no sediment
Analyzed				**6**			**6**	**13**										
Omitted				**1**			**1**	**1**						**1**				
SWMU 8 Surface Soil																		
Round 1 (December 2004/January 2005)																		
08SS0010002	X	X		X			X	X	X	X								
08SS0020002	X	X		X			X	X	X	X								
08SS0030002				X			X	X	X	X			X					
08SS0040002	X	X		X			X	X	X	X								
08SS0050002	X	X		X			X	X	X	X								
08SS0060002	X	X		X			X	X	X	X			X					
08SS0070002	X	X		X			X	X	X	X			X					

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SS0080002	X	X		X			X	X	X	X			X					
08SS0090002	X	X		X			X	X	X	X			X					
08SS0100002				X			X	X	X	X	X	X	X					
08SS0110002				X			X	X	X	X	X	X	X					
08SS0120002				X			X	X	X	X	X	X	X					
08SS0130002				X			X	X	X	X	X	X	X					
08SS0140002																X	X	
Analyzed	**8**	**8**		**13**			**13**	**13**	**13**	**13**	**4**	**4**	**9**			**1**	**1**	
Omitted																		
Round 3 (September/October 2005)																		
08SS0150002							X											
08SS0160002							X											
08SS0170002							X											
08SS0180002							X											
08SS0190002							X											
08SS0200002							X											
08SS0210002							X											
08SS0220002							X											
08SS0230002							X											
08SS0240002							X											
08SS0250002							X											
08SS0260002							X											
08SS0270002							X											
08SS0280002							X											
08SS0290002							X											
08SS0300002							X											
08SS0310002							X											
08SS0320002							X											
08SS0330002							X											
08SS0340002							X											
08SS0350002							X											
08SS0360002							X											

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SS0370002							X											
08SS0380002							X											
08SS0390002							X											
08SS0400002							X											
08SS0410002							X											
08SS0420002							X											
08SS0430002							X											
08SS0440002							X											
08SS0450002							X											
Analyzed							**31**											
Omitted																		

SWMU 8 Subsurface Soil
Round 1 (December 2004/January 2005)

08SB0010206	O	O		O					O	O								Refusal
08SB0010610	O	O		O					O	O								Refusal
08SB001xxxx	O	O		O					O	O								Refusal
08SB0020206	O	O		O					O	O								Refusal
08SB0020610	O	O		O					O	O								Refusal
08SB002xxxx	O	O		O					O	O								Refusal
08SB0030206				O					O	O			O					Refusal
08SB0030610				O					O	O			O					Refusal
08SB003xxxx				O					O	O			O					Refusal
08SB0040206	X	X		X					X	X								
08SB0040610	O	O		O					O	O								Refusal
08SB004xxxx	O	O		O					O	O								Refusal
08SB0050206	X	X		X			X		X	X								
08SB0050610	O	O		O					O	O								Refusal
08SB005xxxx	O	O		O					O	O								Refusal
08SB0060206	X	X		X			X		X	X			X					
08SB0060610	X	X		X			X		X	X			X					
08SB006xxxx	O	O		O					O	O			O					Refusal

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SB0070206	X	X		X			X		X	X			X					
08SB0070610	X	X		X			X		X	X			X					
08SB0071013	X	X		X			X		X	X			X					
08SB0080206	X	X		X			X		X	X			X					
08SB0080610	X	X		X			X		X	X			X					
08SB008xxxx	O	O		O					O	O			O					Refusal
08SB0090206	X	X		X			X		X	X			X					
08SB0090610	X	X		X			X		X	X			X					
08SB009xxxx	O	O		O					O	O			O					Refusal
08SB0100206				X			X		X	X	X	X	X					
08SB0100610				X			X		X	X	X	X	X					
08SB0101013				X			X		X	X	X	X	X					
08SB0110206				X			X		X	X	X	X	X					
08SB0110610				O					O	O	O	O	O					Refusal
08SB011xxxx				O					O	O	O	O	O					Refusal
08SB0120206				X			X		X	X	X	X	X					
08SB0120610				X			X		X	X	X	X	X					
08SB0121018				X			X		X	X	X	X	X					
08SB0130206				X			X		X	X	X	X	X					
08SB0130610				X			X		X	X	X	X	X					
08SB0131013				X			X		X	X	X	X	X					
08SB0140206																O	O	Refusal
08SB0140610																O	O	Refusal
08SB014xxxx																O	O	Refusal
Analyzed	**11**	**11**		**21**			**20**		**21**	**21**	**10**	**10**	**19**					
Omitted	**13**	**13**		**18**					**18**	**18**	**2**	**2**	**8**			**3**	**3**	

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
Round 2(1) (May/June 2005)																		
08SB015xxxx				O			O	O										Discretionary
08SB016xxxx				O			O	O										Discretionary
08SB017xxxx				O			O	O										Discretionary
08SB018xxxx				O			O	O										Discretionary
08SB019xxxx				O			O	O										Discretionary
08SB020xxxx				O			O	O										Discretionary
Analyzed																		
Omitted				**6**			**6**	**6**										
Round 3 (September/October 2005)																		
08SB0150406							X											
08SB015xxxx							O											Refusal
08SB0160203							X											
08SB016xxxx							O											Refusal
08SB0170206							O											Refusal
08SB017xxxx							O											Refusal
08SB0180204							X											
08SB018xxxx							O											Refusal
08SB0190206							O											Refusal
08SB019xxxx							O											Refusal
08SB0200204							X											
08SB020xxxx							O											Refusal
08SB0210204							X											
08SB021xxxx							O											Refusal
08SB0220206							X											
08SB0220608							X											
08SB0230206							O											Refusal
08SB023xxxx							O											Refusal
08SB0240203							X											
08SB024xxxx							O											Refusal
08SB0250206							X											

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SB0250608							X											
08SB0260406							X											
08SB026xxxx							O											Refusal
08SB0270406							X											
08SB027xxxx							O											Refusal
08SB0280406							X											
08SB028xxxx							O											Refusal
08SB0290406							X											
08SB029xxxx							O											Refusal
08SB0300206							O											Refusal
08SB030xxxx							O											Refusal
08SB0310406							X											
08SB031xxxx							O											Refusal
08SB0320206							X											
08SB0320607							X											
08SB0330406							X											
08SB033xxxx							O											Refusal
08SB0340406							X											
08SB034xxxx							O											Refusal
08SB0350305							X											
08SB035xxxx							O											Refusal
08SB0360206							O											Refusal
08SB036xxxx							O											Refusal
08SB0370206							O											Refusal
08SB037xxxx							O											Refusal
08SB0380206							O											Refusal
08SB038xxxx							O											Refusal
08SB0390206							O											Refusal
08SB039xxxx							O											Refusal
08SB0400204							X											
08SB040xxxx							O											Refusal
08SB0410406							X											
08SB041xxxx							O											Refusal

TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	
08SB0420406							X											
08SB042xxxx							O											Refusal
08SB0430305							X											
08SB043xxxx							O											Refusal
08SB0440204							X											
08SB044xxxx							O											Refusal
08SB0450204							X											
08SB045xxxx							O											Refusal
Analyzed							**26**											
Omitted							**36**											
Round 4 (October 2006)																		
08SB0460608							X											
08SB0470608							X											
08SB0480507							X											
08SB0490507							X											
08SB0500608							X											
08SB0510204							X											
08SB0520103							X											
08SB0530507							X											
08SB0540204							X											
08SB0550709							X											
08SB0560709							X											
08SB0570608							X											
08SB0580709							X											
08SB0590709							X											
08SB0600709							X											
08SB0610507							X											
08SB0620406							X											
Analyzed							**17**											
Omitted							**0**											

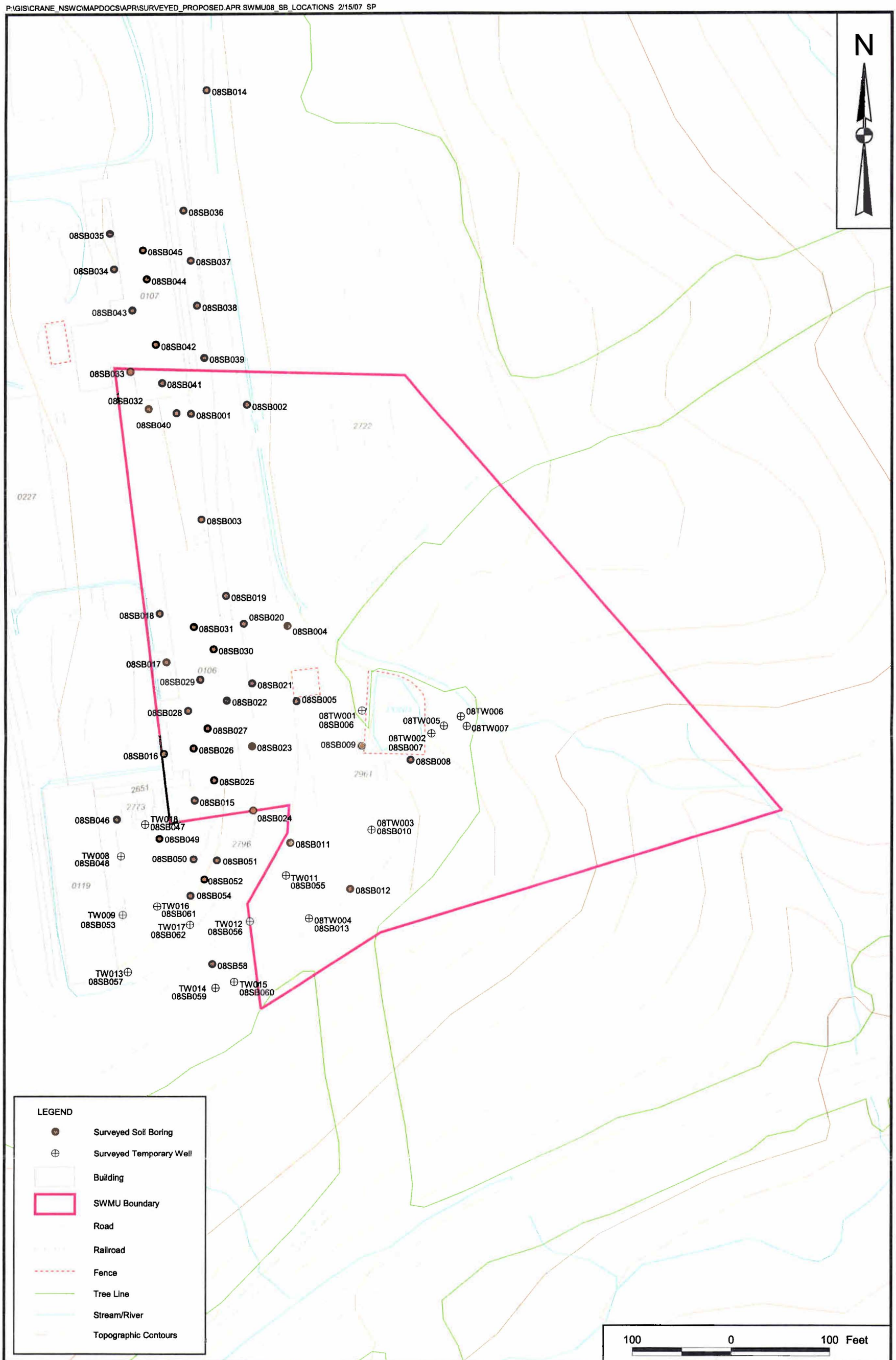
TABLE 2-3

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

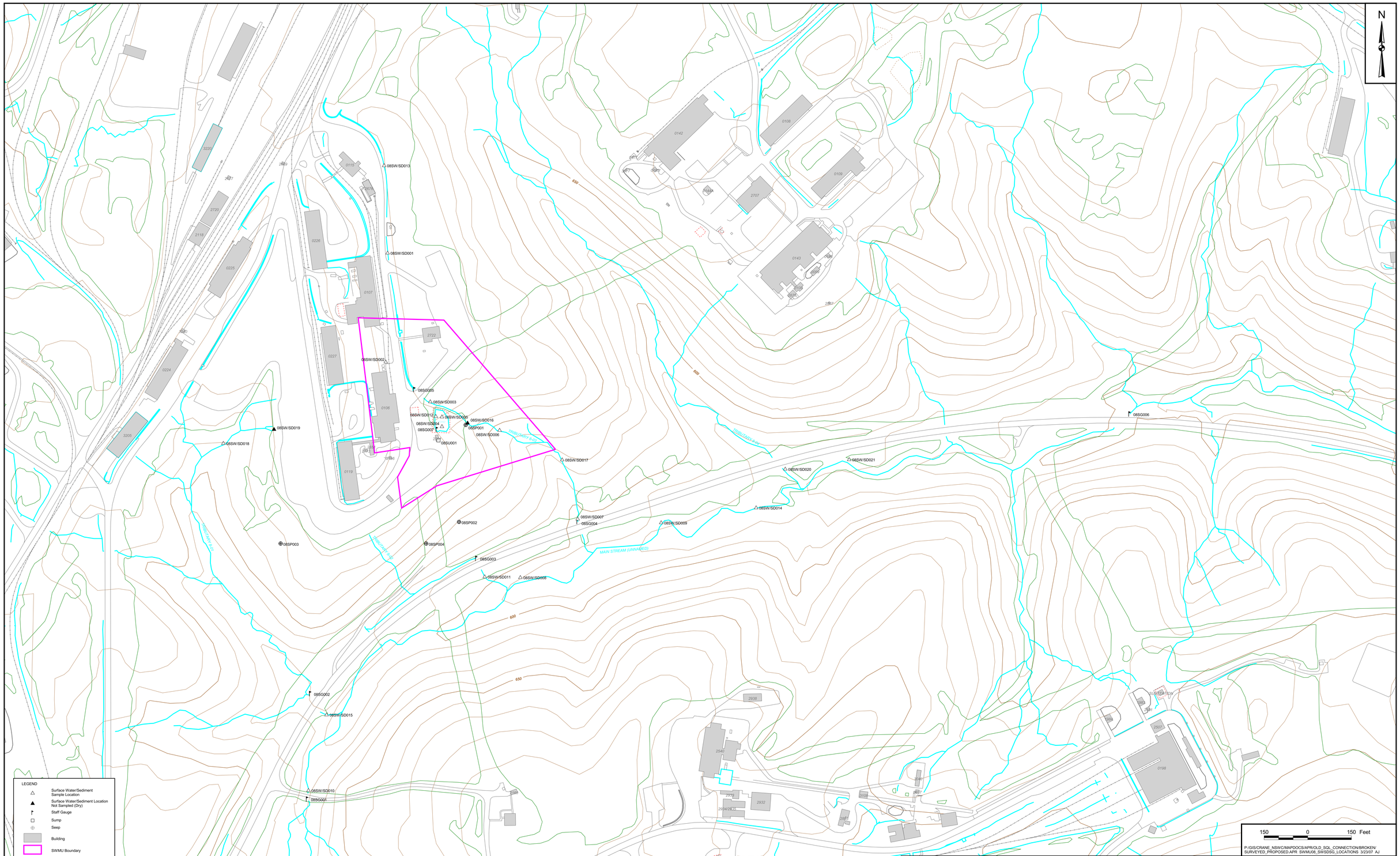
Sample Number	Energetics		Metals				VOCs	SVOCs			Pesticides	Herbicides	PCBs	Miscellaneous				Reason Sample Was Not Collected
	Nitroaromatics / Nitramines	Perchlorate	TAL Metals (total)	TAL Metals plus Tin (total)	TAL Metals (dissolved)	TAL Metals plus Tin (dissolved)(4)	8260B	8270C (1,4-dioxane only)	SVOCs (except PAHs)	PAHs				Fecal Coliform	Cyanide	CEC	TOC	

1 Subsurface samples were discretionary based on any positive photoionization detector (PID) readings measured during boring for temporary wells. No positive PID readings were measured, so no samples were collected.
X = Analyzed.
O = Omitted
AVS/SEM - Acid volatile/simultaneously extracted metals.
CEC - Cation exchange capacity.
SVOCs - Semivolatile organic compounds.
VOCs - Volatile organic compounds.
TOC - Total organic carbon.
TAL Metals - U.S. EPA Contract Laboratory Program Target Analyte List Metals.
PAHs - Polycyclic aromatic hydrocarbons
PCBs - Polychlorinated biphenyls.
-f - Filtered.

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SURVEYED_PROPOSED.APR SWMU08_SB_LOCATIONS 2/15/07 SP



DRAWN BY	DATE		SURVEYED SOIL BORING/TEMPORARY GROUNDWATER WELL LOCATIONS SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331	
K. PEILA	7/28/05			APPROVED BY —	DATE —
CHECKED BY	DATE			APPROVED BY —	DATE —
J. GOERDT	2/15/07				
COST/SCHEDULE-AREA					
SCALE AS NOTED		NAVFAC		DRAWING NO. FIGURE 2 - 1	REV 0



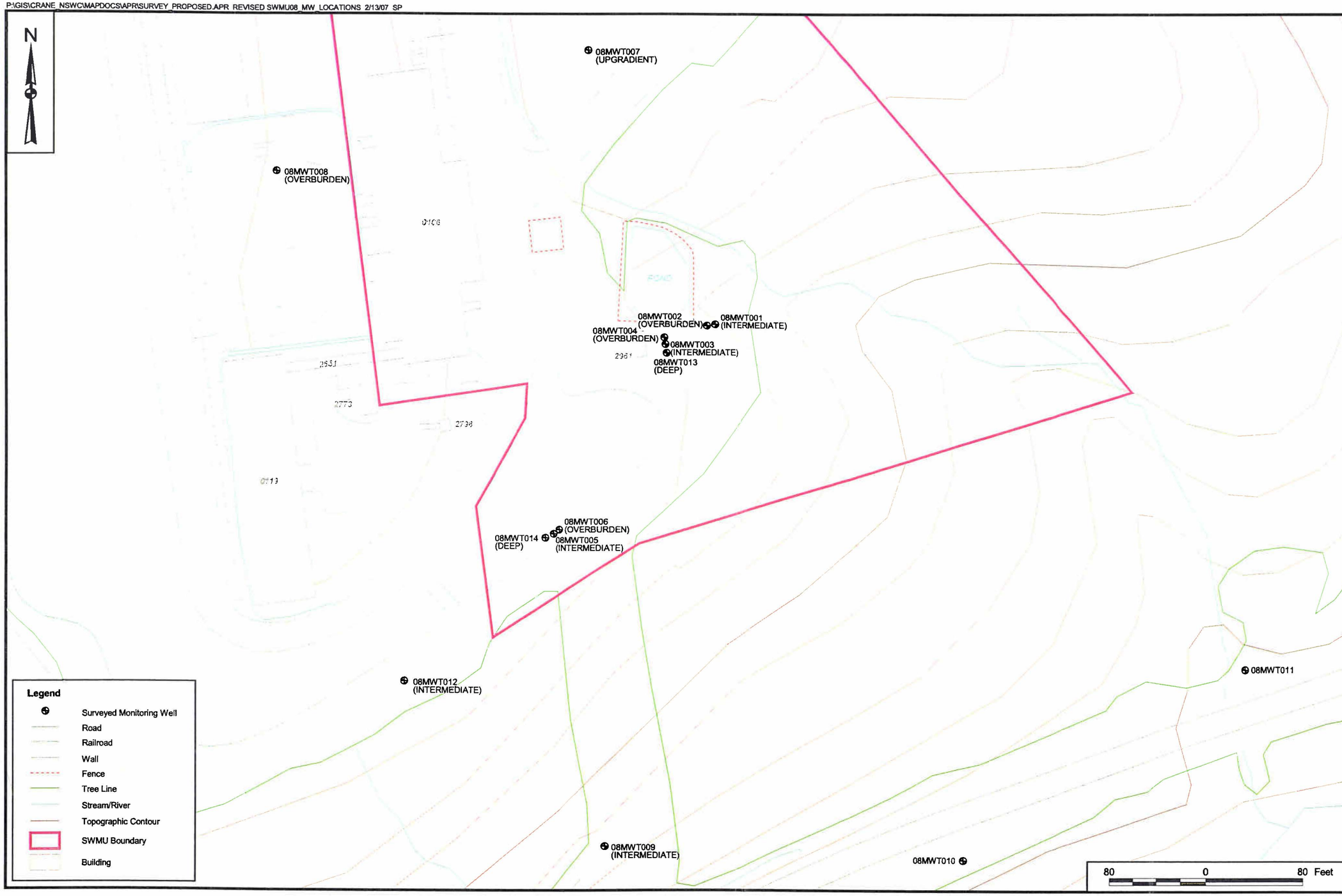
DRAWN BY	DATE
K. PEILA	9/21/05
CHECKED BY	DATE
J. GOERDT	3/23/07
CHECKED BY	DATE
A. JANOCHA	3/23/07
SCALE	
AS NOTED	

NAVFAC

SURFACE WATER/SEDIMENT, STAFF GAUGE,
SUMP AND SEEP LOCATIONS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

CONTRACT NO.	
1245	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 2 - 2	0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SURVEY_PROPOSED.APR REVISED SWMU08_MW_LOCATIONS 2/13/07 SP



CONTRACT NO.
CTO 0331

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 2 - 3

REV _

SURVEYED PERMANENT GROUNDWATER WELL LOCATIONS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY S. PAXTON DATE 2/13/07

CHECKED BY J. GOERDT DATE 2/13/07

COST/SCHED-AREA

SCALE AS NOTED

3.0 DATA PRESENTATION AND QUALITY

This section describes the analytical data and summarizes the quality of SWMU 8 data. Data presentation is provided in Section 3.1 and data quality is described in Section 3.2. Analytical data are presented in Appendix G. Additional detail concerning the data validation and post-validation quality review is presented in Appendix H.

3.1 DATA PRESENTATION

RFI data were collected by TtNUS in four sampling rounds from December 2004 to October 2006, as described in Section 2.0 of this report. A complete list of samples collected, and scheduled samples that were not collected, is presented in Table 2-3. Table 2-3 also provides brief explanations for why some samples were not collected. Laucks Testing Laboratory conducted the analyses, which are summarized for each sample in Table 2-3. Validation and quality review of the data were conducted by TtNUS as described in Section 3.2. The following subsections present descriptions of available background data and SWMU 8 site data.

3.1.1 Background Data Set Descriptions

3.1.1.1 Surface Soil Background Concentrations

In addition to the RFI data collection described above, soil samples were collected and analyzed in an effort to establish the concentrations of metals representative of the entire NSWC Crane complex (TtNUS, 2001). All metals likely to be included in NSWC Crane environmental investigations were analyzed in that effort. The intent was to provide background soil data sets that could be used to gain perspective on whether observed metals concentrations in SWMU soils are indicative of background concentrations.

Soil samples were classified into Soil Groups that uniquely represent the chemical and physical soil characteristics by which various Crane soils differ. Those characteristics are as follows:

- Geological parent material [referred to as depositional environment in TtNUS (2001)]
- Depth (surface or subsurface)
- Grain size

The details of sample collection and data generation are provided in TtNUS (2001). For SWMU 8, there is one depositional environment (Pennsylvanian) and two depths (surface and subsurface). In the

subsurface, there are three distinct grain size classifications. Based on chemical analyses and extensive statistical testing, the Soil Group determined to represent SWMU 8 surface soils is as follows:

- Soil Group 3 – Alluvial, Mississippian, and Pennsylvanian surface soil

Table 3-1 presents background concentration ranges and related statistics for all NSWC Crane soils, regardless of depositional environment, depth, or grain size. This table helps the data user understand how an individual SWMU-specific background data set compares to the data set for all of NSWC Crane. Table 3-2 presents surface soil background data summaries specific to SWMU 8 (Alluvial, Mississippian, and Pennsylvanian surface soil). The tables indicate the metals that were analyzed, frequencies of detection, measured concentration ranges, simple summary statistics, locations of maximum observed concentrations, estimates of the statistical distribution shapes, and estimates of the concentrations [95-percent upper tolerance limits (UTLs)] that encompass 95 percent of the data, on average. References to samples numbers and locations are specific to TtNUS (2001).

3.1.1.2 Subsurface Soil Background Concentrations

Similar to surface soils, the NSWC Crane basewide background soil collection effort determined that the following two distinct Soil Groups represent SWMU 8 subsurface soil metals concentrations for background soils:

- Soil Group 8 - Pennsylvanian Subsurface Clay and Silt
- Soil Group 9 - Pennsylvanian Subsurface Sand

Tables 3-3 and 3-4 present the data associated with these soil groups. The presentation is similar to the data presentations of Tables 3-1 and 3-2, described in Section 3.1.1.1.

3.1.1.3 Surface Water, Sediment, and Groundwater Upgradient Concentrations

For mobile environmental media such as surface water, sediment, and groundwater, “background” concentrations are represented by upgradient data. These locations represent concentrations of chemicals that are unaffected by SWMU operations. The upgradient locations are not necessarily free from contamination, but they do represent locations that are free from site-related contamination.

During this investigation, permanent groundwater monitoring wells were installed, and one upgradient groundwater location, 08MWT007, was identified. Surface water was divided into three main groups,

Tributaries, Main Stream, and Sump, so that the various sample groups could be referenced efficiently. The stream segments eventually flow via Bogg's Creek located east of SWMU 8 into Turkey Creek located southeast and south of SWMU 8. Sampling location 08SW/SD013 represents upgradient conditions for the Tributary group, and location 08SW/SD010 represents upgradient conditions for the Main Stream group. There is no upgradient condition for sumps. In the Appendix G tables, upgradient samples are marked as "UPGRAD."

3.1.2 Data Set Descriptions

3.1.2.1 Surface Soil Site Data

During the RFI, select surface soil samples were collected for explosives, metals, SVOC, VOC, herbicide, pesticide, and PCB analyses, depending on the sampling round, as described in Section 2.0. Some surface soil samples were not collected as proposed. Brief explanations for why certain samples were not collected are provided in Section 2.0 and Table 2-3.

The data for SMWU 8 surface soils are summarized in Tables 3-5 through 3-12. These tables represent groups of surface soil samples according to characteristics that define mutually exclusive populations. One group represents surface samples near the Building 106 Pond and hence potentially contaminated by chemicals found in the pond (Tables 3-5 and 3-9). Another group represents surface soil samples collected in areas covered by grass or relatively permeable pavement such as gravel (Tables 3-6 and 3-10). The last two groups identify surface soil samples associated with either Building 106 and asphalt paved areas immediately around the building (Tables 3-7 and 3-11) or with Building 107 and the paved area immediately around Building 107 (Tables 3-8 and 3-12). Appendix Table G-1 is a list of all surface and subsurface soil data generated during Round 1. This table is subdivided into four sections, G-1a, G-1b, G-1c, and G-1d, to facilitate identification of samples associated with particular site features, i.e., samples located in areas of grass or gravel, samples in Buildings 106 or 107, and samples located in the pond. The sample results are arranged according to vertical depth at each location to facilitate an understanding of the vertical concentration profile for each parameter. Tables 3-5 through 3-8 indicate how often each chemical was detected, the locations of the maximum and minimum detections, etc. Tables 3-9 through 3-12 are similar to Table G-1, but display results only for chemicals that were detected at least once in surface soil. For each chemical that falls into this category, all results, including non-detects and rejected values, are shown.

3.1.2.2 Subsurface Soil Site Data

During the RFI, select subsurface soil samples were collected for explosives, metals, SVOC, VOC, herbicide, pesticide, and PCB analyses, depending on the sampling round, as described in Section 2.0.

Some subsurface soil samples were not collected as scheduled. Explanations for why certain samples were not collected or were collected in addition to the scheduled sample collections are provided in Section 2.0 and Table 2-3. At six sampling locations, subsurface soil samples were collected but were only to be analyzed if the surface soil data at the same location indicated that contaminant concentrations were high enough to cause significant subsurface soil contamination. Many of the surface soil samples had no significant contamination; therefore, the subsurface soil samples were not analyzed for select parameters. The last sampling occurred in October, 2006 in a final attempt to delineate contamination south of Building 106 and determine whether there is a source of VOC contamination in that area. Sampling was limited to subsurface soil.

The data for SMWU 8 subsurface soils are summarized in Tables 3-13 through 3-20 and are grouped into the same groups (i.e., Pond, Grass and Gravel areas, Building 106, Building 107) as surface soil samples. Tables G-1a through G-1d list all surface and subsurface soil data generated during Round 1, with samples arranged at each sampling location by vertical depth. Tables 3-13 through 3-16 indicate how often each chemical was detected, the locations of the maximum and minimum detections, etc. Tables 3-17 through 3-20 are similar to Table G-1, but display results only for chemicals that were detected at least once in subsurface soil. For each chemical that falls into this category, all results, including non-detects and rejected values, are shown.

3.1.2.3 Surface Water Site Data

Data from surface water samples collected during the RFI are summarized in Tables 3-21 through 3-26. The surface water samples were analyzed for various combinations of explosives, total and dissolved metals, SVOCs, VOCs, PCBs, and water quality parameters (e.g., temperature and pH). Details of the analyses performed are presented in Table 2-3.

After surface water and sediment data review, the surface water data were divided into three sets. One data set (Pond Surface Water, Tables 3-21 and 3-24) represents the Building 106 Pond, which received process waters from Building 106 and 107 and is the most contaminated surface water body. Another data set (Tributaries, Tables 3-22 and 3-25) represents samples collected in what are considered to be intermittent drainage channels of relatively small size and limited availability of water. The third data set

(Main Stream, Tables 3-23 and 3-26) represents the most downgradient surface channel locations. These locations are in the southeastern and southern region of the sampled area. There are no upgradient surface water samples for the Building 106 Pond; upgradient data for the Tributary and Main Stream groups are presented in the same tables as the downgradient data because only one upgradient location was sampled for each of these groups.

The summary formats for surface water are similar to those described for surface and subsurface soils (see Sections 3.1.2.1 and 3.1.2.2). A complete printout of all surface water data is presented in Appendix Tables G-2. The upgradient surface water samples (08SW01301, 08SW01001, and 08SW01002) are labeled as “UPGRAD” in those tables.

3.1.2.4 Sediment Site Data

Select sediment samples were analyzed for various combinations of explosives, total and dissolved metals, SVOCs, VOCs, and PCBs (see Table 2-3). Sediment chemistry data are presented in Tables 3-27 through 3-32 for the same groupings as described for surface water in the previous section: Pond, Tributary, and Main Stream. The summary formats of sediment data tables in this section are similar to those described for surface and subsurface soils (see Sections 3.1.2.1 and 3.1.2.2). Appendix Table G-3 presents all sediment data generated during the RFI. The upgradient samples (08SD013010006 and 08SD011010006) are labeled as “UPGRAD” in those tables.

Perchlorate was detected in sediment samples using EPA analytical method 314.0. This method, however, is known for yielding false detections because other chemicals in the sample can appear as chlorate during analysis. Therefore, several samples in which perchlorate appeared to have been detected were analyzed by a more definitive method, Method 8321. This method has much lower detection limits than method 314.0 and it is far less subject to false detections. In particular, samples 08SD002010006, 08SD003010006, 08SD004010012, 08SD004011224, 08SD005011224, 08SD007010006-D were analyzed using method 8321. Perchlorate was not detected in any of the perchlorate confirmation samples. Therefore, the original detections were concluded to be false detections and perchlorate was concluded not to be present in any of the samples analyzed at this site.

3.1.2.5 Groundwater Site Data

During the RFI, groundwater samples were collected from select soil borings to represent groundwater that is perched above bedrock or in the shallow bedrock. The groundwater samples were analyzed for

various combinations of explosives, total and dissolved metals, SVOCs, VOCS, fecal coliform, and water quality parameters. See Table 2-3 for a summary of the analyses performed.

The groundwater samples were grouped into subsets representing unique populations, similar to the subgrouping done for other media, including Shallow Bedrock and Overburden, Intermediate Zone, and Deep Zone. The Intermediate Zone represents bedrock conditions at depths that are intermediate to the overburden and the Deep Zone. The Deep Zone data represent bedrock from the deepest sampled elevations. Summary statistics for groundwater data are presented in Tables 3-33 through 3-35. Data for all chemicals detected at least once in groundwater are presented in Tables 3-36 through 3-38. There is a single upgradient groundwater location from which three samples were collected (08GWT00701, 08GWT00701-F, and 08GWT00702). These samples are labeled as “UPGRAD” in the tables. Appendix Table G-4 presents all groundwater data generated during the RFI.

3.1.2.6 Sump Surface Water

Water was collected from one sump located southwest of the Building 106 Pond. The sample was analyzed for various combinations of explosives, total and dissolved metals, SVOCs, VOCs, fecal coliform, and water quality parameters (see Table 2-3).

This sample represents a unique data population and was segregated from the other samples. There is no upgradient location to serve as a point of reference for the data from the sump. Summary statistics for the sump data are presented in Table 3-39. Table 3-40 presents data for all chemicals detected at least once in water from the sump. Table G-5 presents all data for this sample regardless of whether the parameter was detected.

3.1.2.7 Seep Surface Water

Seep water was collected from one seep located east of the Building 106 Pond. The sample was analyzed for total and dissolved metals, SVOCs, VOCs, fecal coliform, and water quality parameters (see Table 2-3). Because this sample is an expression of groundwater at the ground surface, it represents a transition from groundwater to surface water. Therefore, data from this sample were included with the surface water Tributary data (Tables 3-22 and 3-25). The complete data set for this sample is included in Appendix G, Table G-2.

3.1.2.8 Sample Nomenclature Change

Two different sediment depths were sampled in Round 1 at locations 08SW/SD004 and 08SW/SD005, in the Building 106 Pond. The sediment samples collected from those locations were labeled as 08SD00401, 08SD00402, 08SD00501, and 08SD00502. The last two digits indicated different sampling depths for each location. However, when additional sediment samples were collected in Round 2, it was not possible to indicate both a different sampling depth and a different round number without changing the structure of the sample numbers. Therefore, sediment sample numbers 08SD00401, 08SD00402, 08SD00501, and 08SD00502 were changed to 08SD004010012, 08SD004011224, 08SD005010012, and 08SD005011224, respectively. The first seven characters are identical to the original seven characters. The eighth and ninth characters represent the sampling round number, and the last four characters represent the sampling depth in inches. All other sediment sample numbers were changed in a similar manner, where necessary, so that the numbering scheme was consistent across all sediment samples.

The rest of this report is devoted to an interpretation of the data and data quality to support the RFI objectives. This interpretation begins in Section 3.2 with a summary of the data quality.

3.2 DATA QUALITY SUMMARY

Data Quality Indicators (DQIs) are parameters that are monitored to help establish the quality of data generated during an investigation. Some of the DQIs are generated from analysis of field samples (e.g., field duplicates) and some are generated from the analysis of laboratory samples [e.g., laboratory duplicate and matrix spike (MS) sampling]. Individually, field and laboratory DQIs provide measures of the performance of the respective investigative operations (field or laboratory). During data validation, individual QC results were evaluated. If individual QC results were acceptable, no validation flag was assigned to an analytical result; otherwise, a flag indicating the type of QC deficiency was assigned to the result. The data quality review provided in this section, which was implemented after the data validation process was completed, is not designed to identify data that are acceptable or unacceptable according to data QC criteria. Instead, it is designed to provide an overall quantitative measure of analytical performance not provided by data validation. These quantitative evaluations are frequently analyte specific. They reflect, for example, biases associated with the quantification of particular analytes in a particular sample matrix. Many of the summary tables referenced in the sections below reflect this, and the data user must be aware that even chemicals in the same analytical fraction (e.g., VOCs) may exhibit different data quality. Taken together, the DQIs provide a measure of overall analytical performance.

At approximately the same time that the samples were collected at SWMU 8, samples were also collected at NSWC Crane SWMUs 15, 18, 19, and 20. More than 90 percent of the QC samples were from SWMUs 8 and 15; therefore, most of the QC data and statistics are directly related to SMWUs 8 and 15. The sample matrices of these SWMUs (i.e., 8, 15, 18, 19, and 20) are similar enough that similar laboratory performance is expected, regardless of the SWMU from which the samples were taken. Therefore, samples of similar matrix from these SWMUs may have been grouped together for analysis. This is a benefit when compiling accuracy and precision statistics because a more robust estimate of these characteristics is obtained when using larger data sets. Generally speaking, all aqueous samples are expected to yield similar laboratory performance, and soil and sediment samples are expected to yield similar laboratory performance. Because data sets were combined, data quality is presented and discussed below for the combined data sets. This includes the sump water sample (08SU00101), which did not seem to exhibit any unique behavior with respect to analytical performance.

Hexachlorophene and pentachlorophenol are not herbicides, but these compounds were analyzed by an herbicide analytical method to obtain lower detection limits than could be obtained with the normally used SVOC analytical method. Therefore, these compounds are discussed as herbicides in the following text. The general data quality is summarized below and additional details are provided in Appendix H

Overall Sample and Data Precision, Accuracy, Representativeness , Comparability, Completeness, and Sensitivity

Sample collection deviated somewhat from the proposed sampling strategy. Table 2-3 shows the samples that were collected and the analytical fractions for which they were analyzed. Brief explanations are also given in Table 2-3 for having not collected samples that were scheduled to be collected. If a sample was not collected, it was typically because the intended sampling location no longer existed, there was no surface water or groundwater at or near the intended sampling location, or because refusal was encountered during installation of a soil boring. Some samples were to be collected and extracted for analysis but that the decision to analyze them would be made after reviewing other data. In all cases, the extract and hold samples required no analysis, and lack of data for those samples is not a deficiency. If the total number of planned samples is used as the basis for computing the percent completeness for sample collection, several matrix-analytical fraction combinations yield a percentage less than the target of 90 percent. However, if only those samples are included that were collectable because of the prevailing field conditions, the percent complete is greater than the 90 percent target for most combinations of matrix and analytical fraction (see Appendix H, Section H.3 and Table H-1). The exception is sediment for which lack of a single sample prevented attainment of the 90 percent goal for a few analytical fractions. The failure to attain the 90 percent goal in both cases (i.e., including and

excluding aqueous samples that were not collected because of lack of water) must be considered when evaluating the data.

A significant deviation from the intended sampling scheme occurred for coliform analyses, but the deviation did not have a negative impact on the project. Details are provided in Appendix H. Briefly, total coliform analyses were requested instead of fecal coliform analyses for Round 2 samples. Because the origin of a sewer-like odor turned out to be unrelated to Building 106 and 107 military operations, these erroneous analysis requests had no negative consequence. Nevertheless, the lack of fecal coliform data for surface water/sump and seep samples is noted as a deficiency in Appendix H, Table H-1.

For all samples that were collected, laboratory percent completeness was computed based on the total number of results expected versus the total number of acceptable (i.e., non-rejected) results, for each combination of analytical fraction and matrix. The target of 90 percent was exceeded in all cases. Nevertheless, there were parameters for which the completeness was significantly affected by having several rejected results in a particular matrix. Many of the affected parameters are known to exhibit poor analytical responses, and rejections of results for those parameters are not considered to be detrimental to the project. These and other rejected results that are more significant are discussed where appropriate in the following sections.

Based on a review of field logs, all samples appear to be representative of the intended environmental matrices. Lack of data where samples could not be collected or where data have been rejected, however, should be considered when evaluating representativeness of the areas or volumes of environmental media that were characterized. This affects primarily surface water samples that were not collected because there was no surface water in the targeted drainage channels. Inability to achieve target detection limits or risk-based target levels (RBTLs) in several cases should also be considered (see Appendix H, Section H.3.2). In addition, disparities between total and dissolved metals concentrations must be considered when interpreting the data (see Appendix H, Section H3.6). Some dissolved metals concentrations exceeded total metals concentrations in the same sample. This is common when concentrations are near detection limits or when random measurement uncertainties cause the dissolved metals concentrations to be slightly (e.g., 30 percent) greater than the total metals concentrations. Nickel and lead results exhibited the most frequent and greatest percentage deviation in this regard, and some of the deviations occurred for results that were greater than five times the maximum non-detect concentration. For these results, the disparities are significant. The significant disparities occurred for nickel in samples 08SW00101, 08SW00401, 08SW00402, 08SW00501, 08SW00502, 08SW00601, 08SW00701, 08SW00701-D, 08SW00901, and 08SW01401, for lead in samples 08SW00401, 08SW00902, and 08SW01401, for selenium and sodium in sample 08GWT00601, and for magnesium

and potassium in sample 08GWTW001. In these cases, it may be reasonable to consider the total metals concentrations to be equal to the dissolved metals concentrations.

In the October 2006 soil sampling, a large discrepancy was evident between the original and duplicate sample VOC results collected at soil boring 08SB51. The discrepancy appeared to be alarming at first, but the impact is mitigated by the fact that the detected compounds do not appear to be related to site operations. Instead, they appear to represent an isolated gasoline spill southeast of Building 106.

In addition to the DQIs discussed in detail in Appendix H, temperature blanks that accompanied each cooler containing samples were used to assess whether the samples had been stored at the appropriate temperature during shipping. All temperature blanks were less than or equal to 4 degree Celsius (°C), indicating no deficiencies with regard to shipping temperature, hence no representativeness deficiencies related to sample storage and shipping.

No particular sensitivity problems were noted. Some compounds could not be detected at concentration levels commensurate with RBTLs, but this was known at the outset of the investigation. The affected chemicals are either not significant site-related contaminants or it was not practical to try to reduce detections limits further because the disparity between the laboratory detection limit and RBTL was sometimes an order of magnitude or more and would have required non-routine analytical methods or method development efforts that were beyond the needs of the project.

Whereas individual analytes may have exhibited quality problems for particular sample batches and QC type [e.g., MS or laboratory control sample (LCS)], overall data quality was acceptable for the intended uses (i.e., completion of the RFI, including human health and ecological risk assessments). Each section in Appendix H addresses data quality in more detail for a particular DQI for samples of a given matrix (solid or aqueous) and analytical fraction (e.g., metals or VOCs). Brief summaries of data quality are presented below by analytical fraction.

Explosives and Perchlorate

Accuracy and precision QC indicators were generally within or very slightly outside of the reference ranges, and the results for these compounds may be used without qualification.

Fecal and Total Coliform Bacteria

No analytical performance problems were identified for these parameters; therefore, fecal and total coliform bacteria results may be used without qualification. Note that coliform analyses were reported instead of fecal coliforms for Round 2 samples.

Grain Size and Total Organic Carbon

All TOC results were generated as planned, and completeness was 100 percent. No significant analytical problems were detected for this analyte; therefore, these results may be used without qualification.

Herbicides

Only four surface and 12 subsurface soil samples were scheduled for herbicide analysis. The dinoseb, hexachlorophene, and pentachlorophenol results exhibited a severe to moderate low bias [approximately 19 to 88 percent recoveries in MSs and matrix spike duplicates (MSDs)] in solids. This is evident from consistently low percent recoveries for MSs and LCSs. This low bias indicates that reported results are likely to be less than site concentrations. The degree of bias is analyte specific and may vary with concentration. Precision measures were generally within expectations.

Semivolatile Organic Compounds Including Polycyclic Aromatic Hydrocarbons

Results for 19 different SVOCs were rejected in various matrices. Not all of the compounds were rejected in every matrix or sample, and the matrix-specific rejections are shown in Table H-3 of Appendix H. Minimum and maximum non-detect values exceeded the RBTLs for several analytes, but the nominal detection and reporting limits were typically achieved (see Appendix H, Tables H-4 through 9). This indicates that the failure to achieve the RBTLs is not an analytical deficiency. Recoveries in LCSs, MSs, and MSDs were generally biased low in solid and aqueous matrices (Tables H-10 and H-11). The parameters exhibiting the most negative bias were 2,4-dimethylphenol, 2,4-dinitrophenol, 2-nitrophenol, 3,3‘dichlorobenzidine, 4,6-dinitro-2-methylphenol, 4-chloroaniline, 4-nitrophenol, and hexachlorocyclopentadiene. Mean percent recoveries for these analytes are shown in Appendix H, Tables H-10 and H-11, for solid and aqueous samples, respectively. The mean recoveries indicate the type or performance to be expected on average for these compounds. SVOC results rejected for soil and sediment samples were limited to 2,4-dimethylhenol, 3,3’-dichlorobenzidine, 4-chloroaniline, 4-nitroquinoline-1-oxide, and kepone. For groundwater samples and the sump water sample, the rejections were for 4-nitroquinoline-1-oxide and kepone only, whereas for drainage channel surface water samples, 17 compounds were rejected in at least one sample. Calibration non-compliances frequently

occurred for target compounds that have poor analytical responses, and these cases (except the phenolic compounds) were no exceptions. Overall, the semivolatile compounds, including polycyclic aromatic hydrocarbons (PAHs), show a slight to moderate low bias in solid and liquid matrices. In soils, the 4-chloroaniline and 3,3'-dichlorobenzidine results are markedly less precise than the other SVOCs, with uncertainty for other compounds being typical, even though low MSs were observed for compounds other than 4-chloroaniline.

Total Metals and Cyanide

Mean metals recoveries (bias indicators) were generally well within the range of 75 to 125 percent, indicating that, on average, metals results are not significantly biased. Some individual metals recoveries, however, were unusually high or low for a few isolated samples. The extreme recoveries were typically associated with cases where the spiked amount of analyte was more than 25 percent of, but significantly less than, the native analyte concentration in the unspiked sample. In this situation, the amount of spike added meets the criterion of a valid QC indicator, but it is a borderline case that does not increase the native concentration sufficiently to provide an accurate assessment of accuracy. More detail is provided in Appendix H, Section H.3.3.

Several soil and sediment precision [i.e., relative percent differences (RPDs)] measures exceeded the reference point of 50 percent for solid matrices. Many of the RPD values that exceeded the reference ranges (30 percent for aqueous matrices and 50 percent for solid matrices) were caused by results being comparable to detection limits. In this concentration range, the relative analytical uncertainty is greater than at higher concentrations. Nevertheless, several metals exhibited some high RPD values (e.g., greater than 100 percent) and sporadically high or low bias indicators that represent an occasional large degree of heterogeneity or possible infiltration of laboratory contamination. The precision for field duplicate sample metals data appeared to be comparable to or better than laboratory duplicate precision. Some SVOC parameters also exhibited occasional large RPD values for laboratory duplicates. The majority of RPD values exceeding the 50 percent reference point for sediment came from location 08SW/SD12, which is in the Building 106 Pond. Appendix H, Section H.3.4 provides more detail on the degree of laboratory precision.

Pesticides and Polychlorinated Biphenyls

A few individual pesticide recoveries were less than the 70 to 125 percent target range. On average, no significant bias problems were detected with these analytes except for a moderate low bias in endrin aldehyde results for solid and liquid matrices. Mean MS recoveries ranged from 50 to 54 percent for solid

samples and from 67 to 71 percent for aqueous samples for endrin aldehyde. RPD data indicated that precision was acceptable.

Volatile Organic Compounds

The compounds acetone, acetonitrile, acrolein, dichlorodifluoromethane, isobutanol, and propionitrile constitute all of the parameters with results rejected for volatile analyses across all matrices and all sampling rounds. In October 2006 sampling however, only acrolein results were rejected (in every soil sample collected). The data were rejected because these compounds yielded poor analytical responses. This behavior was expected at the outset of the investigation. This is a systematic problem that occurred for one or more of these compounds in the majority of the samples analyzed from SWMU 8. These chemicals are of minor significance to the project. Mean recoveries averaged about 79 percent across all analytes in solid MSs/MSDs and about 100 percent across all analytes in aqueous MSs/MSDs. Individual recoveries spanned a larger range and were indicative of a slight to moderate low bias in solid samples but no significant bias in aqueous samples. Precision was generally acceptable with some exceptions associated with individual soil samples (see Appendix H, Section H.3.4).

TABLE 3-1

DESCRIPTIVE STATISTICS
COMPLETE BACKGROUND SOIL SAMPLE DATA SET
SWMU 8 - BUILDING 106 POND[1]
NSWC CRANE
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Distribution of Data	95-Percent Upper Tolerance Limit
ALUMINUM	67/67	5,020	17,400	11,290	11,100	NORMAL	17,400
ANTIMONY	8/67	0.49	11.3	0.86	4.36	LOGNORMAL	2.88
ARSENIC	67/67	1.1	10.2	5.28	5.20	NORMAL	9.60
BARIUM	67/67	24.8	155	69.7	68.8	LOGNORMAL	147
BERYLLIUM	14/67	0.3	0.82	0.36	0.47	LOGNORMAL	0.85
CADMIUM	34/67	0.05	3.6	0.36	0.62	LOGNORMAL	2.05
CALCIUM	66/67	53.6	35,300	997	1,010	LOGNORMAL	3,350
CHROMIUM	67/67	7.7	30.6	16.4	16.1	LOGNORMAL	29.1
COBALT	67/67	1.8	27.1	8.70	8.62	LOGNORMAL	21.7
COPPER	67/67	3.5	23.8	10.2	10.0	LOGNORMAL	21.4
IRON	67/67	7,140	40,800	18,100	17,800	LOGNORMAL	34,500
LEAD	67/67	6.4	21.5	11.9	11.7	LOGNORMAL	19.7
LITHIUM	66/66	7.8	46.6	16.1	15.7	LOGNORMAL	29.4
MAGNESIUM	67/67	496	2,870	1,410	1,390	LOGNORMAL	3,060
MANGANESE	67/67	23.2	3,040	599	590	LOGNORMAL	3,270
MERCURY	17/67	0.04	0.14	0.033	0.062	LOGNORMAL	0.072
NICKEL	67/67	4.6	23.7	11.9	11.7	NORMAL	18.7
POTASSIUM	67/67	280	1,650	856	833	NORMAL	1,370
SELENIUM	15/67	0.28	0.88	0.33	0.53	LOGNORMAL	0.83
SILVER	48/67	0.04	0.11	0.049	0.055	LOGNORMAL	0.10
SODIUM	32/67	3.7	205	33.0	56.2	LOGNORMAL	232
STRONTIUM	66/66	4.2	63.2	12.3	12.1	LOGNORMAL	25.3
THALLIUM	66/67	0.05	0.31	0.18	0.18	NORMAL	0.29
TIN	0/67	NA	NA	0.32[2]	NA	NA	NA
THORIUM	66/66	4.1	11.7	7.24	7.11	LOGNORMAL	10.9
VANADIUM	67/67	14.1	48.5	26.5	26.2	LOGNORMAL	45.8
ZINC	50/67	9.4	60.2	28.1	32.0	NORMAL	54.0

Notes:
NA - Not available.
mg/kg - Milligrams per kilogram.

1 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, Naval Surface Warfare Center Crane, Crane, Indiana (TtNUS, 2001).
2 - This value is the average of all detected and non-detected values. Non-detected values were represented by one-half the detection limit. This value was used for statistical analysis when no detections were encountered.

TABLE 3-2

DESCRIPTIVE STATISTICS
SOIL GROUP 3 - ALLUVIAL, MISSISSIPPIAN, AND PENNSYLVANIAN SURFACE SOIL
SWMU 8 - BUILDING 106 POND[1]
NSWC CRANE
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Distribution of Data	95-Percent Upper Tolerance Limit
ALUMINUM	15/15	6,770	17,400	10,238	10,238	LOGNORMAL	19,900
ANTIMONY	2/15	1.4	5.6	0.83	3.50	LOGNORMAL	6.9
ARSENIC	15/15	2.4	10.2	6.11	6.11	NORMAL	11.83
BARIUM	15/15	46.1	153	89.0	89.0	LOGNORMAL	211
BERYLLIUM	1/15	0.49	0.49	0.40	0.49	LOGNORMAL	0.93
CADMIUM	10/15	0.1	3.6	0.63	0.88	LOGNORMAL	6.05
CALCIUM	14/15	115	35,300	2,730	2,920	LOGNORMAL	55,200
CHROMIUM	15/15	8.5	21.7	14.6	14.6	LOGNORMAL	28.7
COBALT	15/15	6	27.1	12.9	12.9	LOGNORMAL	32.4
COPPER	15/15	5.4	17.1	8.85	8.85	LOGNORMAL	17.6
IRON	15/15	10,700	36,200	16,800	16,800	LOGNORMAL	37,400
LEAD	15/15	9.4	21.5	15.0	15.0	LOGNORMAL	27.0
LITHIUM	14/14	9.1	29.9	14.8	14.8	LOGNORMAL	30.0
MAGNESIUM	15/15	620	2,250	1,200	1,200	LOGNORMAL	2,800
MANGANESE	15/15	268	3,040	1,140	1,140	LOGNORMAL	5,700
MERCURY	7/15	0.04	0.07	0.037	0.051	NORMAL	0.077
NICKEL	15/15	9.2	20	13.4	13.4	LOGNORMAL	22.1
POTASSIUM	15/15	418	1,490	847	847	LOGNORMAL	1,970
SELENIUM	5/15	0.51	0.64	0.48	0.58	NORMAL	0.81
SILVER	15/15	0.05	0.11	0.065	0.065	LOGNORMAL	0.130
SODIUM	6/15	9.4	23.7	8.11	15.6	NORMAL	28
STRONTIUM	14/14	7.4	63.2	14.3	14.3	LOGNORMAL	46.4
THALLIUM	15/15	0.1	0.27	0.19	0.19	NORMAL	0.31
TIN	0/15	NA	NA	0.36[2]	NA	NA	NA
THORIUM	14/14	5.3	8.5	6.86	6.86	LOGNORMAL	10.2
VANADIUM	15/15	17.1	40	25.4	25.4	LOGNORMAL	51.2
ZINC	14/15	24.4	60.2	37.0	38.6	NORMAL	65.6

Notes:
NA - Not available.
mg/kg - Milligrams per kilogram.

1 - Taken from Table 4-4 of the Final Basewide Background Soil Investigation Report, Naval Surface Warfare Center Crane, Crane, Indiana (TtNUS, 2001).
2 - This value is the average of all detected and non-detected values. Non-detected values were represented by one-half the detection limit. This value was used for statistical analysis when no detections were encountered.

TABLE 3-3

DESCRIPTIVE STATISTICS
SOIL GROUP 8 - PENNSYLVANIAN SUBSURFACE CLAY AND SILT
SWMU 8 - BUILDING 106 POND[1]
NSWC CRANE
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Distribution of Data	95-Percent Upper Tolerance Limit
ALUMINUM	9/9	9,070	16,200	13,019	13,019	NORMAL	20,600
ANTIMONY	1/9	11.3	11.3	1.83	11.30	LOGNORMAL	40.3
ARSENIC	9/9	1.4	8.5	5.51	5.51	NORMAL	12.5
BARIUM	9/9	25.1	83.4	57.0	57.0	NORMAL	115
BERYLLIUM	0/9	NA	NA	0.36 [2]	NA	NA	NA
CADMIUM	8/9	0.05	0.64	0.26	0.28	NORMAL	0.8
CALCIUM	9/9	85.2	970	470	470	LOGNORMAL	4,640
CHROMIUM	9/9	14.2	27.1	19.9	19.9	NORMAL	33.0
COBALT	9/9	5.2	12.5	8.32	8.32	LOGNORMAL	21.2
COPPER	9/9	11	23.8	15.3	15.3	LOGNORMAL	33.3
IRON	9/9	14,800	40,800	24,422	24,422	LOGNORMAL	60,200
LEAD	9/9	8.6	15.2	11.8	11.8	NORMAL	19.6
LITHIUM	9/9	13.7	46.6	23.2	23.2	LOGNORMAL	80.0
MAGNESIUM	9/9	1,100	2,870	1,958	1,958	NORMAL	3,410
MANGANESE	9/9	29	457	263	263	NORMAL	704
MERCURY	1/9	0.14	0.14	0.037	0.140	LOGNORMAL	0.18
NICKEL	9/9	10	23.7	13.6	13.6	LOGNORMAL	29.6
POTASSIUM	9/9	718	1290	974	974	LOGNORMAL	1,890
SELENIUM	8/9	0.37	0.88	0.47	0.51	NORMAL	1.07
SILVER	8/9	0.05	0.1	0.053	0.056	LOGNORMAL	0.14
SODIUM	6/9	10	205	64.0	79.1	LOGNORMAL	1,070
STRONTIUM	9/9	10	20.3	13.8	13.8	LOGNORMAL	30.9
THALLIUM	9/9	0.14	0.25	0.20	0.20	LOGNORMAL	0.33
TIN	0/9	NA	NA	0.35 [2]	NA	NA	NA
THORIUM	9/9	7.1	11.7	9.02	9.02	NORMAL	14.9
VANADIUM	9/9	20.9	48.5	33.2	33.2	LOGNORMAL	69.1
ZINC	9/9	24.3	58.2	37.1	37.1	LOGNORMAL	83.3

Notes:
NA - Not available.
mg/kg - Milligrams per kilogram.

1 - Taken from Table 4-9 of the Final Basewide Background Soil Investigation Report, Naval Surface Warfare Center Crane, Crane, Indiana (TtNUS, 2001).
2 - This value is the average of all detected and non-detected values. Non-detected values were represented by one half the detection limit.

TABLE 3-4

DESCRIPTIVE STATISTICS
SOIL GROUP 9 - PENNSYLVANIAN SUBSURFACE SAND
SWMU 8 - BUILDING 106 POND[1]
NSWC CRANE
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Distribution of Data	95-Percent Upper Tolerance Limit
ALUMINUM	1/1	5,430	5,430	5,430	5,430	NA	NA
ANTIMONY	0/1	NA	NA	0.38 [2]	NA	NA	NA
ARSENIC	1/1	2.9	2.9	2.90	2.90	NA	NA
BARIUM	1/1	24.8	24.8	24.8	24.8	NA	NA
BERYLLIUM	0/1	NA	NA	0.14 [2]	NA	NA	NA
CADMIUM	1/1	0.14	0.14	0.14	0.14	NA	NA
CALCIUM	1/1	53.6	53.6	54	54	NA	NA
CHROMIUM	1/1	7.7	7.7	7.7	7.7	NA	NA
COBALT	1/1	8.8	8.8	8.80	8.80	NA	NA
COPPER	1/1	5.6	5.6	5.6	5.6	NA	NA
IRON	1/1	11,300	11,300	11,300	11,300	NA	NA
LEAD	1/1	11.7	11.7	11.7	11.7	NA	NA
LITHIUM	1/1	8.6	8.6	8.6	8.6	NA	NA
MAGNESIUM	1/1	654	654	654	654	NA	NA
MANGANESE	1/1	327	327	327	327	NA	NA
MERCURY	0/1	NA	NA	0.02 [2]	NA	NA	NA
NICKEL	1/1	4.6	4.6	4.6	4.6	NA	NA
POTASSIUM	1/1	353	353	353	353	NA	NA
SELENIUM	1/1	0.28	0.28	0.28	0.28	NA	NA
SILVER	1/1	0.05	0.05	0.050	0.050	NA	NA
SODIUM	0/1	NA	NA	1.15 [2]	NA	NA	NA
STRONTIUM	1/1	5.4	5.4	5.4	5.4	NA	NA
THALLIUM	1/1	0.09	0.09	0.09	0.09	NA	NA
TIN	0/1	NA	NA	0.22	NA	NA	NA
THORIUM	1/1	4.9	4.9	4.90	4.90	NA	NA
VANADIUM	1/1	14.1	14.1	14.1	14.1	NA	NA
ZINC	1/1	11.4	11.4	11.4	11.4	NA	NA

Notes:
NA - Not available.
mg/kg - Milligrams per kilogram.

1 - Taken from Table 4-10 of the Final Basewide Background Soil Investigation Report, Naval Surface Warfare Center Crane, Crane, Indiana (TtNUS, 2001).
2 - This value is the average of all detected and non-detected values. Non-detected values were represented by one-half the detection limit.

TABLE 3-5

DESCRIPTIVE STATISTICS FOR POND SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)									
ACETONE	6600	2500	2/4	2 J	5 J	0.993 - 1.06	2.01	3.5	08SS0080002
Semivolatile Organics (µg/kg)									
ACENAPHTHYLENE	370000	682000	1/4	22	22	3.76 - 4.01	6.96	22	08SS0090002
ANTHRACENE	650000	1480000	1/4	7 J	7 J	3.76 - 4.01	3.21	7	08SS0090002
BENZO(A)ANTHRACENE	160	5210	3/4	4 J	44	4.01	14.5	18.7	08SS0090002
BENZO(A)PYRENE	62	1520	3/4	6 J	91	4.01	27	35.3	08SS0090002
BENZO(B)FLUORANTHENE	490	59800	3/4	7 J	94	4.01	27.8	36.3	08SS0090002
BENZO(G,H,I)PERYLENE	230000	119000	2/4	16 J	140 J	3.76 - 4.01	40	78	08SS0090002
BENZO(K)FLUORANTHENE	490	148000	2/4	8	55	3.76 - 4.01	16.7	31.5	08SS0090002
CHRYSENE	160	4730	3/4	6 J	65	4.01	19.8	25.7	08SS0090002
DIBENZO(A,H)ANTHRACENE	62	18400	1/4	37 J	37 J	3.76 - 4.01	10.7	37	08SS0090002
FLUORANTHENE	230000	122000	2/4	9	29	3.91 - 4.01	10.5	19	08SS0090002
INDENO(1,2,3-CD)PYRENE	620	109000	2/4	10 J	91 J	3.76 - 4.01	26.2	50.5	08SS0090002
PHENANTHRENE	230000	45700	2/4	8	16	3.91 - 4.01	6.99	12	08SS0090002
PYRENE	230000	78500	2/4	8	42	3.91 - 4.01	13.5	25	08SS0090002
Inorganics (mg/kg)									
ALUMINUM	8.3	NA	4/4	17600 J	24500 J	---	20350	20350	08SS0060002
ARSENIC	0.29	18	4/4	5.8 J	8 J	---	6.43	6.43	08SS0060002
BARIUM	82	330	4/4	65.3 J	130 J	---	87.2	87.2	08SS0060002
BERYLLIUM	3.2	21	4/4	0.53 J	0.89 J	---	0.673	0.673	08SS0060002
CADMIUM	0.38	0.36	2/4	0.46 J	0.67 J	0.21 - 0.35	0.353	0.565	08SS0090002
CALCIUM	NA	NA	4/4	1550 J	15700 J	---	5345	5345	08SS0090002
CHROMIUM	2.1	26	4/4	17.9 J	21.4 J	---	19.4	19.4	08SS0090002
COBALT	0.17	13	4/4	6.8 J	11.5 J	---	8.2	8.2	08SS0060002
COPPER	310	5.4	4/4	11.7 J	27.9 J	---	17.2	17.2	08SS0090002
IRON	2300	NA	4/4	16700 J	24300 J	---	19400	19400	08SS0060002
LEAD	400	11	4/4	12.8 J	87.7 J	---	36.6	36.6	08SS0090002
MAGNESIUM	NA	NA	4/4	1650 J	2290 J	---	2008	2008	08SS0060002
MANGANESE	110	NA	4/4	201 J	412 J	---	271	271	08SS0060002
MERCURY	2.3	0.1	4/4	0.017 J	0.029 J	---	0.0248	0.0248	08SS0070002
NICKEL	14	13.6	4/4	12.6 J	15.4 J	---	14.5	14.5	08SS0080002
POTASSIUM	NA	NA	4/4	1190 J	1700 J	---	1440	1440	08SS0060002
SODIUM	NA	NA	1/4	81.3 J	81.3 J	48.6 - 51.3	39	81.3	08SS0080002
VANADIUM	7.8	7.8	4/4	28.6 J	36.8 J	---	32.2	32.2	08SS0060002
ZINC	680	6.62	4/4	36.9 J	68.5 J	---	47.7	47.7	08SS0090002

Data qualifiers (e.g., U, J) are defined in Appedix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-6

DESCRIPTIVE STATISTICS FOR GRASS AND GRAVEL SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)									
2-BUTANONE	4400	89600	4/23	2 J	4 J	0.899 - 1.32	0.938	3	08SS0390002
ACETONE	6600	2500	5/16	1 J	64 J	0.899 - 27	7.05	15.8	08SS0320002
METHYLENE CHLORIDE	1.2	4050	3/23	1 J	4 J	0.899 - 1.32	0.752	2.33	08SS0180002
Semivolatile Organics (µg/kg)									
ACENAPHTHYLENE	370000	682000	1/8	100	100	3.78 - 3.98	14.2	100	08SS0050002
ANTHRACENE	650000	1480000	1/8	33	33	3.78 - 3.98	5.82	33	08SS0050002
BENZO(A)ANTHRACENE	160	5210	2/8	4 J	480	3.78 - 3.98	61.9	242	08SS0050002
BENZO(A)PYRENE	62	1520	1/8	560	560	3.78 - 3.98	71.7	560	08SS0050002
BENZO(B)FLUORANTHENE	490	59800	1/8	640	640	3.78 - 3.98	81.7	640	08SS0050002
BENZO(G,H,I)PERYLENE	230000	119000	1/8	560	560	3.78 - 3.98	71.7	560	08SS0050002
BENZO(K)FLUORANTHENE	490	148000	1/8	430	430	3.78 - 3.98	55.4	430	08SS0050002
CHRYSENE	160	4730	2/8	5 J	640	3.78 - 3.98	82.1	323	08SS0050002
DIBENZO(A,H)ANTHRACENE	62	18400	1/8	170	170	3.78 - 3.98	22.9	170	08SS0050002
FLUORANTHENE	230000	122000	2/8	6 J	540	3.78 - 3.98	69.7	273	08SS0050002
INDENO(1,2,3-CD)PYRENE	620	109000	1/8	430	430	3.78 - 3.98	55.4	430	08SS0050002
NAPHTHALENE	3100	99.39	1/8	9	9	3.78 - 3.98	2.82	9	08SS0050002
PHENANTHRENE	230000	45700	2/8	18	91	3.78 - 3.98	15.1	54.5	08SS0050002
PYRENE	230000	78500	3/8	5 J	690	3.8 - 3.98	89.5	235	08SS0050002
Inorganics (mg/kg)									
ALUMINUM	8.3	NA	8/8	19200 J	28200 J	---	23738	23738	08SS0110002
ARSENIC	0.29	18	8/8	3.8 J	7.9 J	---	6.01	6.01	08SS0030002
BARIUM	82	330	8/8	56.9 J	123 J	---	91.9	91.9	08SS0120002
BERYLLIUM	3.2	21	6/8	0.55 J	0.78 J	0.46 - 0.52	0.566	0.673	08SS0030002
CADMIUM	0.38	0.36	2/8	0.47 J	0.55 J	0.19 - 0.41	0.223	0.51	08SS0030002
CALCIUM	NA	NA	8/8	1180 J	5090 J	---	2230	2230	08SS0050002
CHROMIUM	2.1	26	8/8	19 J	24.7 J	---	21.6	21.6	08SS0030002
COBALT	0.17	13	8/8	3.9 J	7.7 J	---	5.65	5.65	08SS0020002, 08SS0050002
COPPER	310	5.4	8/8	5.5 J	13.2 J	---	9.38	9.38	08SS0130002
IRON	2300	NA	8/8	15700 J	32400 J	---	22050	22050	08SS0030002
LEAD	400	11	8/8	8.5 J	31.1 J	---	15.3	15.3	08SS0010002
MAGNESIUM	NA	NA	8/8	1690 J	2970 J	---	2055	2055	08SS0130002
MANGANESE	110	NA	8/8	64.1 J	522 J	---	233	233	08SS0020002
MERCURY	2.3	0.1	6/8	0.007 J	0.033 J	0.007	0.0121	0.015	08SS0130002
NICKEL	14	13.6	8/8	7.6 J	11.3 J	---	9.38	9.38	08SS0030002
POTASSIUM	NA	NA	8/8	985 J	1990 J	---	1302	1302	08SS0130002
SODIUM	NA	NA	6/8	61.1 J	124 J	56.8 - 60.8	78.9	95.4	08SS0130002
TIN	4700	7.62	5/8	0.2 J	0.45 J	0.35 - 0.92	0.323	0.346	08SS0130002
VANADIUM	7.8	7.8	8/8	29.4 J	40.5 J	---	34.2	34.2	08SS0130002
ZINC	680	6.62	8/8	19.4 J	128 J	---	44	44	08SS0010002
Miscellaneous Parameters (mg/kg)									
CATION EXCHANGE CAPACITY (MEQ/1)	NA	NA	1/1	12	12	---	12	12	08SS0140002
PH (S.U.)	NA	NA	1/1	7.7	7.7	---	7.7	7.7	08SS0140002
TOTAL ORGANIC CARBON	NA	NA	1/1	2200	2200	---	2200	2200	08SS0140002

TABLE 3-6

DESCRIPTIVE STATISTICS FOR GRASS AND GRAVEL SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
MEQ/1 - Cation exchange capacity units.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
S.U. - Standard Units.
µg/kg - Micrograms per kilogram.

TABLE 3-7

DESCRIPTIVE STATISTICS FOR BUILDING 106 SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)									
1,1,1-TRICHLOROETHANE	97	29800	1/11	2 J	2 J	0.913 - 1.15	0.642	2	08SS0300002
2-BUTANONE	4400	89600	5/11	2 J	5 J	0.913 - 1.15	1.73	3.2	08SS0300002
ACETONE	6600	2500	4/11	5 J	48 J	3 - 7	8.45	19	08SS0300002
CARBON DISULFIDE	1500	94.12	1/11	1.04 J	1.04 J	0.913 - 1.22	0.563	1.04	08SS0250002
METHYLENE CHLORIDE	1.2	4050	1/11	6 J	6 J	0.913 - 1.22	1.02	6	08SS0040002
TRICHLOROETHENE	2.8	12400	4/11	6	26	0.913 - 1.15	5.87	15.3	08SS0300002
Semivolatile Organics (µg/kg)									
ACENAPHTHYLENE	370000	682000	1/1	31	31	---	31	31	08SS0040002
ANTHRACENE	650000	1480000	1/1	14	14	---	14	14	08SS0040002
BENZO(A)ANTHRACENE	160	5210	1/1	170	170	---	170	170	08SS0040002
BENZO(A)PYRENE	62	1520	1/1	230	230	---	230	230	08SS0040002
BENZO(B)FLUORANTHENE	490	59800	1/1	280	280	---	280	280	08SS0040002
BENZO(G,H,I)PERYLENE	230000	119000	1/1	230 J	230 J	---	230	230	08SS0040002
BENZO(K)FLUORANTHENE	490	148000	1/1	120	120	---	120	120	08SS0040002
CHRYSENE	160	4730	1/1	230	230	---	230	230	08SS0040002
DIBENZO(A,H)ANTHRACENE	62	18400	1/1	69 J	69 J	---	69	69	08SS0040002
FLUORANTHENE	230000	122000	1/1	130	130	---	130	130	08SS0040002
INDENO(1,2,3-CD)PYRENE	620	109000	1/1	180 J	180 J	---	180	180	08SS0040002
NAPHTHALENE	3100	99.39	1/1	4 J	4 J	---	4	4	08SS0040002
PHENANTHRENE	230000	45700	1/1	18	18	---	18	18	08SS0040002
PYRENE	230000	78500	1/1	210	210	---	210	210	08SS0040002
Inorganics (mg/kg)									
ALUMINUM	8.3	NA	1/1	20900 J	20900 J	---	20900	20900	08SS0040002
ARSENIC	0.29	18	1/1	4.9 J	4.9 J	---	4.9	4.9	08SS0040002
BARIUM	82	330	1/1	86.1 J	86.1 J	---	86.1	86.1	08SS0040002
BERYLLIUM	3.2	21	1/1	0.53 J	0.53 J	---	0.53	0.53	08SS0040002
CALCIUM	NA	NA	1/1	2070 J	2070 J	---	2070	2070	08SS0040002
CHROMIUM	2.1	26	1/1	17.9 J	17.9 J	---	17.9	17.9	08SS0040002
COBALT	0.17	13	1/1	7.1 J	7.1 J	---	7.1	7.1	08SS0040002
COPPER	310	5.4	1/1	6.1 J	6.1 J	---	6.1	6.1	08SS0040002
IRON	2300	NA	1/1	18300 J	18300 J	---	18300	18300	08SS0040002
LEAD	400	11	1/1	11.7 J	11.7 J	---	11.7	11.7	08SS0040002
MAGNESIUM	NA	NA	1/1	1730 J	1730 J	---	1730	1730	08SS0040002
MANGANESE	110	NA	1/1	130 J	130 J	---	130	130	08SS0040002
NICKEL	14	13.6	1/1	8.5 J	8.5 J	---	8.50	8.50	08SS0040002
POTASSIUM	NA	NA	1/1	975 J	975 J	---	975	975	08SS0040002
SODIUM	NA	NA	1/1	201 J	201 J	---	201	201	08SS0040002
VANADIUM	7.8	7.8	1/1	29.4 J	29.4 J	---	29.4	29.4	08SS0040002
ZINC	680	6.62	1/1	21.7 J	21.7 J	---	21.7	21.7	08SS0040002

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-8

DESCRIPTIVE STATISTICS FOR BUILDING 107 SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)									
1,1,1-TRICHLOROETHANE	97	29800	1/6	5	5	0.915 - 1.01	1.24	5	08SS0410002
1,1,2-TRICHLOROETHANE	0.91	28600	1/6	2 J	2 J	0.915 - 1.01	0.739	2	08SS0410002
1,1-DICHLOROETHENE	2.9	8280	2/6	1 J	4	0.915 - 1.01	1.16	2.5	08SS0410002
2-HEXANONE	NA	12600	2/6	1 J	1 J	0.915 - 1.01	0.656	1	08SS0420002, 08SS0430002
ACETONE	6600	2500	4/6	2 J	4 J	0.943 - 1.01	2	2.75	08SS0440002
CIS-1,2-DICHLOROETHENE	20	783.73	2/6	3 J	4	0.915 - 1.01	1.49	3.5	08SS0410002
TRICHLOROETHENE	2.8	12400	2/6	55	430 J	0.915 - 1.01	81.2	243	08SS0410002

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-9

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round			**01**	**01**	**01**	**01**
Location			**08SB006**	**08SB007**	**08SB008**	**08SB009**
Sample Number	**HHRA**	**ERA**	**08SS0060002**	**08SS0070002**	**08SS0080002**	**08SS0090002**
Sample Code	**Criterion**	**Criterion**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Classification			**3**	**3**	**3**	**3**
Depth Range			**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Date			**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**
Volatile Organics (µg/kg)						
ACETONE	6600	2500	1.06 UJ	2 J	5 J	0.993 UJ
Semivolatile Organics (µg/kg)						
ACENAPHTHYLENE	370000	682000	4.01 U	3.76 U	3.91 U	22
ANTHRACENE	650000	1480000	4.01 U	3.76 U	3.91 U	7 J
BENZO(A)ANTHRACENE	160	5210	4.01 U	8	4 J	44
BENZO(A)PYRENE	62	1520	4.01 U	6 J	9	**91**
BENZO(B)FLUORANTHENE	490	59800	4.01 U	8	7 J	94
BENZO(G,H,I)PERYLENE	230000	119000	4.01 UJ	3.76 UJ	16 J	140 J
BENZO(K)FLUORANTHENE	490	148000	4.01 U	3.76 U	8	55
CHRYSENE	160	4730	4.01 U	6 J	6 J	65
DIBENZO(A,H)ANTHRACENE	62	18400	4.01 UJ	3.76 UJ	3.91 UJ	37 J
FLUORANTHENE	230000	122000	4.01 U	9	3.91 U	29
INDENO(1,2,3-CD)PYRENE	620	109000	4.01 UJ	3.76 UJ	10 J	91 J
PHENANTHRENE	230000	45700	4.01 U	8	3.91 U	16
PYRENE	230000	78500	4.01 U	8	3.91 U	42
Inorganics (mg/kg)						
ALUMINUM	8.3	NA	**24500 J**	**17600 J**	**21200 J**	**18100 J**
ARSENIC	0.29	18	**8 J**	**6 J**	**5.8 J**	**5.9 J**
BARIUM	82	330	**130 J**	68.9 J	**84.5 J**	65.3 J
BERYLLIUM	3.2	21	0.89 J	0.53 J	0.73 J	0.54 J
CADMIUM	0.38	0.36	0.21 U	**0.46 J**	0.35 U	**0.67 J**
CALCIUM	NA	NA	1550 J	2040 J	2090 J	15700 J
CHROMIUM	2.1	26	**18.8 J**	**17.9 J**	**19.6 J**	**21.4 J**
COBALT	0.17	13	**11.5 J**	**6.8 J**	**7.4 J**	**7.1 J**
COPPER	310	5.4	**11.7 J**	**13.8 J**	**15.2 J**	**27.9 J**
IRON	2300	NA	**24300 J**	**16700 J**	**18200 J**	**18400 J**
LEAD	400	11	**12.8 J**	**28.8 J**	**17 J**	**87.7 J**
MAGNESIUM	NA	NA	2290 J	1650 J	2000 J	2090 J
MANGANESE	110	NA	**412 J**	**228 J**	**201 J**	**243 J**
MERCURY	2.3	0.1	0.017 J	0.029 J	0.025 J	0.028 J
NICKEL	14	13.6	**15.1 J**	12.6 J	**15.4 J**	**14.9 J**
POTASSIUM	NA	NA	1700 J	1350 J	1520 J	1190 J
SODIUM	NA	NA	49.3 U	48.6 U	81.3 J	51.3 U
VANADIUM	7.8	7.8	**36.8 J**	**28.6 J**	**34.2 J**	**29.2 J**
ZINC	680	6.62	**46.8 J**	**38.7 J**	**36.9 J**	**68.5 J**

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.

TABLE 3-10

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round			**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**
Location			**08SB001**	**08SB002**	**08SB003**	**08SB005**	**08SB010**	**08SB011**	**08SB012**	**08SB013**
Sample Number	**HHRA**	**ERA**	**08SS0010002**	**08SS0020002**	**08SS0030002**	**08SS0050002**	**08SS0100002**	**08SS0110002**	**08SS0120002**	**08SS0130002**
Sample Code	**Criterion**	**Criterion**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Classification			**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Depth Range			**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Date			**12/11/2004**	**12/11/2004**	**12/11/2004**	**12/11/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**
Volatile Organics (µg/kg)										
2-BUTANONE	4400	89600	0.953 U	0.932 U	0.999 U	0.924 U	0.912 U	0.951 U	0.899 U	0.947 U
ACETONE	6600	2500	0.953 U	0.932 UJ	0.999 UJ	0.924 UJ	1 J	7 J	0.899 UJ	0.947 UJ
METHYLENE CHLORIDE	1.2	4050	0.953 UJ	0.932 UJ	0.999 UJ	0.924 UJ	0.912 UJ	0.951 UJ	0.899 UJ	0.947 UJ
Semivolatile Organics (µg/kg)										
ACENAPHTHYLENE	370000	682000	3.98 U	3.89 U	3.97 U	100	3.81 U	3.78 U	3.8 U	3.91 U
ANTHRACENE	650000	1480000	3.98 U	3.89 U	3.97 U	33	3.81 U	3.78 U	3.8 U	3.91 U
BENZO(A)ANTHRACENE	160	5210	3.98 U	3.89 U	4 J	**480**	3.81 U	3.78 U	3.8 U	3.91 U
BENZO(A)PYRENE	62	1520	3.98 U	3.89 U	3.97 U	**560**	3.81 U	3.78 U	3.8 U	3.91 U
BENZO(B)FLUORANTHENE	490	59800	3.98 U	3.89 U	3.97 U	**640**	3.81 U	3.78 U	3.8 U	3.91 U
BENZO(G,H,I)PERYLENE	230000	119000	3.98 U	3.89 U	3.97 U	560	3.81 U	3.78 U	3.8 U	3.91 U
BENZO(K)FLUORANTHENE	490	148000	3.98 U	3.89 U	3.97 U	430	3.81 U	3.78 U	3.8 U	3.91 U
CHRYSENE	160	4730	3.98 U	3.89 U	5 J	**640**	3.81 U	3.78 U	3.8 U	3.91 U
DIBENZO(A,H)ANTHRACENE	62	18400	3.98 U	3.89 U	3.97 U	**170**	3.81 U	3.78 U	3.8 U	3.91 U
FLUORANTHENE	230000	122000	3.98 U	3.89 U	6 J	540	3.81 U	3.78 U	3.8 U	3.91 U
INDENO(1,2,3-CD)PYRENE	620	109000	3.98 U	3.89 U	3.97 U	430	3.81 U	3.78 U	3.8 U	3.91 U
NAPHTHALENE	3100	99.39	3.98 U	3.89 U	3.97 U	9	3.81 U	3.78 U	3.8 U	3.91 U
PHENANTHRENE	230000	45700	3.98 U	3.89 U	18	91	3.81 U	3.78 U	3.8 U	3.91 U
PYRENE	230000	78500	3.98 U	3.89 U	5 J	690	3.81 U	11	3.8 U	3.91 U
Inorganics (mg/kg)										
ALUMINUM	8.3	NA	**23000 J**	**20800 J**	**24300 J**	**19200 J**	**21200 J**	**28200 J**	**27100 J**	**26100 J**
ARSENIC	0.29	18	**5.5 J**	**6.4 J**	**7.9 J**	**7.4 J**	**5.4 J**	**3.8 J**	**4 J**	**7.7 J**
BARIUM	82	330	**87.6 J**	**88.2 J**	**91.4 J**	56.9 J	**99.4 J**	**103 J**	**123 J**	**85.7 J**
BERYLLIUM	3.2	21	0.52 U	0.61 J	0.78 J	0.46 U	0.55 J	0.59 J	0.75 J	0.76 J
CADMIUM	0.38	0.36	**0.47 J**	0.25 U	**0.55 J**	0.29 U	0.19 U	0.19 U	0.2 U	0.41 U
CALCIUM	NA	NA	1980 J	2310 J	2030 J	5090 J	1200 J	1970 J	1180 J	2080 J
CHROMIUM	2.1	26	**21.6 J**	**19.4 J**	**24.7 J**	**21.7 J**	**19 J**	**21.5 J**	**21.4 J**	**23.5 J**
COBALT	0.17	13	**5.6 J**	**7.7 J**	**5.4 J**	**7.7 J**	**4.4 J**	**6.3 J**	**4.2 J**	**3.9 J**
COPPER	310	5.4	**11.3 J**	**9.1 J**	**11.1 J**	**9.1 J**	**9.8 J**	**5.9 J**	**5.5 J**	**13.2 J**
IRON	2300	NA	**23200 J**	**19000 J**	**32400 J**	**22600 J**	**19100 J**	**15700 J**	**19100 J**	**25300 J**
LEAD	400	11	**31.1 J**	**11.9 J**	**16.8 J**	**18.4 J**	**12.1 J**	8.5 J	11 J	**12.7 J**
MAGNESIUM	NA	NA	1800 J	1890 J	2150 J	1690 J	2140 J	1950 J	1850 J	2970 J
MANGANESE	110	NA	**166 J**	**522 J**	**153 J**	**466 J**	**179 J**	**148 J**	64.1 J	**164 J**
MERCURY	2.3	0.1	0.008 J	0.022 J	0.01 J	0.01 J	0.007 U	0.007 U	0.007 J	0.033 J
NICKEL	14	13.6	7.6 J	9.7 J	11.3 J	8 J	9.7 J	8.5 J	9.6 J	10.6 J
POTASSIUM	NA	NA	1230 J	1530 J	1340 J	1180 J	1140 J	1020 J	985 J	1990 J
SODIUM	NA	NA	56.8 U	109 J	60.8 U	61.1 J	84.1 J	102 J	91.9 J	124 J
TIN	4700	7.62	0.92 U	0.43 U	0.44 J	0.35 U	0.41 J	0.23 J	0.2 J	0.45 J
VANADIUM	7.8	7.8	**34.7 J**	**33.7 J**	**39.2 J**	**34.1 J**	**31.2 J**	**29.4 J**	**31.1 J**	**40.5 J**
ZINC	680	6.62	**128 J**	**33.9 J**	**38.3 J**	**31.2 J**	**32.2 J**	**21.2 J**	**19.4 J**	**47.5 J**
Miscellaneous Parameters (mg/kg)										
CATION EXCHANGE CAPACITY (MEQ/1)	NA	NA								
PH (S.U.)	NA	NA								
TOTAL ORGANIC CARBON	NA	NA								

TABLE 3-10

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round			**01**	**03**	**03**	**03**	**03**	**03**	**03**	**03**
Location			**08SB014**	**08SB015**	**08SB016**	**08SB017**	**08SB018**	**08SB020**	**08SB021**	**08SB024**
Sample Number	**HHRA**	**ERA**	**08SS0140002**	**08SS0150002**	**08SS0160002**	**08SS0170002**	**08SS0180002**	**08SS0200002**	**08SS0210002**	**08SS0240002**
Sample Code	**Criteria**	**Criteria**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Classification			**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Depth Range			**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Date			**12/12/2004**	**10/3/2005**	**10/4/2005**	**10/3/2005**	**10/3/2005**	**10/3/2005**	**10/3/2005**	**10/3/2005**
Volatile Organics (µg/kg)										
2-BUTANONE	4400	89600		1.07 U	1.05 U	1.16 U	1.11 U	1.09 U	1 U	1.32 U
ACETONE	6600	2500		2 J	1.05 UR	1.16 UR	1.11 UR	1.09 UR	1 UR	1.32 UR
METHYLENE CHLORIDE	1.2	4050		1.07 UJ	1.05 UJ	1.16 UJ	**4 J**	1.09 UJ	1 UJ	1.32 UJ
Semivolatile Organics (µg/kg)										
ACENAPHTHYLENE	370000	682000								
ANTHRACENE	650000	1480000								
BENZO(A)ANTHRACENE	160	5210								
BENZO(A)PYRENE	62	1520								
BENZO(B)FLUORANTHENE	490	59800								
BENZO(G,H,I)PERYLENE	230000	119000								
BENZO(K)FLUORANTHENE	490	148000								
CHRYSENE	160	4730								
DIBENZO(A,H)ANTHRACENE	62	18400								
FLUORANTHENE	230000	122000								
INDENO(1,2,3-CD)PYRENE	620	109000								
NAPHTHALENE	3100	99.39								
PHENANTHRENE	230000	45700								
PYRENE	230000	78500								
Inorganics (mg/kg)										
ALUMINUM	8.3	NA								
ARSENIC	0.29	18								
BARIUM	82	330								
BERYLLIUM	3.2	21								
CADMIUM	0.38	0.36								
CALCIUM	NA	NA								
CHROMIUM	2.1	26								
COBALT	0.17	13								
COPPER	310	5.4								
IRON	2300	NA								
LEAD	400	11								
MAGNESIUM	NA	NA								
MANGANESE	110	NA								
MERCURY	2.3	0.1								
NICKEL	14	13.6								
POTASSIUM	NA	NA								
SODIUM	NA	NA								
TIN	4700	7.62								
VANADIUM	7.8	7.8								
ZINC	680	6.62								
Miscellaneous Parameters (mg/kg)										
CATION EXCHANGE CAPACITY (MEQ/1)	NA	NA	12							
PH (S.U.)	NA	NA	7.7							
TOTAL ORGANIC CARBON	NA	NA	2200							

TABLE 3-10

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round			**03**	**03**	**03**	**03**	**03**	**03**	**03**	**03**
Location			**08SB032**	**08SB033**	**08SB035**	**08SB036**	**08SB037**	**08SB038**	**08SB039**	**08SB040**
Sample Number	**HHRA**	**ERA**	**08SS0320002**	**08SS0330002**	**08SS0350002**	**08SS0360002**	**08SS0370002**	**08SS0380002**	**08SS0390002**	**08SS0400002**
Sample Code	**Criteria**	**Criteria**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Classification			**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Depth Range			**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Date			**10/4/2005**	**10/4/2005**	**10/2/2005**	**9/27/2005**	**9/27/2005**	**9/27/2005**	**9/27/2005**	**10/4/2005**
Volatile Organics (µg/kg)										
2-BUTANONE	4400	89600	3 J	0.93 U	0.979 U	0.974 U	3 J	2 J	4 J	0.943 U
ACETONE	6600	2500	64 J	5 J	0.979 UJ	3 U	17 U	14 U	27 U	0.943 UR
METHYLENE CHLORIDE	1.2	4050	1.14 UJ	**2 J**	0.979 UJ	0.974 UJ	1.07 UJ	1.2 UJ	1.04 UJ	1 J
Semivolatile Organics (µg/kg)										
ACENAPHTHYLENE	370000	682000								
ANTHRACENE	650000	1480000								
BENZO(A)ANTHRACENE	160	5210								
BENZO(A)PYRENE	62	1520								
BENZO(B)FLUORANTHENE	490	59800								
BENZO(G,H,I)PERYLENE	230000	119000								
BENZO(K)FLUORANTHENE	490	148000								
CHRYSENE	160	4730								
DIBENZO(A,H)ANTHRACENE	62	18400								
FLUORANTHENE	230000	122000								
INDENO(1,2,3-CD)PYRENE	620	109000								
NAPHTHALENE	3100	99.39								
PHENANTHRENE	230000	45700								
PYRENE	230000	78500								
Inorganics (mg/kg)										
ALUMINUM	8.3	NA								
ARSENIC	0.29	18								
BARIUM	82	330								
BERYLLIUM	3.2	21								
CADMIUM	0.38	0.36								
CALCIUM	NA	NA								
CHROMIUM	2.1	26								
COBALT	0.17	13								
COPPER	310	5.4								
IRON	2300	NA								
LEAD	400	11								
MAGNESIUM	NA	NA								
MANGANESE	110	NA								
MERCURY	2.3	0.1								
NICKEL	14	13.6								
POTASSIUM	NA	NA								
SODIUM	NA	NA								
TIN	4700	7.62								
VANADIUM	7.8	7.8								
ZINC	680	6.62								
Miscellaneous Parameters (mg/kg)										
CATION EXCHANGE CAPACITY (MEQ/1)	NA	NA								
PH (S.U.)	NA	NA								
TOTAL ORGANIC CARBON	NA	NA								

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
MEQ/1 - Cation exchange capacity units.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
S.U. - Standard Units.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-11

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN BUILDING 106 SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round	HHRA Criterion	ERA Criterion	01	03	03	03	03	03	03	03
Location			08SB004	08SB019	08SB022	08SB023	08SB025	08SB026	08SB027	08SB028
Sample Number			08SS0040002	08SS0190002	08SS0220002	08SS0230002	08SS0250002	08SS0260002	08SS0270002	08SS0280002
Sample Code			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Classification			3	3	3	3	3	3	3	3
Depth Range			0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
Sample Date			12/11/2004	10/3/2005	9/29/2005	10/4/2005	9/29/2005	9/29/2005	9/28/2005	9/29/2005
Volatile Organics (µg/kg)										
1,1,1-TRICHLOROETHANE	97	29800	0.943 U	0.913 U	1.02 U	0.918 U	1.04 U	1.12 U	1.02 U	1.15 U
2-BUTANONE	4400	89600	2 J	0.913 U	1.02 U	0.918 U	3 J	3 J	1.02 U	1.15 U
ACETONE	6600	2500	18 J	5 J	5 U	5 J	5 U	7 U	3 U	5 U
CARBON DISULFIDE	1500	94.12	0.943 U	0.913 U	1.02 U	0.918 U	1.04 J	1.12 U	1.02 U	1.15 U
METHYLENE CHLORIDE	1.2	4050	**6 J**	0.913 UJ	1.02 UJ	0.918 UJ	1.04 UJ	1.12 UJ	1.02 UJ	1.15 UJ
TRICHLOROETHENE	2.8	12400	0.943 U	0.913 U	**20**	0.918 U	1.04 U	1.12 U	1.02 U	1.15 U
Semivolatile Organics (µg/kg)										
ACENAPHTHYLENE	370000	682000	31							
ANTHRACENE	650000	1480000	14							
BENZO(A)ANTHRACENE	160	5210	**170**							
BENZO(A)PYRENE	62	1520	**230**							
BENZO(B)FLUORANTHENE	490	59800	280							
BENZO(G,H,I)PERYLENE	230000	119000	230 J							
BENZO(K)FLUORANTHENE	490	148000	120							
CHRYSENE	160	4730	**230**							
DIBENZO(A,H)ANTHRACENE	62	18400	**69 J**							
FLUORANTHENE	230000	122000	130							
INDENO(1,2,3-CD)PYRENE	620	109000	180 J							
NAPHTHALENE	3100	99.39	4 J							
PHENANTHRENE	230000	45700	18							
PYRENE	230000	78500	210							
Inorganics (mg/kg)										
ALUMINUM	8.3	NA	**20900 J**							
ARSENIC	0.29	18	**4.9 J**							
BARIUM	82	330	**86.1 J**							
BERYLLIUM	3.2	21	0.53 J							
CALCIUM	NA	NA	2070 J							
CHROMIUM	2.1	26	**17.9 J**							
COBALT	0.17	13	**7.1 J**							
COPPER	310	5.4	**6.1 J**							
IRON	2300	NA	**18300 J**							
LEAD	400	11	**11.7 J**							
MAGNESIUM	NA	NA	1730 J							
MANGANESE	110	NA	**130 J**							
NICKEL	14	13.6	8.5 J							
POTASSIUM	NA	NA	975 J							
SODIUM	NA	NA	201 J							
VANADIUM	7.8	7.8	**29.4 J**							
ZINC	680	6.62	**21.7 J**							

TABLE 3-11

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN BUILDING 106 SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round			**03**	**03**	**03**
Location			**08SB029**	**08SB030**	**08SB031**
Sample Number	**HHRA**	**ERA**	**08SS0290002**	**08SS0300002**	**08SS0310002**
Sample Code	**Criteria**	**Criteria**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Classification			**3**	**3**	**3**
Depth Range			**0 - 2**	**0 - 2**	**0 - 2**
Sample Date			**9/29/2005**	**10/2/2005**	**9/29/2005**
Volatile Organics (µg/kg)					
1,1,1-TRICHLOROETHANE	97	29800	0.96 U	2 J	1.04 U
2-BUTANONE	4400	89600	3 J	5 J	1.04 U
ACETONE	6600	2500	5 U	48 J	4 U
CARBON DISULFIDE	1500	94.12	0.96 U	1.22 U	1.04 U
METHYLENE CHLORIDE	1.2	4050	0.96 UJ	1.22 UJ	1.04 UJ
TRICHLOROETHENE	2.8	12400	**6**	**26**	**9**
Semivolatile Organics (µg/kg)					
ACENAPHTHYLENE	370000	682000			
ANTHRACENE	650000	1480000			
BENZO(A)ANTHRACENE	160	5210			
BENZO(A)PYRENE	62	1520			
BENZO(B)FLUORANTHENE	490	59800			
BENZO(G,H,I)PERYLENE	230000	119000			
BENZO(K)FLUORANTHENE	490	148000			
CHRYSENE	160	4730			
DIBENZO(A,H)ANTHRACENE	62	18400			
FLUORANTHENE	230000	122000			
INDENO(1,2,3-CD)PYRENE	620	109000			
NAPHTHALENE	3100	99.39			
PHENANTHRENE	230000	45700			
PYRENE	230000	78500			
Inorganics (mg/kg)					
ALUMINUM	8.3	NA			
ARSENIC	0.29	18			
BARIUM	82	330			
BERYLLIUM	3.2	21			
CALCIUM	NA	NA			
CHROMIUM	2.1	26			
COBALT	0.17	13			
COPPER	310	5.4			
IRON	2300	NA			
LEAD	400	11			
MAGNESIUM	NA	NA			
MANGANESE	110	NA			
NICKEL	14	13.6			
POTASSIUM	NA	NA			
SODIUM	NA	NA			
VANADIUM	7.8	7.8			
ZINC	680	6.62			

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-12

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN BUILDING 107 SURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round			**03**	**03**	**03**	**03**	**03**	**03**	**03**
Location			**08SB034**	**08SB041**	**08SB042**	**08SB043**	**08SB044**	**08SB045**	**08SB045**
Sample Number	**HHRA**	**ERA**	**08SS0340002**	**08SS0410002**	**08SS0420002**	**08SS0430002**	**08SS0440002**	**08SS0450002**	**08SS0450002-D**
Sample Code	**Criterion**	**Criterion**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**ORIG**	**DUP**
Sample Classification			**3**	**3**	**3**	**3**	**3**	**3**	**3**
Depth Range			**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**	**0 - 2**
Sample Date			**10/2/2005**	**10/2/2005**	**10/2/2005**	**10/2/2005**	**10/2/2005**	**10/2/2005**	**10/2/2005**
Volatile Organics (ug/kg)									
1,1,1-TRICHLOROETHANE	97	29800	1.01 U	5	0.967 U	0.974 U	1 U	0.915 U	0.91 U
1,1,2-TRICHLOROETHANE	0.91	28600	1.01 U	**2 J**	0.967 U	0.974 U	1 U	0.915 U	0.91 U
1,1-DICHLOROETHENE	2.9	8280	1.01 U	**4**	1 J	0.974 U	1 U	0.915 U	0.91 U
2-HEXANONE	NA	12600	1.01 U	0.943 U	1 J	1 J	1 U	0.915 U	0.91 U
ACETONE	6600	2500	1.01 UJ	0.943 UJ	2 J	2 J	4 J	3 J	0.91 UJ
CIS-1,2-DICHLOROETHENE	20	783.73	1.01 U	4	3 J	0.974 U	1 U	0.915 U	0.91 U
TRICHLOROETHENE	2.8	12400	1.01 U	**430 J**	**55**	0.974 U	1 U	0.915 U	0.91 U

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-13

DESCRIPTIVE STATISTICS FOR POND SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)								
1,1,1-TRICHLOROETHANE	97	2/9	15	23 J	0.886 - 0.974	4.58	19	08SB0071013
1,1-DICHLOROETHANE	2100	2/9	35	210 J	0.886 - 0.974	27.6	123	08SB0071013
1,2-DICHLOROETHANE	1.2	1/9	6 J	6 J	0.886 - 0.974	1.08	6	08SB0071013
2-BUTANONE	4400	1/9	100 J	100 J	0.886 - 0.974	11.5	100	08SB0071013
ACETONE	6600	9/9	2 J	140 J	---	25.1	25.1	08SB0071013
CHLOROETHANE	3000	1/9	380	380	0.886 - 0.974	42.6	380	08SB0071013
CIS-1,2-DICHLOROETHENE	20	3/9	2 J	3 J	0.886 - 0.974	1.08	2.33	08SB0071013
ETHYLBENZENE	670	1/9	2 J	2 J	0.886 - 0.974	0.633	2	08SB0071013
METHYLENE CHLORIDE	1.2	8/9	2 J	67 J	0.94	22.3	25	08SB0071013
TOLUENE	590	1/9	120 J	120 J	0.886 - 0.974	13.7	120	08SB0071013
TOTAL XYLENES	7100	1/9	13 J	13 J	0.886 - 0.974	1.86	13	08SB0071013
TRANS-1,2-DICHLOROETHENE	34	1/9	5 J	5 J	0.886 - 0.974	0.967	5	08SB0071013
TRICHLOROETHENE	2.8	4/9	1 J	36	0.886 - 0.974	4.92	10.5	08SB0060610
TRICHLOROFLUOROMETHANE	8000	5/9	1 J	4 J	0.894 - 0.947	1.54	2.4	08SB0071013
Semivolatile Organics (µg/kg)								
2-METHYLNAPHTHALENE	5600	1/9	4 J	4 J	3.61 - 4.04	2.14	4	08SB0070206
ACENAPHTHYLENE	370000	2/9	17	23	3.61 - 4	5.91	20	08SB0071013
ANTHRACENE	650000	2/9	12	15	3.61 - 4	4.47	13.5	08SB0070206
BENZO(A)ANTHRACENE	160	3/9	10	89	3.61 - 4	17.1	47.7	08SB0071013
BENZO(A)PYRENE	62	3/9	8	110	3.61 - 4	26.6	76	08SB0070206, 08SB0071013
BENZO(B)FLUORANTHENE	490	3/9	11	200	3.61 - 4	35.8	104	08SB0071013
BENZO(G,H,I)PERYLENE	230000	3/9	13 J	170 J	3.61 - 4	32.5	93.7	08SB0071013
BENZO(K)FLUORANTHENE	490	3/9	7 J	88	3.61 - 4	17.6	49	08SB0071013
BIS(2-ETHYLHEXYL)PHTHALATE	35000	1/9	180 J	180 J	73.3 - 82	54.1	180	08SB0080206
CHRYSENE	160	3/9	12	190	3.61 - 4	31.4	90.3	08SB0071013
DIBENZO(A,H)ANTHRACENE	62	2/9	29 J	60 J	3.61 - 4	11.4	44.5	08SB0071013
FLUORANTHENE	230000	3/9	11	83	3.61 - 4	18	50.3	08SB0070206
FLUORENE	41000	2/9	6 J	8 J	3.61 - 4	3.02	7	08SB0071013
INDENO(1,2,3-CD)PYRENE	620	3/9	9 J	120 J	3.61 - 4	23.8	67.7	08SB0071013
NAPHTHALENE	3100	3/9	4 J	8	3.61 - 4	3.03	5.35	08SB0070206
PHENANTHRENE	230000	3/9	37	67	3.61 - 4	19.1	53.7	08SB0071013
PYRENE	230000	3/9	11	120	3.61 - 4	25	71.3	08SB0070206
Inorganics (mg/kg)								
ALUMINUM	8.3	9/9	6140 J	23700 J	---	15763	15763	08SB0070610
ANTIMONY	0.27	1/9	13.3 J	13.3 J	0.07 - 0.49	1.57	13.3	08SB0070610
ARSENIC	0.29	9/9	3 J	8.4 J	---	5.23	5.23	08SB0071013
BARIUM	82	9/9	20.9 J	96.7 J	---	63.9	63.9	08SB0070206
BERYLLIUM	3.2	5/9	0.57 J	0.75 J	0.32 - 0.39	0.427	0.628	08SB0070206
CADMIUM	0.38	3/9	0.51 J	0.79 J	0.1 - 0.22	0.262	0.647	08SB0070610
CALCIUM	NA	9/9	94.9 J	21100 J	---	4850	4850	08SB0070610
CHROMIUM	2.1	9/9	12.2 J	43.4 J	---	19.2	19.2	08SB0071013
COBALT	0.17	9/9	1 J	11.3 J	---	5.58	5.58	08SB0070206
COPPER	310	9/9	4 J	24.4 J	---	13.1	13.1	08SB0070610

TABLE 3-13

DESCRIPTIVE STATISTICS FOR POND SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Inorganics (mg/kg)								
IRON	2300	9/9	4610 J	21800 J	---	15090	15090	08SB0071013
LEAD	400	9/9	6.1 J	234 J	---	42.5	42.5	08SB0070610
MAGNESIUM	NA	9/9	344 J	2370 J	---	1535	1535	08SB0070610
MANGANESE	110	9/9	18.9 J	451 J	---	159	159	08SB0080206
MERCURY	2.3	8/9	0.008 J	0.049 J	0.006	0.0246	0.0273	08SB0070206
NICKEL	14	9/9	3.2 J	17.6 J	---	11.6	11.6	08SB0070206
POTASSIUM	NA	9/9	866 J	1720 J	---	1235	1235	08SB0070206
SODIUM	NA	4/9	67.6 J	1350 J	32.6 - 58.3	194	410	08SB0071013
TIN	4700	2/9	18.7 J	3010 J	0.22 - 3	337	1514	08SB0070610
VANADIUM	7.8	9/9	13.5 J	37.1 J	---	26.2	26.2	08SB0070206
ZINC	680	9/9	9.9 J	63.2 J	---	31	31	08SB0071013

Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-14

DESCRIPTIVE STATISTICS FOR GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (ug/kg)								
1,1,1-TRICHLOROETHANE	97	1/38	1.8 J	1.8 J	0.88 - 1.2	0.53	1.80	08SB0590709
1,1-DICHLOROETHANE	2100	3/38	3.2	21	0.88 - 1.2	1.25	10.07	08SB0550709
1,1-DICHLOROETHENE	2.9	3/38	2.6 J	15	0.88 - 1.2	1.10	8.20	08SB0131013
2-BUTANONE	4400	9/38	2 J	31	0.88 - 1.2	2.45	8.78	08SB0131013
ACETONE	6600	27/33	1 J	130 J	0.964 - 29	34.71	41.26	08SB0131013
BENZENE	1.7	2/38	1.5 J	2 J	0.88 - 1.2	0.56	1.75	08SB0131013
CARBON DISULFIDE	1500	1/38	1 J	1 J	0.88 - 1.2	0.51	1.00	08SB0120610
CHLOROETHANE	3000	1/38	7	7	0.88 - 1.2	0.66	7.00	08SB0131013
CIS-1,2-DICHLOROETHENE	20	6/38	1 J	6	0.88 - 1.2	0.81	2.48	08SB0101013
ETHYLBENZENE	670	2/38	3 J	440 J	0.88 - 1.2	12.13	221.50	08SB0510204
METHYLENE CHLORIDE	1.2	5/38	12 J	44 J	0.907 - 12	3.96	22.80	08SB0131013
TOLUENE	590	2/38	19	23 J	0.88 - 1.2	1.57	21.00	08SB0510204
TOTAL XYLENES	7100	5/38	1 J	3900 J	0.88 - 1.2	103.28	781.68	08SB0510204
TRICHLOROETHENE	2.8	1/38	2 J	2 J	0.88 - 1.2	0.53	2.00	08SB0131013
TRICHLOROFLUOROMETHANE	8000	5/38	1 J	4	0.88 - 1.2	0.72	2.20	08SB0131013
VINYL CHLORIDE	0.67	2/38	2 J	2 J	0.88 - 1.2	0.57	2.00	08SB0101013
VINYL CHLORIDE	0.67	2/38	2 J	2 J	0.88 - 1.2	0.57	2.00	08SB0100610
Semivolatile Organics (ug/kg)								
2-METHYLNAPHTHALENE	3100	2/5	7 J	7 J	3.84 - 4.05	3.98	7.00	08SB0110206
2-METHYLNAPHTHALENE	3100	2/5	7 J	7 J	3.84 - 4.05	3.98	7.00	08SB0120206
NAPHTHALENE	3100	3/5	10	38	3.84 - 3.91	12.78	20.00	08SB0110206
PHENANTHRENE	230000	1/5	5 J	5 J	3.84 - 4.05	2.58	5.00	08SB0120206
Inorganics (mg/kg)								
ALUMINUM	8.3	5/5	22500 J	31500 J	-	25400.00	25400.00	08SB0050206
ARSENIC	0.29	5/5	5.4 J	9.7 J	-	7.66	7.66	08SB0120206
BARIUM	82	5/5	49.3 J	125 J	-	95.18	95.18	08SB0130206
BERYLLIUM	3.2	4/5	0.66 J	0.89 J	0.49 - 0.49	0.71	0.83	08SB0100206
CALCIUM	NA	5/5	633 J	22600 J	-	5071.60	5071.60	08SB0110206
CHROMIUM	2.1	5/5	21.9 J	25 J	-	23.16	23.16	08SB0050206
COBALT	0.17	5/5	3.4 J	7.4 J	-	5.90	5.90	08SB0130206
COPPER	310	5/5	8.1 J	14.4 J	-	10.60	10.60	08SB0110206
IRON	2300	5/5	19200 J	25400 J	-	22440.00	22440.00	08SB0130206
LEAD	400	5/5	8.3 J	33.3 J	-	16.68	16.68	08SB0120206
MAGNESIUM	NA	5/5	1590 J	3710 J	-	2452.00	2452.00	08SB0110206
MANGANESE	110	5/5	33.5 J	616 J	-	384.90	384.90	08SB0130206
MERCURY	2.3	3/5	0.035 J	0.039 J	0.007 - 0.007	0.02	0.04	08SB0130206
NICKEL	14	5/5	8.6 J	12.6 J	-	11.28	11.28	08SB0120206
POTASSIUM	NA	5/5	1260 J	2010 J	-	1638.00	1638.00	08SB0110206
SODIUM	NA	4/5	101 J	129 J	60.9 - 60.9	93.69	109.50	08SB0110206
THALLIUM	0.056	2/5	0.4 J	0.76 J	0.29 - 0.32	0.32	0.58	08SB0120206
TIN	4700	4/5	0.33 J	0.5 J	0.39 - 0.39	0.34	0.38	08SB0110206
VANADIUM	7.8	5/5	36.2 J	44.8 J	-	40.14	40.14	08SB0120206
ZINC	680	5/5	20.5 J	55.2 J	-	39.32	39.32	08SB0110206

TABLE 3-15

DESCRIPTIVE STATISTICS FOR BUILDING 106 SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)								
2-BUTANONE	4400	5/9	1.14 J	11 J	0.965 - 1.18	2.92	4.83	08SB0250608
ACETONE	6600	2/9	19 J	43 J	5 - 19	10.1	31	08SB0220608
CARBON DISULFIDE	1500	1/9	2 J	2 J	0.965 - 1.18	0.697	2	08SB0290406
METHYLENE CHLORIDE	1.2	1/9	21 J	21 J	0.965 - 1.18	2.81	21	08SB0040206
TRICHLOROETHENE	2.8	3/9	5	36	1.01 - 1.18	5.81	16.3	08SB0290406
TRICHLOROFLUOROMETHANE	8000	1/9	1.1 J	1.1 J	0.965 - 1.18	0.599	1.1	08SB0040206
Semivolatile Organics (µg/kg)								
BENZO(A)ANTHRACENE	160	1/1	5 J	5 J	---	5	5	08SB0040206
CHRYSENE	160	1/1	6 J	6 J	---	6	6	08SB0040206
PHENANTHRENE	230000	1/1	7 J	7 J	---	7	7	08SB0040206
PYRENE	230000	1/1	20	20	---	20	20	08SB0040206
Inorganics (mg/kg)								
ALUMINUM	8.3	1/1	22100 J	22100 J	---	22100	22100	08SB0040206
ARSENIC	0.29	1/1	5.5 J	5.5 J	---	5.5	5.5	08SB0040206
BARIUM	82	1/1	85.3 J	85.3 J	---	85.3	85.3	08SB0040206
CALCIUM	NA	1/1	1420 J	1420 J	---	1420	1420	08SB0040206
CHROMIUM	2.1	1/1	20.1 J	20.1 J	---	20.1	20.1	08SB0040206
COBALT	0.17	1/1	6.6 J	6.6 J	---	6.6	6.6	08SB0040206
COPPER	310	1/1	7.9 J	7.9 J	---	7.9	7.9	08SB0040206
IRON	2300	1/1	20000 J	20000 J	---	20000	20000	08SB0040206
LEAD	400	1/1	12.3 J	12.3 J	---	12.3	12.3	08SB0040206
MAGNESIUM	NA	1/1	1770 J	1770 J	---	1770	1770	08SB0040206
MANGANESE	110	1/1	146 J	146 J	---	146	146	08SB0040206
MERCURY	2.3	1/1	0.018 J	0.018 J	---	0.018	0.018	08SB0040206
NICKEL	14	1/1	9.2 J	9.2 J	---	9.2	9.2	08SB0040206
POTASSIUM	NA	1/1	1200 J	1200 J	---	1200	1200	08SB0040206
SODIUM	NA	1/1	143 J	143 J	---	143	143	08SB0040206
VANADIUM	7.8	1/1	33.5 J	33.5 J	---	33.5	33.5	08SB0040206
ZINC	680	1/1	22.9 J	22.9 J	---	22.9	22.9	08SB0040206

Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-16

DESCRIPTIVE STATISTICS FOR BUILDING 107 SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)								
2-HEXANONE	NA	3/6	1.01 J	1.11 J	0.982 - 1.2	0.808	1.08	08SB0340406, 08SB0410406
ACETONE	6600	4/6	1 J	7 J	1.01 - 1.11	3.51	5	08SB0410406
CIS-1,2-DICHLOROETHENE	20	1/6	1.11 J	1.11 J	0.982 - 1.2	0.631	1.11	08SB0410406
METHYLENE CHLORIDE	1.2	1/6	2 J	2 J	0.982 - 1.2	0.784	2	08SB0420406
TRICHLOROETHENE	2.8	2/6	19	71	0.982 - 1.2	15.4	45	08SB0410406

Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-17

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**
Location		**08SB006**	**08SB006**	**08SB007**	**08SB007**	**08SB007**	**08SB008**	**08SB008**	**08SB009**	**08SB009**	**08SB009**
Sample Number	**HHRA**	**08SB0060206**	**08SB0060610**	**08SB0070206**	**08SB0070610**	**08SB0071013**	**08SB0080206**	**08SB0080610**	**08SB0090206**	**08SB0090610**	**08SB0090610-D**
Sample Code	**Criterion**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**ORIG**	**DUP**
Sample Classification		**9**	**9**	**9**	**9**	**8**	**8**	**8**	**9**	**9**	**9**
Depth Range		**2 - 6**	**6 - 10**	**2 - 6**	**6 - 10**	**10 - 13**	**2 - 6**	**6 - 10**	**2 - 6**	**6 - 10**	**6 - 10**
Sample Date		**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**
Volatile Organics (µg/kg)											
1,1,1-TRICHLOROETHANE	97	0.89 UJ	0.939 U	0.886 U	15	23 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
1,1-DICHLOROETHANE	2100	0.89 UJ	0.939 U	0.886 U	35	210 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
1,2-DICHLOROETHANE	1.2	0.89 UJ	0.939 U	0.886 U	0.94 U	**6 J**	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
2-BUTANONE	4400	0.89 UJ	0.939 U	0.886 U	0.94 U	100 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
ACETONE	6600	9 J	3 J	5 J	2 J	140 J	4 J	31 J	26 J	6 J	4 J
CHLOROETHANE	3000	0.89 UJ	0.939 U	0.886 U	0.94 U	380	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
CIS-1,2-DICHLOROETHENE	20	0.89 UJ	2 J	0.886 U	2 J	3 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
ETHYLBENZENE	670	0.89 UJ	0.939 U	0.886 U	0.94 U	2 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
METHYLENE CHLORIDE	1.2	**22 J**	**3 J**	**13 J**	0.94 UJ	**67 J**	**9 J**	**61 J**	**23**	**2 J**	**36 J**
TOLUENE	590	0.89 UJ	0.939 U	0.886 U	0.94 U	120 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
TOTAL XYLENES	7100	0.89 UJ	0.939 U	0.886 U	0.94 U	13 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
TRANS-1,2-DICHLOROETHENE	34	0.89 UJ	0.939 U	0.886 U	0.94 U	5 J	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
TRICHLOROETHENE	2.8	1 J	**36**	0.886 U	2 J	**3 J**	0.947 U	0.974 U	0.931 UJ	0.894 U	0.934 U
TRICHLOROFLUOROMETHANE	8000	2 J	0.939 U	1 J	0.94 U	4 J	0.947 U	3	2 J	0.894 U	2 J
Semivolatile Organics (µg/kg)											
2-METHYLNAPHTHALENE	3100	3.77 U	3.78 U	4 J	3.88 U	4.04 U	4 U	3.61 U	3.66 U	3.69 U	3.71 U
ACENAPHTHYLENE	370000	3.77 U	3.78 U	17	3.88 U	23	4 U	3.61 U	3.66 U	3.69 U	3.71 U
ANTHRACENE	650000	3.77 U	3.78 U	15	3.88 U	12	4 U	3.61 U	3.66 U	3.69 U	3.71 U
BENZO(A)ANTHRACENE	160	3.77 U	3.78 U	44	10	89	4 U	3.61 U	3.66 U	3.69 U	3.71 U
BENZO(A)PYRENE	62	3.77 U	3.78 U	**110**	8	**110**	4 U	3.61 U	3.66 U	3.69 U	3.71 U
BENZO(B)FLUORANTHENE	490	3.77 U	3.78 U	100	11	200	4 U	3.61 U	3.66 U	3.69 U	3.71 U
BENZO(G,H,I)PERYLENE	230000	3.77 UJ	3.78 UJ	98 J	13 J	170 J	4 UJ	3.61 UJ	3.66 UJ	3.69 UJ	3.71 UJ
BENZO(K)FLUORANTHENE	490	3.77 U	3.78 U	52	7 J	88	4 U	3.61 U	3.66 U	3.69 U	3.71 U
BIS(2-ETHYLHEXYL)PHTHALATE	35000	76.5 U	76.7 U	78.1 U	78.7 U	82 UJ	180 J	73.3 U	74.3 U	74.9 U	75.4 UJ
CHRYSENE	160	3.77 U	3.78 U	69	12	**190**	4 U	3.61 U	3.66 U	3.69 U	3.71 U
DIBENZO(A,H)ANTHRACENE	62	3.77 UJ	3.78 UJ	29 J	3.88 UJ	60 J	4 UJ	3.61 UJ	3.66 UJ	3.69 UJ	3.71 UJ
FLUORANTHENE	230000	3.77 U	3.78 U	83	11	57	4 U	3.61 U	3.66 U	3.69 U	3.71 U
FLUORENE	41000	3.77 U	3.78 U	6 J	3.88 U	8 J	4 U	3.61 U	3.66 U	3.69 U	3.71 U
INDENO(1,2,3-CD)PYRENE	620	3.77 UJ	3.78 UJ	74 J	9 J	120 J	4 UJ	3.61 UJ	3.66 UJ	3.69 UJ	3.71 UJ
NAPHTHALENE	3100	3.77 U	3.78 U	8	4 J	4.04 J	4 U	3.61 U	3.66 U	3.69 U	3.71 U
PHENANTHRENE	230000	3.77 U	3.78 U	57	37	67	4 U	3.61 U	3.66 U	3.69 U	3.71 U
PYRENE	230000	3.77 U	3.78 U	120	11	83	4 U	3.61 U	3.66 U	3.69 U	3.71 U
Inorganics (mg/kg)											
ALUMINUM	8.3	**10100 J**	**8530 J**	**20900 J**	**23700 J**	**21800 J**	**22600 J**	**15300 J**	**12800 J**	**6140 J**	**7830 J**
ANTIMONY	0.27	0.12 U	0.08 U	0.34 U	**13.3 J**	0.49 U	0.22 U	0.07 U	0.14 U	0.14 U	0.12 U
ARSENIC	0.29	**4.1 J**	**3 J**	**7.5 J**	**4.5 J**	**8.4 J**	**6 J**	**4.1 J**	**4.8 J**	**4.7 J**	**3.9 J**
BARIUM	82	42.9 J	29.2 J	**96.7 J**	**94.3 J**	**90.2 J**	**88.2 J**	72.1 J	40.3 J	20.9 J	31 J
BERYLLIUM	3.2	0.39 U	0.34 U	0.75 J	0.64 J	0.61 J	0.57 J	0.57 J	0.32 U	0.36 U	0.38 U

TABLE 3-17

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**
Location		**08SB006**	**08SB006**	**08SB007**	**08SB007**	**08SB007**	**08SB008**	**08SB008**	**08SB009**	**08SB009**	**08SB009**
Sample Number	**HHRA**	**08SB0060206**	**08SB0060610**	**08SB0070206**	**08SB0070610**	**08SB0071013**	**08SB0080206**	**08SB0080610**	**08SB0090206**	**08SB0090610**	**08SB0090610-D**
Sample Code	**Criterion**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**ORIG**	**DUP**
Sample Classification		**9**	**9**	**9**	**9**	**8**	**8**	**8**	**9**	**9**	**9**
Depth Range		**2 - 6**	**6 - 10**	**2 - 6**	**6 - 10**	**10 - 13**	**2 - 6**	**6 - 10**	**2 - 6**	**6 - 10**	**6 - 10**
Sample Date		**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**	**12/12/2004**
Inorganics (mg/kg) (Continued)											
CADMIUM	0.38	0.1 U	0.12 U	**0.51 J**	**0.79 J**	**0.64 J**	0.22 U	0.15 U	0.13 U	0.11 U	0.11 U
CALCIUM	NA	415 J	94.9 J	2400 J	21100 J	16900 J	1330 J	207 J	986 J	218 J	449 J
CHROMIUM	2.1	**12.2 J**	**13.9 J**	**20.5 J**	**19.2 J**	**43.4 J**	**19.7 J**	**17 J**	**14.4 J**	**12.3 J**	**13.6 J**
COBALT	0.17	**2.3 J**	**1.5 J**	**11.3 J**	**7.6 J**	**8 J**	**9 J**	**6.8 J**	**2.7 J**	**1 J**	**1.4 J**
COPPER	310	4 J	5.4 J	17.1 J	24.4 J	20.6 J	14.7 J	15.2 J	10.2 J	6.3 J	5 J
IRON	2300	**10500 J**	**4610 J**	**20200 J**	**18800 J**	**21800 J**	**20000 J**	**13700 J**	**15100 J**	**11100 J**	**12400 J**
LEAD	400	6.7 J	11.7 J	29.6 J	234 J	67.2 J	12 J	7.6 J	7.2 J	6.1 J	6.8 J
MAGNESIUM	NA	769 J	489 J	2220 J	2370 J	2160 J	2300 J	1850 J	1310 J	344 J	439 J
MANGANESE	110	27.4 J	18.9 J	**341 J**	**171 J**	**258 J**	**451 J**	68.9 J	75.6 J	23.4 J	34.2 J
MERCURY	2.3	0.024 J	0.008 J	0.049 J	0.021 J	0.026 J	0.02 J	0.006 U	0.041 J	0.029 J	0.014 J
NICKEL	14	5.4 J	4.1 J	**17.6 J**	**17 J**	**17.4 J**	13.6 J	**16.4 J**	9.5 J	3.2 J	4.3 J
POTASSIUM	NA	1030 J	1230 J	1720 J	1130 J	1570 J	1520 J	1130 J	918 J	866 J	1020 J
SODIUM	NA	35.7 U	42.5 U	58.3 U	122 J	1350 J	67.6 J	100 J	49.9 U	32.6 U	34.5 U
TIN	4700	0.22 U	0.22 U	3 U	3010 J	18.7 J	0.43 U	0.32 U	0.26 U	0.26 U	1.5 U
VANADIUM	7.8	**15.9 J**	**20.4 J**	**37.1 J**	**30.8 J**	**36 J**	**35.7 J**	**24.5 J**	**21.5 J**	**13.5 J**	**12.1 J**
ZINC	680	16.8 J	9.9 J	50.4 J	43.3 J	63.2 J	32.3 J	28.4 J	19.9 J	14.5 J	15.1 J

Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		01		01		01		01		01		01	
Location		08SB005		08SB010/TW003		08SB010/TW003		08SB010/TW003		08SB011		08SB012	
Sample Number	**HHRA**	08SB0050206		08SB0100206		08SB0100610		08SB0101013		08SB0110206		08SB0120206	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification		9		8		8		8		8		8	
Depth Range		2 - 6		2 - 6		6 - 10		10 - 13		2 - 6		2 - 6	
Sample Date		12/11/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004	
Volatile Organics (ug/kg)													
1,1,1-TRICHLOROETHANE	97	0.965	U	0.947	U	1.05	U	0.988	U	0.979	U	1.01	U
1,1-DICHLOROETHANE	2100	0.965	U	0.947	U	1.05	U	0.988	U	6		1.01	U
1,1-DICHLOROETHENE	2.9	0.965	U	0.947	U	1.05	U	0.988	U	7		1.01	U
2-BUTANONE	4400	0.965	U	0.947	U	5	J	7	J	2	J	6	J
ACETONE	6600	1	J	6	J	42	J	42	J	15	J	26	J
BENZENE	1.7	0.965	U	0.947	U	1.05	U	0.988	U	0.979	U	1.01	U
CARBON DISULFIDE	1500	0.965	U	0.947	U	1.05	U	0.988	U	0.979	U	1.01	U
CHLOROETHANE	3000	0.965	U	0.947	U	1.05	U	0.988	U	0.979	U	1.01	U
CIS-1,2-DICHLOROETHENE	20	0.965	U	0.947	U	2	J	6		0.979	U	1.01	U
ETHYLBENZENE	670	0.965	U	0.947	U	1.05	U	0.988	U	0.979	U	1.01	U
METHYLENE CHLORIDE	1.2	0.965	UJ	0.947	UJ	12	J	15	J	0.979	UJ	1.01	UJ
TOLUENE	590	0.965	U	0.947	U	1.05	U	0.988	U	0.979	U	1.01	U
TOTAL XYLENES	7100	0.965	U	0.947	U	1.05	U	0.988	U	1	J	2	J
TRICHLOROETHENE	2.8	0.965	U	0.947	U	1.05	U	0.988	U	0.979	U	1.01	U
TRICHLOROFLUOROMETHANE	8000	0.965	U	0.947	U	2	J	1	J	0.979	U	1.01	U
VINYL CHLORIDE	0.67	0.965	U	0.947	U	2	J	2	J	0.979	U	1.01	U
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	3100	3.84	U	3.91	U					7	J	7	J
NAPHTHALENE	3100	3.84	U	3.91	U					38		12	
PHENANTHRENE	230000	3.84	U	3.91	U					4.04	U	5	J
Inorganics (mg/kg)													
ALUMINUM	8.3	31500	J	24000	J					24600	J	24400	J
ARSENIC	0.29	5.4	J	5.4	J					8.2	J	9.7	J
BARIUM	82	49.3	J	102	J					97.6	J	102	J
BERYLLIUM	3.2	0.49	U	0.89	J					0.66	J	0.87	J
CADMIUM	0.38	0.21	U	0.26	U					0.33	U	0.3	U
CALCIUM	NA	778	J	670	J					22600	J	633	J
CHROMIUM	2.1	25	J	21.9	J					23.3	J	23.4	J
COBALT	0.17	3.4	J	5.1	J					6.7	J	6.9	J
COPPER	310	8.1	J	8.5	J					14.4	J	11.6	J
IRON	2300	20000	J	19200	J					23600	J	24000	J
LEAD	400	8.3	J	11.9	J					14.7	J	33.3	J
MAGNESIUM	NA	1590	J	2110	J					3710	J	2530	J
MANGANESE	110	33.5	J	316	J					389	J	570	J
MERCURY	2.3	0.007	U	0.007	U					0.037	J	0.035	J
NICKEL	14	8.6	J	10.8	J					12.4	J	12.6	J
POTASSIUM	NA	1260	J	1290	J					2010	J	1960	J
SELENIUM	0.26	0.19	U	0.2	U					0.49	U	0.42	U
SODIUM	NA	60.9	U	104	J					129	J	104	J
THALLIUM	0.056	0.3	U	0.29	U					0.4	J	0.76	J

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		01		01		01		01		01		01	
Location		08SB005		08SB010/TW003		08SB010/TW003		08SB010/TW003		08SB011		08SB012	
Sample Number	**HHRA**	08SB0050206		08SB0100206		08SB0100610		08SB0101013		08SB0110206		08SB0120206	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification		9		8		8		8		8		8	
Depth Range		2 - 6		2 - 6		6 - 10		10 - 13		2 - 6		2 - 6	
Sample Date		12/11/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004	
TIN	4700	0.39	U	0.34	J					0.5	J	0.35	J
VANADIUM	7.8	36.2	J	36.4	J					42.3	J	44.8	J
ZINC	680	20.5	J	29.7	J					55.2	J	46	J

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		01		01		01		01		01		01	
Location		08SB012		08SB012		08SB012		08SB013/TW004		08SB013/TW004		08SB013/TW004	
Sample Number	**HHRA**	08SB0120206-D		08SB0120610		08SB0121018		08SB0130206		08SB0130610		08SB0131013	
Sample Code	**Criterion**	DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification		8		8		8		8		8		8	
Depth Range		2 - 6		6 - 10		10 - 18		2 - 6		6 - 10		10 - 13	
Sample Date		12/12/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004	
Volatile Organics (ug/kg)													
1,1,1-TRICHLOROETHANE	97	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	1.07	U
1,1-DICHLOROETHANE	2100	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	1.07	U
1,1-DICHLOROETHENE	2.9	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	15	
2-BUTANONE	4400	2	J	9	J	7	J	2	J	10	J	31	
ACETONE	6600	14	U	45	J	65	J	6	J	51	J	130	J
BENZENE	1.7	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	2	J
CARBON DISULFIDE	1500	1.03	UJ	1	J	1.09	U	0.983	U	1.04	U	1.07	UJ
CHLOROETHANE	3000	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	7	
CIS-1,2-DICHLOROETHENE	20	1.03	U	0.985	U	2	J	0.983	U	1.04	U	2	J
ETHYLBENZENE	670	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	3	J
METHYLENE CHLORIDE	1.2	5	J	0.985	UJ	15	J	0.983	UJ	28	J	44	J
TOLUENE	590	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	19	
TOTAL XYLENES	7100	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	1.07	U
TRICHLOROETHENE	2.8	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	2	J
TRICHLOROFLUOROMETHANE	8000	1.03	J	0.985	U	2	J	0.983	U	2	J	4	
VINYL CHLORIDE	0.67	1.03	U	0.985	U	1.09	U	0.983	U	1.04	U	1.07	U
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	3100	4.04	U					4.05	U			0	
NAPHTHALENE	3100	5	J					10				0	
PHENANTHRENE	230000	4.04	U					4.05	U				
Inorganics (mg/kg)													
ALUMINUM	8.3	23200	J					22500	J				
ARSENIC	0.29	10.4	J					9.6	J				
BARIUM	82	100	J					125	J				
BERYLLIUM	3.2	0.75	J					0.88	J				
CADMIUM	0.38	0.32	J					0.25	U				
CALCIUM	NA	600	J					677	J				
CHROMIUM	2.1	23.1	J					22.2	J				
COBALT	0.17	7.6						7.4	J				
COPPER	310	13.7	J					10.4	J				
IRON	2300	25700	J					25400	J				
LEAD	400	20.5	J					15.2	J				
MAGNESIUM	NA	2580	J					2320	J				
MANGANESE	110	564	J					616	J				
MERCURY	2.3	0.038	J					0.039	J				
NICKEL	14	15.1	J					12	J				
POTASSIUM	NA	1590	J					1670	J				
SELENIUM	0.26	0.43	J					0.52	U				
SODIUM	NA	97.6	U					101	J				
THALLIUM	0.056	0.41	J					0.32	U				

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		01		01		01		01		01		01	
Location		08SB012		08SB012		08SB012		08SB013/TW004		08SB013/TW004		08SB013/TW004	
Sample Number	**HHRA**	08SB0120206-D		08SB0120610		08SB0121018		08SB0130206		08SB0130610		08SB0131013	
Sample Code	**Criterion**	DUP		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification		8		8		8		8		8		8	
Depth Range		2 - 6		6 - 10		10 - 18		2 - 6		6 - 10		10 - 13	
Sample Date		12/12/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004		12/12/2004	
TIN	4700	0.45	U					0.33	J				
VANADIUM	7.8	44.3						41	J				
ZINC	680	46.2	J					45.2	J				

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		03		03		03		03		03		03	
Location		08SB015		08SB016		08SB018		08SB020		08SB021		08SB024	
Sample Number	**HHRA**	08SB0150406		08SB0160203		08SB0180204		08SB0200204		08SB0210204		08SB0240203	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification		8		8		8		9		8		8	
Depth Range		4 - 6		2 - 3		2 - 4		2 - 4		2 - 4		2 - 3	
Sample Date		10/3/2005		10/4/2005		10/3/2005		10/3/2005		10/3/2005		10/3/2005	
Volatile Organics (ug/kg)													
1,1,1-TRICHLOROETHANE	97	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
1,1-DICHLOROETHANE	2100	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
1,1-DICHLOROETHENE	2.9	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
2-BUTANONE	4400	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
ACETONE	6600	3	J	1.19	UR	0.968	UR	0.964	UJ	7	J	1.2	UR
BENZENE	1.7	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
CARBON DISULFIDE	1500	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
CHLOROETHANE	3000	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
CIS-1,2-DICHLOROETHENE	20	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
ETHYLBENZENE	670	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
METHYLENE CHLORIDE	1.2	0.907	UJ	1.19	UJ	0.968	UJ	0.964	UJ	1	UJ	1.2	UJ
TOLUENE	590	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
TOTAL XYLENES	7100	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
TRICHLOROETHENE	2.8	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
TRICHLOROFLUOROMETHANE	8000	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
VINYL CHLORIDE	0.67	0.907	U	1.19	U	0.968	U	0.964	UJ	1	U	1.2	U
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	3100												
NAPHTHALENE	3100												
PHENANTHRENE	230000												
Inorganics (mg/kg)													
ALUMINUM	8.3												
ARSENIC	0.29												
BARIUM	82												
BERYLLIUM	3.2												
CADMIUM	0.38												
CALCIUM	NA												
CHROMIUM	2.1												
COBALT	0.17												
COPPER	310												
IRON	2300												
LEAD	400												
MAGNESIUM	NA												
MANGANESE	110												
MERCURY	2.3												
NICKEL	14												
POTASSIUM	NA												
SELENIUM	0.26												
SODIUM	NA												
THALLIUM	0.056												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		03		03		03		03		03		03	
Location		08SB015		08SB016		08SB018		08SB020		08SB021		08SB024	
Sample Number	**HHRA**	08SB0150406		08SB0160203		08SB0180204		08SB0200204		08SB0210204		08SB0240203	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification		8		8		8		9		8		8	
Depth Range		4 - 6		2 - 3		2 - 4		2 - 4		2 - 4		2 - 3	
Sample Date		10/3/2005		10/4/2005		10/3/2005		10/3/2005		10/3/2005		10/3/2005	
TIN	4700												
VANADIUM	7.8												
ZINC	680												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		03		03		03		03		03		04	
Location		08SB032		08SB033		08SB033		08SB035		08SB040		08SB046	
Sample Number	**HHRA**	08SB0320607		08SB0330406		08SB0330406-D		08SB0350305		08SB0400204		08SB0460608	
Sample Code	**Criterion**	NORMAL		NORMAL		DUP		NORMAL		NORMAL		NORMAL	
Sample Classification		8		8		8		8		8			
Depth Range		6 - 7		4 - 6		4 - 6		3 - 5		2 - 4		6 - 8	
Sample Date		10/4/2005		10/4/2005		10/4/2005		10/2/2005		10/4/2005		10/24/2006	
Volatile Organics (ug/kg)													
1,1,1-TRICHLOROETHANE	97	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
1,1-DICHLOROETHANE	2100	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
1,1-DICHLOROETHENE	2.9	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
2-BUTANONE	4400	0.926	U	0.98	U	5	J	0.984	U	0.977	U	0.93	U
ACETONE	6600	0.926	UR	15	J	52	J	4	J	0.977	UR	1.9	U
BENZENE	1.7	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
CARBON DISULFIDE	1500	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
CHLOROETHANE	3000	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
CIS-1,2-DICHLOROETHENE	20	0.926	U	0.98	U	1.05	U	0.984	U	1	J	0.93	U
ETHYLBENZENE	670	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
METHYLENE CHLORIDE	1.2	0.926	UJ	0.98	UJ	1.05	UJ	0.984	UJ	0.977	UJ	2	U
TOLUENE	590	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
TOTAL XYLENES	7100	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
TRICHLOROETHENE	2.8	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
TRICHLOROFLUOROMETHANE	8000	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
VINYL CHLORIDE	0.67	0.926	U	0.98	U	1.05	U	0.984	U	0.977	U	0.93	U
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	3100												
NAPHTHALENE	3100												
PHENANTHRENE	230000												
Inorganics (mg/kg)													
ALUMINUM	8.3												
ARSENIC	0.29												
BARIUM	82												
BERYLLIUM	3.2												
CADMIUM	0.38												
CALCIUM	NA												
CHROMIUM	2.1												
COBALT	0.17												
COPPER	310												
IRON	2300												
LEAD	400												
MAGNESIUM	NA												
MANGANESE	110												
MERCURY	2.3												
NICKEL	14												
POTASSIUM	NA												
SELENIUM	0.26												
SODIUM	NA												
THALLIUM	0.056												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		03		03		03		03		03		04	
Location		08SB032		08SB033		08SB033		08SB035		08SB040		08SB046	
Sample Number	**HHRA**	08SB0320607		08SB0330406		08SB0330406-D		08SB0350305		08SB0400204		08SB0460608	
Sample Code	**Criterion**	NORMAL		NORMAL		DUP		NORMAL		NORMAL		NORMAL	
Sample Classification		8		8		8		8		8			
Depth Range		6 - 7		4 - 6		4 - 6		3 - 5		2 - 4		6 - 8	
Sample Date		10/4/2005		10/4/2005		10/4/2005		10/2/2005		10/4/2005		10/24/2006	
TIN	4700												
VANADIUM	7.8												
ZINC	680												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		04		04		04		04		04		04	
Location		08SB047/TW018		08SB048/TW008		08SB049		08SB050		08SB051		08SB051	
Sample Number	**HHRA**	08SB0470608		08SB0480507		08SB0490507		08SB0500608		08SB0510204		08SB0510204-D	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		DUP	
Sample Classification													
Depth Range		6 - 8		5 - 7		5 - 7		6 - 8		2 - 4		2 - 4	
Sample Date		10/24/2006		10/24/2006		10/24/2006		10/24/2006		10/24/2006		10/24/2006	
Volatile Organics (ug/kg)													
1,1,1-TRICHLOROETHANE	97	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
1,1-DICHLOROETHANE	2100	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
1,1-DICHLOROETHENE	2.9	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
2-BUTANONE	4400	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
ACETONE	6600	4.8	U	29	U	100	J	25	J	55	J	62	J
BENZENE	1.7	0.94	U	0.88	U	1	U	1.1	U	1.5	J	1	U
CARBON DISULFIDE	1500	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
CHLOROETHANE	3000	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
CIS-1,2-DICHLOROETHENE	20	0.94	U	0.88	U	1	U	1.1	U	1.9	J	1	U
ETHYLBENZENE	670	0.94	U	0.88	U	1	U	1.1	U	440	J	2.9	J
METHYLENE CHLORIDE	1.2	9.3	U	12	U	2	U	5	U	2.4	U	5.3	U
TOLUENE	590	0.94	U	0.88	U	1	U	1.1	U	23	J	5.4	J
TOTAL XYLENES	7100	0.94	U	0.88	U	1	U	1.1	U	3900	J	91	J
TRICHLOROETHENE	2.8	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
TRICHLOROFLUOROMETHANE	8000	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
VINYL CHLORIDE	0.67	0.94	U	0.88	U	1	U	1.1	U	0.95	U	1	U
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	3100												
NAPHTHALENE	3100												
PHENANTHRENE	230000												
Inorganics (mg/kg)													
ALUMINUM	8.3												
ARSENIC	0.29												
BARIUM	82												
BERYLLIUM	3.2												
CADMIUM	0.38												
CALCIUM	NA												
CHROMIUM	2.1												
COBALT	0.17												
COPPER	310												
IRON	2300												
LEAD	400												
MAGNESIUM	NA												
MANGANESE	110												
MERCURY	2.3												
NICKEL	14												
POTASSIUM	NA												
SELENIUM	0.26												
SODIUM	NA												
THALLIUM	0.056												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		04		04		04		04		04		04	
Location		08SB047/TW018		08SB048/TW008		08SB049		08SB050		08SB051		08SB051	
Sample Number	**HHRA**	08SB0470608		08SB0480507		08SB0490507		08SB0500608		08SB0510204		08SB0510204-D	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		DUP	
Sample Classification													
Depth Range		6 - 8		5 - 7		5 - 7		6 - 8		2 - 4		2 - 4	
Sample Date		10/24/2006		10/24/2006		10/24/2006		10/24/2006		10/24/2006		10/24/2006	
TIN	4700												
VANADIUM	7.8												
ZINC	680												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		04		04		04		04		04		04	
Location		08SB052		08SB053/TW009		08SB054		08SB055/TW011		08SB056/TW012		08SB057/TW013	
Sample Number	**HHRA**	08SB0520103		08SB0530507		08SB0540204		08SB0550709		08SB0560709		08SB0570608	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification													
Depth Range		1 - 3		5 - 7		2 - 4		7 - 9		7 - 9		6 - 8	
Sample Date		10/24/2006		10/23/2006		10/23/2006		10/23/2006		10/23/2006		10/23/2006	
Volatile Organics (ug/kg)													
1,1,1-TRICHLOROETHANE	97	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
1,1-DICHLOROETHANE	2100	0.97	U	0.99	U	0.96	U	21		3.2		0.95	U
1,1-DICHLOROETHENE	2.9	0.97	U	0.99	U	0.96	U	2.6	J	0.92	U	0.95	U
2-BUTANONE	4400	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
ACETONE	6600	19	J	71	J	20	J	55	J	13	U	46	J
BENZENE	1.7	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
CARBON DISULFIDE	1500	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
CHLOROETHANE	3000	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
CIS-1,2-DICHLOROETHENE	20	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
ETHYLBENZENE	670	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
METHYLENE CHLORIDE	1.2	5.3	U	0.99	U	1.3	U	1.3	U	5.4	U	0.95	U
TOLUENE	590	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
TOTAL XYLENES	7100	4.2		0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
TRICHLOROETHENE	2.8	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
TRICHLOROFLUOROMETHANE	8000	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
VINYL CHLORIDE	0.67	0.97	U	0.99	U	0.96	U	1.1	U	0.92	U	0.95	U
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	3100												
NAPHTHALENE	3100												
PHENANTHRENE	230000												
Inorganics (mg/kg)													
ALUMINUM	8.3												
ARSENIC	0.29												
BARIUM	82												
BERYLLIUM	3.2												
CADMIUM	0.38												
CALCIUM	NA												
CHROMIUM	2.1												
COBALT	0.17												
COPPER	310												
IRON	2300												
LEAD	400												
MAGNESIUM	NA												
MANGANESE	110												
MERCURY	2.3												
NICKEL	14												
POTASSIUM	NA												
SELENIUM	0.26												
SODIUM	NA												
THALLIUM	0.056												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		04		04		04		04		04		04	
Location		08SB052		08SB053/TW009		08SB054		08SB055/TW011		08SB056/TW012		08SB057/TW013	
Sample Number	**HHRA**	08SB0520103		08SB0530507		08SB0540204		08SB0550709		08SB0560709		08SB0570608	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification													
Depth Range		1 - 3		5 - 7		2 - 4		7 - 9		7 - 9		6 - 8	
Sample Date		10/24/2006		10/23/2006		10/23/2006		10/23/2006		10/23/2006		10/23/2006	
TIN	4700												
VANADIUM	7.8												
ZINC	680												

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		04		04		04		04		04	
Location		08SB058		08SB059/TW014		08SB060/TW015		08SB061/TW016		08SB062/TW017	
Sample Number	**HHRA**	08SB0580709		08SB0590709		08SB0600709		08SB0610507		08SB0620406	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification											
Depth Range		6 - 8		7 - 9		7 - 9		5 - 7		4 - 6	
Sample Date		10/24/2006		10/23/2006		10/23/2006		10/23/2006		10/23/2006	
Volatile Organics (ug/kg)											
1,1,1-TRICHLOROETHANE	97	0.93	U	1.8	J	0.92	U	0.98	U	0.98	UJ
1,1-DICHLOROETHANE	2100	0.93	U	0.89	U	0.92	U	0.98	U	0.98	UJ
1,1-DICHLOROETHENE	2.9	0.93	U	0.89	U	0.92	U	0.98	U	0.98	U
2-BUTANONE	4400	0.93	U	0.89	U	0.92	U	0.98	U	0.98	U
ACETONE	6600	18	J	80	J	89	J	13	U	78	J
BENZENE	1.7	0.93	U	0.89	U	0.92	U	0.98	U	0.98	UJ
CARBON DISULFIDE	1500	0.93	U	0.89	U	0.92	U	0.98	U	0.98	U
CHLOROETHANE	3000	0.93	U	0.89	U	0.92	U	0.98	U	0.98	U
CIS-1,2-DICHLOROETHENE	20	0.93	U	0.89	U	0.92	U	0.98	U	0.98	U
ETHYLBENZENE	670	0.93	U	0.89	U	0.92	U	0.98	U	0.98	UJ
METHYLENE CHLORIDE	1.2	0.93	U	2.2	U	1.5	U	3.1	U	1.5	U
TOLUENE	590	0.93	U	0.89	U	0.92	U	0.98	U	0.98	UJ
TOTAL XYLENES	7100	1.2	J	0.89	U	0.92	U	0.98	U	0.98	UJ
TRICHLOROETHENE	2.8	0.93	U	0.89	U	0.92	U	0.98	U	0.98	UJ
TRICHLOROFLUOROMETHANE	8000	0.93	U	0.89	U	0.92	U	0.98	U	0.98	U
VINYL CHLORIDE	0.67	0.93	U	0.89	U	0.92	U	0.98	U	0.98	U
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	3100										
NAPHTHALENE	3100										
PHENANTHRENE	230000										
Inorganics (mg/kg)											
ALUMINUM	8.3										
ARSENIC	0.29										
BARIUM	82										
BERYLLIUM	3.2										
CADMIUM	0.38										
CALCIUM	NA										
CHROMIUM	2.1										
COBALT	0.17										
COPPER	310										
IRON	2300										
LEAD	400										
MAGNESIUM	NA										
MANGANESE	110										
MERCURY	2.3										
NICKEL	14										
POTASSIUM	NA										
SELENIUM	0.26										
SODIUM	NA										
THALLIUM	0.056										

TABLE 3-18

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN GRASS AND GRAVEL SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		04		04		04		04		04	
Location		08SB058		08SB059/TW014		08SB060/TW015		08SB061/TW016		08SB062/TW017	
Sample Number	**HHRA**	08SB0580709		08SB0590709		08SB0600709		08SB0610507		08SB0620406	
Sample Code	**Criterion**	NORMAL		NORMAL		NORMAL		NORMAL		NORMAL	
Sample Classification											
Depth Range		6 - 8		7 - 9		7 - 9		5 - 7		4 - 6	
Sample Date		10/24/2006		10/23/2006		10/23/2006		10/23/2006		10/23/2006	
TIN	4700										
VANADIUM	7.8										
ZINC	680										

TABLE 3-19

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN BUILDING 106 SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		**01**	**03**	**03**	**03**	**03**	**03**	**03**	**03**	**03**	**03**
Location		**08SB004**	**08SB022**	**08SB025**	**08SB025**	**08SB026**	**08SB027**	**08SB028**	**08SB029**	**08SB031**	**08SB031**
Sample Number	**HHRA**	**08SB0040206**	**08SB0220608**	**08SB0250206**	**08SB0250608**	**08SB0260406**	**08SB0270406**	**08SB0280406**	**08SB0290406**	**08SB0310406**	**08SB0310406-D**
Sample Code	**Criterion**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**ORIG**	**DUP**
Sample Classification		**8**	**9**	**9**	**9**	**8**	**8**	**8**	**8**	**8**	**8**
Depth Range		**2 - 6**	**6 - 8**	**2 - 6**	**6 - 8**	**4 - 6**	**4 - 6**	**4 - 6**	**4 - 6**	**4 - 6**	**4 - 6**
Sample Date		**12/11/2004**	**9/29/2005**	**9/29/2005**	**9/29/2005**	**9/30/2005**	**9/29/2005**	**9/29/2005**	**9/29/2005**	**9/29/2005**	**9/29/2005**
Volatile Organics (ug/kg)											
2-BUTANONE	4400	3 J	6 J	1.18 U	11 J	3 J	1.14 J	1.01 U	1.13 U	0.965 U	1.01 U
ACETONE	6600	19 J	43 J	6 U	19 U	6 U	6 U	7 U	9 U	5 U	4 U
CARBON DISULFIDE	1500	1.1 U	1.04 U	1.18 U	1.08 U	1.03 U	1.14 U	1.01 U	2 J	0.965 U	1.01 U
METHYLENE CHLORIDE	1.2	**21 J**	1.04 UJ	1.18 UJ	1.08 UJ	1.03 UJ	1.14 UJ	1.01 UJ	1.13 UJ	0.965 UJ	1.01 UJ
TRICHLOROETHENE	2.8	1.1 U	**5**	1.18 U	1.08 U	1.03 U	1.14 U	1.01 U	**36**	**8**	**11**
TRICHLOROFLUOROMETHANE	8000	1.1 J	1.04 U	1.18 U	1.08 U	1.03 U	1.14 U	1.01 U	1.13 U	0.965 U	1.01 U
Semivolatile Organics (ug/kg)											
BENZO(A)ANTHRACENE	160	5 J									
CHRYSENE	160	6 J									
PHENANTHRENE	230000	7 J									
PYRENE	230000	20									
Inorganics (mg/kg)											
ALUMINUM	8.3	**22100 J**									
ARSENIC	0.29	**5.5 J**									
BARIUM	82	**85.3 J**									
CALCIUM	NA	1420 J									
CHROMIUM	2.1	**20.1 J**									
COBALT	0.17	**6.6 J**									
COPPER	310	7.9 J									
IRON	2300	**20000 J**									
LEAD	400	12.3 J									
MAGNESIUM	NA	1770 J									
MANGANESE	110	**146 J**									
MERCURY	2.3	0.018 J									
NICKEL	14	9.2 J									
POTASSIUM	NA	1200 J									
SODIUM	NA	143 J									
VANADIUM	7.8	**33.5 J**									
ZINC	680	22.9 J									

Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-20

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN BUILDING 107 SUBSURFACE SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round		**03**	**03**	**03**	**03**	**03**	**03**
Location		**08SB034**	**08SB041**	**08SB042**	**08SB043**	**08SB044**	**08SB045**
Sample Number	**HHRA**	**08SB0340406**	**08SB0410406**	**08SB0420406**	**08SB0430305**	**08SB0440204**	**08SB0450204**
Sample Code	**Criterion**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Classification		**8**	**8**	**8**	**8**	**8**	**8**
Depth Range		**4 - 6**	**4 - 6**	**4 - 6**	**3 - 5**	**2 - 4**	**2 - 4**
Sample Date		**10/2/2005**	**10/2/2005**	**10/2/2005**	**10/2/2005**	**10/2/2005**	**10/2/2005**
Volatile Organics (ug/kg)							
2-HEXANONE	NA	1.11 J	1.11 J	1.05 U	0.982 U	1.2 U	1.01 J
ACETONE	6600	1.11 UJ	7 J	6 J	1 J	6 J	1.01 UJ
CIS-1,2-DICHLOROETHENE	20	1.11 U	1.11 J	1.05 U	0.982 U	1.2 U	1.01 U
METHYLENE CHLORIDE	1.2	1.11 UJ	1.11 UJ	**2 J**	0.982 UJ	1.2 UJ	1.01 UJ
TRICHLOROETHENE	2.8	1.11 U	**71**	**19**	0.982 U	1.2 U	1.01 U

Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.

TABLE 3-21

DESCRIPTIVE STATISTICS FOR POND SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Carcinogenic Classification	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/L)										
1,1,1-TRICHLOROETHANE	200	N	76	5/6	13	200	0.3	51	61.2	08SW00402
1,1-DICHLOROETHANE	81	N	47	6/6	1.9	99	---	33.7	33.7	08SW00402
1,1-DICHLOROETHENE	7	N	65	3/6	1.4	7.7	0.3	1.84	3.53	08SW00402
2-BUTANONE	700	N	2200	2/6	1.6 J	7200	0.5	1200	3601	08SW01201
2-HEXANONE	NA		99	1/6	0.9 J	0.9 J	0.5	0.358	0.9	08SW01201
4-METHYL-2-PENTANONE	200	N	170	1/6	530	530	0.5	88.5	530	08SW01201
ACETONE	550	N	1700	5/6	1.5 J	440 J	0.5	77.6	93.1	08SW01201
CHLOROETHANE	4.6	C	NA	6/6	1.6	89	---	34.9	34.9	08SW00402
CIS-1,2-DICHLOROETHENE	6.1	N	970	6/6	6.3	140	---	51.7	51.7	08SW00402
ETHYLBENZENE	130	N	14	1/6	11	11	0.3	1.96	11	08SW01201
TOLUENE	72	N	253	2/6	3	110	0.3	18.9	56.5	08SW01201
TOTAL XYLENES	21	N	27	1/6	57	57	0.3	9.63	57	08SW01201
TRANS-1,2-DICHLOROETHENE	12	N	970	2/6	0.5 J	4.4	0.3	0.917	2.45	08SW00402
TRICHLOROETHENE	1.4	C	47	5/6	4.7	590	0.3	103	124	08SW00402
VINYL CHLORIDE	0.02	C	930	6/6	0.7 J	40	---	12.7	12.7	08SW00402
Semivolatile Organics (µg/L)										
1,4-DIOXANE	6.1	C	22000	4/5	4 J	5	1	3.90	4.75	08SW00401, 08SW00402, 08SW00502
2-METHYLNAPHTHALENE	0.62	N	330	1/4	0.9	0.9	0.05 - 0.052	0.244	0.9	08SW00402
2-METHYLPHENOL	180	N	67	1/2	4 J	4 J	0.98	2.25	4	08SW01201
3&4-METHYLPHENOL	18		62	1/2	7	7	0.98	3.75	7	08SW01201
ACENAPHTHENE	37	N	38	1/4	0.37 J	0.37 J	0.05 - 0.052	0.112	0.37	08SW00402
ACETOPHENONE	61	N	NA	1/5	7	7	0.971 - 1.08	1.8	7	08SW01201
BENZYL ALCOHOL	1100	N	8.6	1/5	3 J	3 J	0.971 - 1.08	1	3	08SW01201
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	C	0.3	2/5	1 J	2 J	0.971 - 1.08	0.905	1.5	08SW01201
NAPHTHALENE	0.62	N	13	1/4	0.34 J	0.34 J	0.05 - 0.052	0.104	0.34	08SW00402
PHENANTHRENE	18	N	3.6	1/4	1.42 J	1.42 J	0.05 - 0.052	0.374	1.42	08SW00402
PHENOL	1100	N	180	1/2	7	7	0.98	3.75	7	08SW01201
Total Metals (µg/L)										
ALUMINUM	50	N	87	5/5	328 J	6780 J	---	1665	1665	08SW01201
ANTIMONY	1.5	N	80	1/5	3.1 J	3.1 J	0.29 - 0.46	0.767	3.1	08SW01201
ARSENIC	0.045	C	148	1/5	20.6 J	20.6 J	0.59 - 0.68	4.37	20.6	08SW01201
BARIUM	260	N	220	5/5	94.8 J	450 J	---	174	174	08SW01201
BERYLLIUM	4	N	3.6	1/5	0.32 J	0.32 J	0.02	0.072	0.32	08SW01201
CADMIUM	1.8	N	0.15	2/5	2.4 J	9.5	0.15 - 0.37	2.45	5.95	08SW01201
CALCIUM	NA		NA	5/5	61600 J	240000 J	---	99640	99640	08SW01201
CHROMIUM	11	N	42	5/5	1.1 J	73.4	---	20.5	20.5	08SW01201
COBALT	73	N	24	5/5	0.48 J	24.8	---	5.5	5.5	08SW01201
COPPER	150	N	1.58	5/5	2 J	184 J	---	39.7	39.7	08SW01201
IRON	300	N	1000	5/5	938 J	31100	---	7494	7494	08SW01201
LEAD	15		1.17	5/5	1.2 J	171	---	40.4	40.4	08SW01201
MAGNESIUM	NA		NA	5/5	8490 J	12400	---	9638	9638	08SW01201
MANGANESE	50	N	NA	5/5	158 J	4310	---	1007	1007	08SW01201
NICKEL	73	N	28.9	5/5	1.3	22.9	---	6.02	6.02	08SW01201
POTASSIUM	NA		NA	5/5	3470 J	6900	---	4316	4316	08SW01201
SELENIUM	18	N	5	1/5	0.63 J	0.63 J	0.19 - 0.22	0.207	0.63	08SW01201

TABLE 3-21

DESCRIPTIVE STATISTICS FOR POND SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Carcinogenic Classification	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Total Metals (µg/L) (Continued)										
SODIUM	NA		NA	5/5	25200 J	52900 J	---	32520	32520	08SW01201
TIN	2200	N	180	1/1	31.2 J	31.2 J	---	31.2	31.2	08SW01201
VANADIUM	3.6	N	12	1/5	12.8	12.8	1.14	3.02	12.8	08SW01201
ZINC	1100	N	65.7	2/5	93 J	1700 J	12.2 - 16.6	363	897	08SW01201
Dissolved Metals (µg/L)										
ALUMINUM	50	N	87	1/5	113 J	113 J	8.35 - 50.8	30.2	113	08SW00401-F
ARSENIC	0.045	C	148	1/5	5.8 J	5.8 J	0.3 - 0.48	1.32	5.8	08SW01201-F
BARIUM	260	N	220	5/5	81.1 J	234 J	---	123	123	08SW01201-F
CADMIUM	1.8	N	0.15	4/5	0.15 J	0.61 J	0.05	0.283	0.348	08SW00402-F
CALCIUM	NA		NA	5/5	57300	106000 J	---	69440	69440	08SW01201-F
CHROMIUM	11	N	42	2/5	0.73 J	4.5 J	0.54 - 1.7	1.35	2.62	08SW00402-F
COBALT	73	N	24	5/5	0.41 J	8.3	---	2.07	2.07	08SW01201-F
COPPER	150	N	1.58	4/5	1.1 J	2.3 J	1.4	1.5	1.7	08SW00402-F
IRON	300	N	1000	5/5	452 J	7000	---	1960	1960	08SW01201-F
LEAD	15		1.17	5/5	0.14 J	5.5 J	---	1.55	1.55	08SW00402-F
MAGNESIUM	NA		NA	5/5	8040 J	11600	---	9244	9244	08SW01201-F
MANGANESE	50	N	NA	5/5	88.2 J	2960	---	700	700	08SW01201-F
NICKEL	73	N	28.9	5/5	4.7 J	6	---	5.18	5.18	08SW01201-F
POTASSIUM	NA		NA	5/5	2870 J	4730	---	3474	3474	08SW01201-F
SELENIUM	18	N	5	1/5	0.15 J	0.15 J	0.29 - 0.41	0.168	0.15	08SW01201-F
SODIUM	NA		NA	5/5	19300 J	57400 J	---	30140	30140	08SW01201-F
THALLIUM	0.24	N	10	4/5	0.1 J	0.11 J	0.19	0.105	0.108	08SW00402-F, , 08SW00502-F
TIN	2200	N	180	1/1	1.1 J	1.1 J	---	1.1	1.1	08SW01201-F
ZINC	1100	N	65.7	4/5	4.2 J	22 J	3.5	8.91	10.7	08SW00402-F
Field Parameters (mg/L)										
DISSOLVED OXYGEN	NA		NA	1/1	3.88	3.88	---	3.88	3.88	08SW00403
DISSOLVED OXYGEN - METER	NA		NA	4/4	2.64	8.27	---	5.97	5.97	08SW00502
OXIDATION REDUCTION POTENTIAL (mV)	NA		N/A	5/5	-103	145	---	-0.82	-0.82	08SW00403
PH (S.U.)	NA		N/A	5/5	7.1	7.42	---	7.21	7.21	08SW00403
SPECIFIC CONDUCTANCE (mS/cm)	NA		N/A	5/5	0.294	0.42	---	0.333	0.333	08SW00402
TEMPERATURE (°C)	NA		N/A	5/5	5.85	11.4	---	7.13	7.13	08SW00403
TURBIDITY (NTU)	NA		N/A	5/5	6.9	21	---	14	14	08SW00502

°C - Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment .
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NA - No applicable criterion.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.

TABLE 3-22

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Carcinogenic Classification	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/L)										
1,1,1-TRICHLOROETHANE	200	N	76	4/17	0.9 J	13	0.3	1.26	4.88	08SW00601
1,1-DICHLOROETHANE	81	N	47	4/17	1.4	30	0.3	3.84	15.8	08SP00202
1,1-DICHLOROETHENE	7	N	65	3/17	1.1	5.6	0.3	0.759	3.6	08SP00201
2-BUTANONE	700	N	2200	3/17	0.9 J	10	0.5	1.04	4.73	08SW00302
4-METHYL-2-PENTANONE	200	N	170	1/17	0.6 J	0.6 J	0.5	0.271	0.6	08SW00302
ACETONE	550	N	1700	4/17	2.6 J	52 J	0.5	4	16.2	08SW00302
CIS-1,2-DICHLOROETHENE	6.1	N	970	6/17	1.4	7.9	0.3	1.24	3.23	08SW00601
TRICHLOROETHENE	1.4	C	47	8/17	0.6 J	34	0.3	3.16	6.55	08SW00601
VINYL CHLORIDE	0.02	C	930	1/17	0.8 J	0.8 J	0.3	0.188	0.8	08SW00302
Semivolatile Organics (µg/L)										
1,4-DIOXANE	6.1	C	22000	4/8	3 J	6	0.962 - 1.02	2.74	5	08SW00302, 08SW00702
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	C	0.3	1/7	1 J	1 J	0.962 - 1.02	0.564	1	08SW01501
Total Metals (@g/L)										
ALUMINUM	50	N	87	7/8	282 J	25800 J	21.9	3733	4265	08SP00201
ARSENIC	0.045	C	148	2/8	2.5 J	7.5 J	0.22 - 0.55	1.39	5	08SP00201
BARIUM	260	N	220	8/8	48 J	207 J	---	96.1	96.1	08SP00201
BERYLLIUM	4	N	3.6	1/8	1.1 J	1.1 J	0.02 - 0.04	0.15	1.1	08SP00201
CADMIUM	1.8	N	0.15	4/8	0.07 J	1.1	0.06 - 0.19	0.229	0.383	08SP00201
CALCIUM	NA		NA	8/8	24700 J	96000 J	---	65975	65975	08SP00201
CHROMIUM	11	N	42	8/8	0.32 J	23.8	---	4.05	4.05	08SP00201
COBALT	73	N	24	8/8	0.13 J	52.4	---	7.21	7.21	08SP00201
COPPER	150	N	1.58	5/8	2.1 J	28.4 J	1.9 - 4.8	5.29	7.52	08SP00201
IRON	300	N	1000	8/8	93.2	29000	---	4349	4349	08SP00201
LEAD	15		1.17	5/8	0.43 J	29.8	0.069 - 0.499	4.74	7.49	08SP00201
MAGNESIUM	NA		NA	8/8	4850 J	23600	---	11838	11838	08SW00302
MANGANESE	50	N	NA	8/8	6.2 J	6200	---	909	909	08SP00201
MERCURY	1.1	N	0.0013	1/8	0.068 J	0.068 J	0.03	0.0216	0.068	08SP00201
NICKEL	73	N	28.9	8/8	0.79 J	47.3	---	9.06	9.06	08SP00201
POTASSIUM	NA		NA	8/8	976	3110	---	1750	1750	08SP00201
SELENIUM	18	N	5	2/8	0.2 J	0.58 J	0.094 - 0.48	0.17	0.39	08SP00201
SODIUM	NA		NA	8/8	7210 J	70200 J	---	21953	21953	08SW00302
THALLIUM	0.24	N	10	1/8	0.46 J	0.46 J	0.043 - 0.24	0.0974	0.46	08SP00201
TIN	2200	N	180	1/4	0.41 J	0.41 J	0.048 - 0.13	0.131	0.41	08SP00201
VANADIUM	3.6	N	12	3/8	1.9 J	39.8	1.14	5.91	14.8	08SP00201
ZINC	1100	N	65.7	5/8	9.7 J	79.8 J	6.4 - 21	23.9	33.5	08SP00201
Dissolved Metals (µg/L)										
ALUMINUM	50	N	87	2/8	186	213	8.35 - 62.7	57.3	200	08SP00201-F
ARSENIC	0.045	C	148	1/8	1.9 J	1.9 J	0.12 - 0.42	0.356	1.9	08SW00302-F
BARIUM	260	N	220	8/8	40 J	131 J	---	76.3	76.3	08SW00302-F
CADMIUM	1.8	N	0.15	4/8	0.05 J	0.28 J	0.06 - 0.11	0.119	0.193	08SW00301-F
CALCIUM	NA		NA	8/8	22700	104000 J	---	66213	66213	08SP00201-F
CHROMIUM	11	N	42	4/8	0.22 J	0.58 J	0.52 - 0.7	0.341	0.375	08SW00302-F
COBALT	73	N	24	8/8	0.12 J	7.4	---	1.51	1.51	08SP00201-F

TABLE 3-22

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Carcinogenic Classification	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Dissolved Metals (µg/L) (Continued)										
COPPER	150	N	1.58	4/8	1.6 J	1.9 J	1.2 - 2	1.28	1.73	08SW00601-F
IRON	300	N	1000	8/8	30.7 J	798	---	356	356	08SW00302-F
LEAD	15		1.17	6/8	0.13 J	0.66 J	0.069	0.272	0.352	08SW00302-F
MAGNESIUM	NA		NA	8/8	4590 J	24500	---	11769	11769	08SW00302-F
MANGANESE	50	N	NA	8/8	0.88 J	3190	---	523	523	08SP00201-F
NICKEL	73	N	28.9	8/8	0.38 J	15.5 J	---	4.95	4.95	08SW00301-F
POTASSIUM	NA		NA	8/8	941	1920	---	1314	1314	08SW00302-F
SELENIUM	18	N	5	2/8	0.13 J	0.14 J	0.094 - 0.64	0.159	0.135	08SP00201-F
SODIUM	NA		NA	8/8	6020 J	73000 J	---	21649	21649	08SW00302-F
THALLIUM	0.24	N	10	4/8	0.05 J	0.16 J	0.09 - 0.27	0.0844	0.0975	08SW00301-F
ZINC	1100	N	65.7	8/8	4.6 J	22.6 J	---	9.85	9.85	08SW00301-F
Miscellaneous Parameters										
TOTAL COLIFORM (CFU/100 mL)	NA	NA	NA	1/1	2419.2 >	2419.2 >	---	2419	2419	08SP00201
Field Parameters (mg/L)										
DISSOLVED OXYGEN	NA	NA	NA	9/9	5.88	15.81	---	9.54	9.54	08SW00201
DISSOLVED OXYGEN - METER	NA	NA	NA	3/3	11.36	12.41	---	12	12	08SW00701
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	NA	13/13	-2	203	---	104	104	08SP00202
PH (S.U.)	NA	NA	NA	13/13	6.85	8.73	---	7.64	7.64	08SW00201
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	NA	13/13	0.109	0.609	---	0.34	0.34	08SW00301
TEMPERATURE (°C)	NA	NA	NA	13/13	6.02	13.41	---	10.3	10.3	08SP00202
TURBIDITY (NTU)	NA	NA	NA	13/13	1.4	34	---	8.21	8.21	08SW00101

°C - Degrees Celsius
CFU/100 mL - Colony-forming units per 100 milliliters.
Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NA - No applicable criterion.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - micrograms per liter.

TABLE 3-23

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT MAIN STREAM SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Carcinogenic Classification	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample wiht Maximum Detection
Volatile Organics (µg/L)										
ACETONE	550	N	1700	2/9	1.1 J	2.4 J	0.5	0.583	1.75	08SW02101
Total Metals (µg/L)										
ALUMINUM	50	N	87	3/5	56.7 J	710 J	23.7 - 41.8	287	467	08SW00901
BARIUM	260	N	220	5/5	35.6 J	69.1 J	---	53.1	53.1	08SW00802
CADMIUM	1.8	N	0.15	3/5	0.06 J	0.07 J	0.05	0.048	0.0633	08SW00902
CALCIUM	NA		NA	5/5	32200 J	59400 J	---	46420	46420	08SW00902
CHROMIUM	11	N	42	5/5	0.39 J	0.97 J	---	0.674	0.674	08SW00801
COBALT	73	N	24	4/5	0.12 J	0.27 J	0.088	0.169	0.2	08SW00902
COPPER	150	N	1.58	2/5	0.99 J	1 J	1.6 - 2.2	0.968	0.995	08SW00801
IRON	300	N	1000	5/5	28.4 J	588 J	---	254	254	08SW00901
LEAD	15		1.17	3/5	0.07 J	0.13 J	0.407 - 0.492	0.148	0.0967	08SW00802
MAGNESIUM	NA		NA	5/5	6210 J	11400	---	8510	8510	08SW00802
MANGANESE	50	N	NA	5/5	7.3 J	156	---	49	49	08SW00902
NICKEL	73	N	28.9	5/5	0.26 J	1.3	---	0.762	0.762	08SW00901
POTASSIUM	NA		NA	5/5	1030 J	1430	---	1214	1214	08SW00902
SODIUM	NA		NA	5/5	14200 J	28700 J	---	20620	20620	08SW00802
Dissolved Metals (µg/L)										
BARIUM	260	N	220	5/5	31.5 J	65 J	---	50.4	50.4	08SW00902-F
CADMIUM	1.8	N	0.15	2/5	0.04 J	0.14 J	0.05 - 0.06	0.052	0.09	08SW00801-F
CALCIUM	NA		NA	5/5	31200	58700 J	---	45640	45640	08SW00902-F
CHROMIUM	11	N	42	3/5	0.2 J	0.47 J	0.46 - 0.49	0.317	0.37	08SW01401-F
COBALT	73	N	24	3/5	0.14 J	0.21 J	0.088	0.118	0.167	08SW00902-F
COPPER	150	N	1.58	2/5	0.74 J	0.84 J	1.2 - 1.6	0.736	0.79	08SW00901-F
IRON	300	N	1000	4/5	7.1 J	245 J	6.15	100	125	08SW00901-F
LEAD	15		1.17	5/5	0.1 J	0.27 J	---	0.177	0.177	08SW00902-F
MAGNESIUM	NA		NA	5/5	6250 J	10900	---	8354	8354	08SW00802-F
MANGANESE	50	N	NA	5/5	1.8 J	137	---	38.8	38.8	08SW00902-F
NICKEL	73	N	28.9	5/5	0.36 J	2.7 J	---	1.39	1.39	08SW00801-F, 08SW00901-F
POTASSIUM	NA		NA	5/5	770 J	1380	---	1088	1088	08SW00902-F
SODIUM	NA		NA	5/5	12200 J	27900 J	---	19340	19340	08SW00802-F
THALLIUM	0.24	N	10	2/5	0.11 J	0.12 J	0.09 - 0.13	0.078	0.115	08SW00901-F
ZINC	1100	N	65.7	3/5	1.2 J	2.2 J	1.8 - 2	1.34	1.6	08SW00902-F
Field Parameters (mg/L)										
DISSOLVED OXYGEN	NA		NA	4/4	5.16	9.3	---	7.21	7.21	08SW00803
DISSOLVED OXYGEN - METER	NA		NA	2/2	12.99	13.54	---	13.3	13.3	08SW00901
OXIDATION REDUCTION POTENTIAL (mV)	NA		NA	6/6	32.3	187	---	134	134	08SW02101
PH (S.U.)	NA		NA	6/6	6.88	7.45	---	7.21	7.21	08SW00801
SPECIFIC CONDUCTANCE (mS/cm)	NA		NA	6/6	0.267	0.347	---	0.316	0.316	08SW00803
TEMPERATURE (°C)	NA		NA	6/6	4.68	10.39	---	8.09	8.09	08SW00803
TURBIDITY (NTU)	NA		NA	6/6	0.75	13	---	6.53	6.53	08SW00903

°C - Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NA - No applicable criterion.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.

TABLE 3-24

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criterion	ERA Criterion	DOWNGRAD 01 08SW/SD004 08SW00401 NORMAL 1/10/2005	DOWNGRAD 01 08SW/SD004 08SW00402 NORMAL 1/10/2005	DOWNGRAD 03 08SW/SD004 08SW00403 ORIG 10/25/2005	DOWNGRAD 03 08SW/SD004 08SW00403-D DUP 10/25/2005	DOWNGRAD 01 08SW/SD005 08SW00501 NORMAL 1/10/2005
Volatile Organics (µg/L)							
1,1,1-TRICHLOROETHANE	200	76	21	**200**	13	12	33
1,1-DICHLOROETHANE	81	47	18	**99**	12	12	30
1,1-DICHLOROETHENE	7	65	0.3 U	**7.7**	0.3 U	0.3 U	0.3 U
2-BUTANONE	700	2200	0.5 U	0.5 U	1.6 J	1.4 J	0.5 U
2-HEXANONE	NA	99	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	200	170	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	550	1700	0.5 UJ	15 J	7 J	7.3 J	1.5 J
CHLOROETHANE	4.6	NA	**9.9**	**89**	**43**	**47**	**22**
CIS-1,2-DICHLOROETHENE	6.1	970	**12**	**140**	**6.3**	**6.2**	**22**
ETHYLBENZENE	130	14	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOLUENE	72	253	0.3 U	3	0.3 U	0.3 U	0.3 U
TOTAL XYLENES	21	27	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	12	970	0.3 U	4.4	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	1.4	47	**7.3**	**590**	0.3 U	0.3 U	**8.8**
VINYL CHLORIDE	0.02	930	**0.7 J**	**40**	**1.4**	**1.4 J**	**3.4**
Semivolatile Organics (µg/L)							
1,4-DIOXANE	6.1	22000	5	5			4 J
2-METHYLNAPHTHALENE	0.62	330	0.05 U	**0.9**			0.052 U
2-METHYLPHENOL	180	67	0.98 U	1 UR			0.971 UR
3&4-METHYLPHENOL	18	62	0.98 U	1 UR			0.971 UR
ACENAPHTHENE	37	38	0.05 U	0.37 J			0.052 U
ACETOPHENONE	61	NA	0.98 UJ	1 U			0.971 U
BENZYL ALCOHOL	1100	8.6	0.98 U	1 U			0.971 U
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	0.3	**1 J**	1 U			0.971 U
NAPHTHALENE	0.62	13	0.05 U	0.34 J			0.052 U
PHENANTHRENE	18	3.6	0.05 U	1.42 J			0.052 U
PHENOL	1100	180	0.98 U	1 UR			0.971 UR
Total Metals (µg/L)							
ALUMINUM	50	87	**402 J**	**472 J**			**344 J**
ANTIMONY	1.5	80	0.31 U	0.46 U			0.41 U
ARSENIC	0.045	148	0.59 U	0.68 U			0.6 U
BARIUM	260	220	94.8 J	115 J			97.4 J
BERYLLIUM	4	3.6	0.02 U	0.02 U			0.02 U
CADMIUM	1.8	0.15	0.17 U	**2.4 J**			0.15 U
CALCIUM	NA	NA	61600 J	68600 J			61600 J
CHROMIUM	11	42	1.1 J	**24.6 J**			1.1 J
COBALT	73	24	0.5 J	1.2			0.48 J
COPPER	150	1.58	**2 J**	**8.1 J**			**2.1 J**
IRON	300	1000	**938 J**	**2520 J**			**1270 J**
LEAD	15	1.17	**1.2 J**	**25.9 J**			**1.2 J**
MAGNESIUM	NA	NA	8540 J	9540 J			8490 J
MANGANESE	50	NA	**160 J**	**218 J**			**158 J**
NICKEL	73	28.9	1.3	3.2			1.3
POTASSIUM	NA	NA	3490 J	3890 J			3470 J

TABLE 3-24

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criterion	ERA Criterion	DOWNGRAD 01 08SW/SD004 08SW00401 NORMAL 1/10/2005	DOWNGRAD 01 08SW/SD004 08SW00402 NORMAL 1/10/2005	DOWNGRAD 03 08SW/SD004 08SW00403 ORIG 10/25/2005	DOWNGRAD 03 08SW/SD004 08SW00403-D DUP 10/25/2005	DOWNGRAD 01 08SW/SD005 08SW00501 NORMAL 1/10/2005
Total Metals (µg/L) (Continued)							
SELENIUM	18	5	0.21 U	0.19 U			0.19 U
SODIUM	NA	NA	25200 J	30400 J			25200 J
TIN	2200	180					
VANADIUM	3.6	12	1.14 U	1.14 U			1.14 U
ZINC	1100	65.7	12.3 U	**93 J**			12.2 U
Dissolved Metals (µg/L)							
ALUMINUM	50	87	**113 J**	50.8 U			8.6 U
ARSENIC	0.045	148	0.48 U	0.45 U			0.3 U
BARIUM	260	220	91.4 J	95.6 J			81.1 J
CADMIUM	1.8	0.15	**0.3 J**	**0.61 J**			**0.33 J**
CALCIUM	NA	NA	60200	64400			57300
CHROMIUM	11	42	1.7 U	4.5 J			0.54 U
COBALT	73	24	0.54 J	0.65 J			0.41 J
COPPER	150	1.58	**2 J**	**2.3 J**			1.4 J
IRON	300	1000	**910 J**	**922 J**			**452 J**
LEAD	15	1.17	**1.7 J**	**5.5 J**			0.213 J
MAGNESIUM	NA	NA	8410 J	9190 J			8040 J
MANGANESE	50	NA	**135 J**	**164 J**			**88.2 J**
NICKEL	73	28.9	4.7 J	5.4 J			4.7 J
POTASSIUM	NA	NA	3070 J	3430 J			2870 J
SELENIUM	18	5	0.41 U	0.35 U			0.33 U
SODIUM	NA	NA	23400 J	27000 J			19300 J
THALLIUM	0.24	10	0.1 J	0.11 J			0.11 J
TIN	2200	180					
ZINC	1100	65.7	10.5 J	22 J			4.2 J
Field Parameters (mg/L)							
DISSOLVED OXYGEN	NA	NA			3.88		
DISSOLVED OXYGEN - METER	NA	NA	6.34	2.64			6.61
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	-76	-103	145		-91
PH (S.U.)	NA	NA	7.19	7.1	7.42		7.22
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	0.31	0.42	0.294		0.3
TEMPERATURE (°C)	NA	NA	5.92	6.34	11.4		5.85
TURBIDITY (NTU)	NA	NA	11	18	6.9		13

TABLE 3-24

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criteria	ERA Criteria	DOWNGRAD 01 08SW/SD005 08SW00502 NORMAL 1/10/2005	DOWNGRAD 02 08SW/SD012 08SW01201 ORIG 6/5/2005	DOWNGRAD 02 08SW/SD012 08SW01201-D DUP 6/5/2005
Volatile Organics (µg/L)					
1,1,1-TRICHLOROETHANE	200	76	39	0.3 U	0.3 U
1,1-DICHLOROETHANE	81	47	41	1.9	1.9
1,1-DICHLOROETHENE	7	65	1.5	1.4	1.5
2-BUTANONE	700	2200	0.5 U	**7200**	**6600**
2-HEXANONE	NA	99	0.5 U	0.9 J	1.1 J
4-METHYL-2-PENTANONE	200	170	0.5 U	**530**	**510**
ACETONE	550	1700	1.8 J	440 J	410 J
CHLOROETHANE	4.6	NA	**44**	1.6	1.6
CIS-1,2-DICHLOROETHENE	6.1	970	**30**	**100**	**100**
ETHYLBENZENE	130	14	0.3 U	11	11
TOLUENE	72	253	0.3 U	**110**	**110**
TOTAL XYLENES	21	27	0.3 U	**57**	**56**
TRANS-1,2-DICHLOROETHENE	12	970	0.3 U	0.5 J	0.3 U
TRICHLOROETHENE	1.4	47	**9.2**	**4.7**	**4.5**
VINYL CHLORIDE	0.02	930	**8.8**	**22**	**23**
Semivolatile Organics (µg/L)					
1,4-DIOXANE	6.1	22000	5 J	1 U	1.03 U
2-METHYLNAPHTHALENE	0.62	330	0.051 U		
2-METHYLPHENOL	180	67	1.08 UR	4 J	3 J
3&4-METHYLPHENOL	18	62	1.08 UR	7	6
ACENAPHTHENE	37	38	0.051 U		
ACETOPHENONE	61	NA	1.08 U	7	5 J
BENZYL ALCOHOL	1100	8.6	1.08 U	3 J	3 J
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	0.3	1.08 U	**2 J**	**1.03 J**
NAPHTHALENE	0.62	13	0.051 U		
PHENANTHRENE	18	3.6	0.051 U		
PHENOL	1100	180	1.08 UR	7	6
Total Metals (µg/L)					
ALUMINUM	50	87	**328 J**	**6780 J**	**8120 J**
ANTIMONY	1.5	80	0.29 U	**3.1 J**	**2.9 J**
ARSENIC	0.045	148	0.65 U	**20.6 J**	**15.8 J**
BARIUM	260	220	113 J	**450 J**	**375 J**
BERYLLIUM	4	3.6	0.02 U	0.32 J	0.37 J
CADMIUM	1.8	0.15	0.37 U	**9.5**	**9.3**
CALCIUM	NA	NA	66400 J	240000 J	129000 J
CHROMIUM	11	42	2.5 J	**73.4**	**76.4**
COBALT	73	24	0.52 J	**24.8**	22.5
COPPER	150	1.58	**2.1 J**	**184 J**	**154 J**
IRON	300	1000	**1640 J**	**31100**	**25800**
LEAD	15	1.17	**2.9 J**	**171**	**185**
MAGNESIUM	NA	NA	9220 J	12400	12000
MANGANESE	50	NA	**190 J**	**4310**	**3190**
NICKEL	73	28.9	1.4	22.9	22.5
POTASSIUM	NA	NA	3830 J	6900	5560

TABLE 3-24

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization **Sampling Round** **Location** **Sample Number** **Sample Code** **Sample Date**	**HHRA Criteria**	**ERA Criteria**	**DOWNGRAD 01 08SW/SD005 08SW00502 NORMAL 1/10/2005**	**DOWNGRAD 02 08SW/SD012 08SW01201 ORIG 6/5/2005**	**DOWNGRAD 02 08SW/SD012 08SW01201-D DUP 6/5/2005**
Total Metals (µg/L) (Continued)					
SELENIUM	18	5	0.22 U	0.63 J	0.48 J
SODIUM	NA	NA	28900 J	52900 J	50600 J
TIN	2200	180		31.2 J	27.3 J
VANADIUM	3.6	12	1.14 U	**12.8**	**14.1**
ZINC	1100	65.7	16.6 U	**1700 J**	**1810 J**
Dissolved Metals (µg/L)					
ALUMINUM	50	87	8.6 U	8.35 U	8.35 U
ARSENIC	0.045	148	0.34 U	**5.8 J**	**5.7 J**
BARIUM	260	220	111 J	**234 J**	**233 J**
CADMIUM	1.8	0.15	0.15 J	0.05 U	0.07 U
CALCIUM	NA	NA	59300	106000 J	99800 J
CHROMIUM	11	42	0.78 U	0.73 J	0.99 J
COBALT	73	24	0.47 J	8.3	8
COPPER	150	1.58	1.1 J	1.4 U	1.4 U
IRON	300	1000	**517 J**	**7000**	**7500**
LEAD	15	1.17	0.212 J	0.14 J	0.14 J
MAGNESIUM	NA	NA	8980 J	11600	11400
MANGANESE	50	NA	**152 J**	**2960**	**2780**
NICKEL	73	28.9	5.1 J	6	6.1
POTASSIUM	NA	NA	3270 J	4730	4710
SELENIUM	18	5	0.29 U	0.15 J	0.14 J
SODIUM	NA	NA	23600 J	57400 J	55400 J
THALLIUM	0.24	10	0.11 J	0.19 U	0.07 U
TIN	2200	180		1.1 J	0.92 J
ZINC	1100	65.7	3.5 U	6.1 J	5.7 J
Field Parameters (mg/L)					
DISSOLVED OXYGEN	NA	NA			
DISSOLVED OXYGEN - METER	NA	NA	8.27		
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	120.9		
PH (S.U.)	NA	NA	7.12		
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	0.34		
TEMPERATURE (°C)	NA	NA	6.15		
TURBIDITY (NTU)	NA	NA	21		

°C - Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NTU - nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criterion	ERA Criterion	UPGRAD 03 08SW/SD013 08SW01301 NORMAL 10/25/2005	DOWNGRAD 02 08SP002 08SP00201 NORMAL 6/7/2005	DOWNGRAD 03 08SP002 08SP00202 NORMAL 10/25/2005	DOWNGRAD 01 08SW/SD001 08SW00101 NORMAL 1/9/2005	DOWNGRAD 03 08SW/SD001 08SW00102 NORMAL 10/25/2005	DOWNGRAD 03 08SW/SD002 08SW00201 NORMAL 10/25/2005
Volatile Organics (µg/L)								
1,1,1-TRICHLOROETHANE	200	76	0.3 U	4.4	1.2	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHANE	81	47	0.3 U	27	30	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHENE	7	65	0.3 U	5.6	4.1	0.3 U	0.3 U	0.3 U
2-BUTANONE	700	2200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3.3 J
4-METHYL-2-PENTANONE	200	170	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	550	1700	3.9 J	0.5 UJ	0.5 U	0.5 UJ	0.5 U	7.5 J
CIS-1,2-DICHLOROETHENE	6.1	970	0.3 U	1.5	2.8	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	1.4	47	0.3 U	**4.9**	**2**	0.3 U	0.3 U	0.6 J
VINYL ACETATE	0.02	930	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organics (µg/L)								
1,4-DIOXANE	6.1	22000		5		0.972 U		
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	0.3				0.971 U		
Total Metals (µg/L)								
ALUMINUM	50	87		**25800 J**		**1380 J**		
ARSENIC	0.045	148		**7.5 J**		0.55 U		
BARIUM	260	220		207 J		109 J		
BERYLLIUM	4	3.6		1.1 J		0.04 U		
CADMIUM	1.8	0.15		**1.1**		0.17 U		
CALCIUM	NA	NA		96000 J		62900 J		
CHROMIUM	11	42		**23.8**		2.6 J		
COBALT	73	24		**52.4**		0.38 J		
COPPER	150	1.58		**28.4 J**		**2.6 J**		
IRON	300	1000		**29000**		**1140 J**		
LEAD	15	1.17		**29.8**		**3.7 J**		
MAGNESIUM	NA	NA		15200		10400 J		
MANGANESE	50	NA		**6200**		10.2 J		
MERCURY	1.1	0.0013		**0.068 J**		0.03 U		
NICKEL	73	28.9		**47.3**		2.6		
POTASSIUM	NA	NA		3110		1290 J		
SELENIUM	18	5		0.58 J		0.27 U		
SODIUM	NA	NA		8690 J		9520 J		
THALLIUM	0.24	10		**0.46 J**		0.043 U		
TIN	2200	180		0.41 J				
VANADIUM	3.6	12		**39.8**		2.7		
ZINC	1100	65.7		**79.8 J**		18.8 U		
Dissolved Metals (µg/L)								
ALUMINUM	50	87		**213**		62.7 U		
ARSENIC	0.045	148		0.42 U		0.3 U		
BARIUM	260	220		72.3 J		103 J		
CADMIUM	1.8	0.15		0.1 U		**0.23 J**		
CALCIUM	NA	NA		104000 J		62700		

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization			**UPGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**
Sampling Round			**03**	**02**	**03**	**01**	**03**	**03**
Location	**HHRA**	**ERA**	**08SW/SD013**	**08SP002**	**08SP002**	**08SW/SD001**	**08SW/SD001**	**08SW/SD002**
Sample Number	**Criterion**	**Criterion**	**08SW01301**	**08SP00201**	**08SP00202**	**08SW00101**	**08SW00102**	**08SW00201**
Sample Code			**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Date			**10/25/2005**	**6/7/2005**	**10/25/2005**	**1/9/2005**	**10/25/2005**	**10/25/2005**
Dissolved Metals (µg/L) (Continued)								
CHROMIUM	11	42		0.45 J		0.66 U		
COBALT	73	24		7.4		0.25 J		
COPPER	150	1.58		1.6 U		**1.6 J**		
IRON	300	1000		260		**540 J**		
LEAD	15	1.17		0.4 J		0.453 J		
MAGNESIUM	NA	NA		14800		10300 J		
MANGANESE	50	NA		**3190**		3.1 J		
NICKEL	73	28.9		5.5		5.5 J		
POTASSIUM	NA	NA		1040		1030 J		
SELENIUM	18	5		0.14 J		0.5 U		
SODIUM	NA	NA		10000 J		8770 J		
THALLIUM	0.24	10		0.09 U		0.05 J		
ZINC	1100	65.7		4.6 J		8.7 J		
Miscellaneous Parameters (µg/L)								
TOTAL COLIFORM (CFU/100 mL)	NA	NA		>2419.2				
Field Parameters (mg/L)								
DISSOLVED OXYGEN	NA	NA	14.41		5.88		11.37	15.81
DISSOLVED OXYGEN - METER	NA	NA						
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	95		203	28.7	125	85
PH (S.U.)	NA	NA	9.02		6.85	7.82	8.33	8.73
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	0.095		0.362	0.53	0.15	0.109
TEMPERATURE (°C)	NA	NA	13.78		13.41	9.81	12.48	10.84
TURBIDITY (NTU)	NA	NA	9.4		3.9	34	2.5	1.4

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criteria	ERA Criteria	DOWNGRAD 01 08SW/SD003 08SW00301 NORMAL 1/9/2005	DOWNGRAD 02 08SW/SD003 08SW00302 NORMAL 6/5/2005	DOWNGRAD 03 08SW/SD003 08SW00303 NORMAL 10/25/2005	DOWNGRAD 01 08SW/SD006 08SW00601 NORMAL 1/9/2005	DOWNGRAD 01 08SW/SD007 08SW00701 ORIG 1/8/2005
Volatile Organics (µg/L)							
1,1,1-TRICHLOROETHANE	200	76	0.3 U	0.3 U	0.3 U	13	0.3 U
1,1-DICHLOROETHANE	81	47	0.3 U	0.3 U	0.3 U	4.9	0.3 U
1,1-DICHLOROETHENE	7	65	0.3 U	0.3 U	0.3 U	1.1	0.3 U
2-BUTANONE	700	2200	0.5 U	10	0.9 J	0.5 U	0.5 U
4-METHYL-2-PENTANONE	200	170	0.5 U	0.6 J	0.5 U	0.5 U	0.5 U
ACETONE	550	1700	0.5 UJ	52 J	2.7 J	0.5 UJ	0.5 UJ
CIS-1,2-DICHLOROETHENE	6.1	970	0.3 U	2.4	0.3 U	**7.9**	0.3 U
TRICHLOROETHENE	1.4	47	0.3 U	1.4	0.3 U	**34**	0.6 J
VINYL ACETATE	0.02	930	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organics (µg/L)							
1,4-DIOXANE	6.1	22000	1.02 U	6		3 J	0.962 U
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	0.3	1.02 U	0.99 U		0.971 U	0.962 U
Total Metals (µg/L)							
ALUMINUM	50	87	**524 J**	**964 J**		**557 J**	**349 J**
ARSENIC	0.045	148	0.36 U	**2.5 J**		0.36 U	0.22 U
BARIUM	260	220	54.7 J	136 J		73.8 J	48 J
BERYLLIUM	4	3.6	0.04 U	0.04 U		0.02 U	0.02 U
CADMIUM	1.8	0.15	0.19 U	**0.21 J**		0.18 U	0.06 U
CALCIUM	NA	NA	74700 J	94700 J		65000 J	24700 J
CHROMIUM	11	42	1.1 J	1.8		1.3 J	0.79 J
COBALT	73	24	0.99 J	2.2		0.23 J	0.13 J
COPPER	150	1.58	**2.3 J**	4.8 U		**2.2 J**	**2.1 J**
IRON	300	1000	**433 J**	**3010**		**442 J**	278 J
LEAD	15	1.17	0.919 J	**2.6**		0.499 U	0.374 U
MAGNESIUM	NA	NA	12800 J	23600		8880 J	4850 J
MANGANESE	50	NA	18.8 J	**827**		6.2 J	7.3 J
MERCURY	1.1	0.0013	0.03 U	0.03 U		0.03 U	0.03 U
NICKEL	73	28.9	13.4	5		1.3	1.1
POTASSIUM	NA	NA	1310 J	2100		2200 J	1490 J
SELENIUM	18	5	0.48 U	0.2 J		0.12 U	0.094 U
SODIUM	NA	NA	19400 J	70200 J		16900 J	7210 J
THALLIUM	0.24	10	0.07 U	0.24 U		0.043 U	0.043 U
TIN	2200	180		0.13 U			
VANADIUM	3.6	12	1.14 U	1.9 J		1.14 U	1.14 U
ZINC	1100	65.7	31.9 J	29.9 J		21 U	6.4 U
Dissolved Metals (µg/L)							
ALUMINUM	50	87	9.4 U	**186**		21.9 U	
ARSENIC	0.045	148	0.27 U	**1.9 J**		0.18 U	
BARIUM	260	220	50.5 J	131 J		72.9 J	
CADMIUM	1.8	0.15	**0.28 J**	0.09 U		**0.21 J**	
CALCIUM	NA	NA	72800	98200 J		61800	

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criteria	ERA Criteria	DOWNGRAD 01 08SW/SD003 08SW00301 NORMAL 1/9/2005	DOWNGRAD 02 08SW/SD003 08SW00302 NORMAL 6/5/2005	DOWNGRAD 03 08SW/SD003 08SW00303 NORMAL 10/25/2005	DOWNGRAD 01 08SW/SD006 08SW00601 NORMAL 1/9/2005	DOWNGRAD 01 08SW/SD007 08SW00701 ORIG 1/8/2005
Dissolved Metals (µg/L) (Continued)							
CHROMIUM	11	42	0.57 U	0.58 J		0.7 U	
COBALT	73	24	1.1 J	1.9		0.27 J	
COPPER	150	1.58	**1.7 J**	2 U		**1.9 J**	
IRON	300	1000	**533 J**	**798**		**475 J**	
LEAD	15	1.17	0.223 J	0.66 J		0.244 J	
MAGNESIUM	NA	NA	12300 J	24500		8820 J	
MANGANESE	50	NA	13.8 J	**834**		0.88 J	
NICKEL	73	28.9	15.5 J	4.2		5.2 J	
POTASSIUM	NA	NA	1060 J	1920		1820 J	
SELENIUM	18	5	0.64 U	0.13 J		0.33 U	
SODIUM	NA	NA	16900 J	73000 J		14400 J	
THALLIUM	0.24	10	0.16 J	0.27 U		0.1 J	
ZINC	1100	65.7	22.6 J	9.8 J		6.3 J	
Miscellaneous Parameters (µg/L)							
TOTAL COLIFORM (CFU/100 mL)	NA	NA					
Field Parameters (mg/L)							
DISSOLVED OXYGEN	NA	NA			11.09		
DISSOLVED OXYGEN - METER	NA	NA	12.2			11.36	12.41
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	17.3		109	22.5	42.8
PH (S.U.)	NA	NA	7.7		7.97	7.46	7.31
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	0.609		0.365	0.541	0.223
TEMPERATURE (°C)	NA	NA	7.47		11.01	7.62	6.02
TURBIDITY (NTU)	NA	NA	12		3.3	11	8.3

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criteria	ERA Criteria	DOWNGRAD 01 08SW/SD007 08SW00701-D DUP 1/9/2005	DOWNGRAD 01 08SW/SD007 08SW00701-F-D DUP 1/9/2005	DOWNGRAD 02 08SW/SD007 08SW00702 NORMAL 6/5/2005	DOWNGRAD 03 08SW/SD011 08SW01101 NORMAL 10/25/2005	DOWNGRAD 02 08SW/SD015 08SW01501 NORMAL 6/5/2005
Volatile Organics (µg/L)							
1,1,1-TRICHLOROETHANE	200	76	0.3 U		0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHANE	81	47	0.3 U		0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHENE	7	65	0.3 U		0.3 U	0.3 U	0.3 U
2-BUTANONE	700	2200	0.5 U		0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	200	170	0.5 U		0.5 U	0.5 U	0.5 U
ACETONE	550	1700	0.5 UJ		0.5 UJ	2.6 J	0.5 UJ
CIS-1,2-DICHLOROETHENE	6.1	970	0.3 U		0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	1.4	47	0.6 J		0.3 U	0.3 U	0.3 U
VINYL ACETATE	0.02	930	0.5 U		0.5 U	0.5 U	0.5 U
Semivolatile Organics (µg/L)							
1,4-DIOXANE	6.1	22000	0.962 U		6		0.962 U
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	0.3	0.962 U		0.98 U		**1 J**
Total Metals (µg/L)							
ALUMINUM	50	87	**324 J**		21.9 U		**282 J**
ARSENIC	0.045	148	0.21 U		0.42 U		0.26 U
BARIUM	260	220	43.2 J		80.2 J		60 J
BERYLLIUM	4	3.6	0.02 U		0.02 U		0.02 U
CADMIUM	1.8	0.15	0.11 U		0.15 J		0.07 J
CALCIUM	NA	NA	23400 J		47000 J		62800 J
CHROMIUM	11	42	0.92 J		0.32 J		0.66 J
COBALT	73	24	0.13 J		0.85 J		0.47 J
COPPER	150	1.58	**2.1 J**		2.7 U		1.9 U
IRON	300	1000	245 J		93.2		**393**
LEAD	15	1.17	0.369 U		0.069 U		0.43 J
MAGNESIUM	NA	NA	4980 J		8870		10100
MANGANESE	50	NA	4.8 J		**97**		**102**
MERCURY	1.1	0.0013	0.03 U		0.03 U		0.03 U
NICKEL	73	28.9	1.2		1		0.79 J
POTASSIUM	NA	NA	1530 J		1520		976
SELENIUM	18	5	0.094 U		0.094 U		0.094 U
SODIUM	NA	NA	7540 J		22500 J		21200 J
THALLIUM	0.24	10	0.043 U		0.1 U		0.1 U
TIN	2200	180			0.048 U		0.048 U
VANADIUM	3.6	12	1.14 U		1.14 U		1.14 U
ZINC	1100	65.7	6.8 U		16.4 J		9.7 J
Dissolved Metals (µg/L)							
ALUMINUM	50	87	8.6 U	17.2 U	8.35 U		8.35 U
ARSENIC	0.045	148	0.2 U	0.13 U	0.41 U		0.12 U
BARIUM	260	220	40 J	41 J	79 J		61.6 J
CADMIUM	1.8	0.15	0.05 J	0.08 J	0.11 U		0.06 U
CALCIUM	NA	NA	22700	23400	47300 J		60200 J

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization **Sampling Round** **Location** **Sample Number** **Sample Code** **Sample Date**	**HHRA Criteria**	**ERA Criteria**	**DOWNGRAD 01 08SW/SD007 08SW00701-D DUP 1/9/2005**	**DOWNGRAD 01 08SW/SD007 08SW00701-F-D DUP 1/9/2005**	**DOWNGRAD 02 08SW/SD007 08SW00702 NORMAL 6/5/2005**	**DOWNGRAD 03 08SW/SD011 08SW01101 NORMAL 10/25/2005**	**DOWNGRAD 02 08SW/SD015 08SW01501 NORMAL 6/5/2005**
Dissolved Metals (µg/L) (Continued)							
CHROMIUM	11	42	0.52 U	0.58 U	0.25 J		0.22 J
COBALT	73	24	0.14 J	0.14 J	0.86 J		0.12 J
COPPER	150	1.58	**1.7 J**	**1.7 J**	1.8 U		1.2 U
IRON	300	1000	177 J	171 J	30.7 J		31.1 J
LEAD	15	1.17	0.069 U	0.069 U	0.13 J		0.069 U
MAGNESIUM	NA	NA	4590 J	4840 J	8840		10000
MANGANESE	50	NA	1.8 J	1.4 J	**86.5**		**51.5**
NICKEL	73	28.9	2 J	2.3 J	1.3		0.38 J
POTASSIUM	NA	NA	1200 J	1180 J	1500		941
SELENIUM	18	5	0.34 U	0.37 U	0.094 U		0.094 U
SODIUM	NA	NA	6020 J	5970 J	22300 J		21800 J
THALLIUM	0.24	10	0.08 J	0.07 J	0.1 U		0.11 U
ZINC	1100	65.7	4.7 J	4.5 J	16.2 J		5.9 J
Miscellaneous Parameters (µg/L)							
TOTAL COLIFORM (CFU/100 mL)	NA	NA					
Field Parameters (mg/L)							
DISSOLVED OXYGEN	NA	NA				7.93	
DISSOLVED OXYGEN - METER	NA	NA					
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA				176	
PH (S.U.)	NA	NA				7.67	
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA				0.292	
TEMPERATURE (°C)	NA	NA				11.8	
TURBIDITY (NTU)	NA	NA				16	

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criteria	ERA Criteria	DOWNGRAD 03 08SW/SD015 08SW01502 NORMAL 10/25/2005	DOWNGRAD 03 08SW/SD017 08SW01701 NORMAL 10/25/2005	DOWNGRAD 03 08SW/SD018 08SW01801 NORMAL 10/25/2005	DOWNGRAD 03 08SW/SD020 08SW02001 NORMAL 10/25/2005
Volatile Organics (µg/L)						
1,1,1-TRICHLOROETHANE	200	76	0.3 U	0.9 J	0.3 U	0.3 U
1,1-DICHLOROETHANE	81	47	0.3 U	1.4	0.3 U	0.3 U
1,1-DICHLOROETHENE	7	65	0.3 U	0.3 U	0.3 U	0.3 U
2-BUTANONE	700	2200	0.5 U	0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	200	170	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	550	1700	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	6.1	970	0.3 U	3.4	1.4	0.3 U
TRICHLOROETHENE	1.4	47	0.3 U	**7.7**	1.2	0.3 U
VINYL ACETATE	0.02	930	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organics (µg/L)						
1,4-DIOXANE	6.1	22000				
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	0.3				
Total Metals (µg/L)						
ALUMINUM	50	87				
ARSENIC	0.045	148				
BARIUM	260	220				
BERYLLIUM	4	3.6				
CADMIUM	1.8	0.15				
CALCIUM	NA	NA				
CHROMIUM	11	42				
COBALT	73	24				
COPPER	150	1.58				
IRON	300	1000				
LEAD	15	1.17				
MAGNESIUM	NA	NA				
MANGANESE	50	NA				
MERCURY	1.1	0.0013				
NICKEL	73	28.9				
POTASSIUM	NA	NA				
SELENIUM	18	5				
SODIUM	NA	NA				
THALLIUM	0.24	10				
TIN	2200	180				
VANADIUM	3.6	12				
ZINC	1100	65.7				
Dissolved Metals (µg/L)						
ALUMINUM	50	87				
ARSENIC	0.045	148				
BARIUM	260	220				
CADMIUM	1.8	0.15				
CALCIUM	NA	NA				

TABLE 3-25

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization **Sampling Round** **Location** **Sample Number** **Sample Code** **Sample Date**	**HHRA Criteria**	**ERA Criteria**	**DOWNGRAD** **03** **08SW/SD015** **08SW01502** **NORMAL** **10/25/2005**	**DOWNGRAD** **03** **08SW/SD017** **08SW01701** **NORMAL** **10/25/2005**	**DOWNGRAD** **03** **08SW/SD018** **08SW01801** **NORMAL** **10/25/2005**	**DOWNGRAD** **03** **08SW/SD020** **08SW02001** **NORMAL** **10/25/2005**
Dissolved Metals (µg/L) (Continued)						
CHROMIUM	11	42				
COBALT	73	24				
COPPER	150	1.58				
IRON	300	1000				
LEAD	15	1.17				
MAGNESIUM	NA	NA				
MANGANESE	50	NA				
NICKEL	73	28.9				
POTASSIUM	NA	NA				
SELENIUM	18	5				
SODIUM	NA	NA				
THALLIUM	0.24	10				
ZINC	1100	65.7				
Miscellaneous Parameters (µg/L)						
TOTAL COLIFORM (CFU/100 mL)	NA	NA				
Field Parameters (mg/L)						
DISSOLVED OXYGEN	NA	NA	10.16	6.56	10.06	7
DISSOLVED OXYGEN - METER	NA	NA				
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	181	191	-2	177
PH (S.U.)	NA	NA	7.47	7.41	7.42	7.19
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	0.38	0.136	0.484	0.237
TEMPERATURE (°C)	NA	NA	11.89	11.01	12.32	8.65
TURBIDITY (NTU)	NA	NA	1.5	1.6	8.8	2.4

°C - Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
DOWNGRAD - Location is a downgradient location.
UPGRAD - Location is an upgradient location
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts
NA - No applicable criterion.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.
CFU/100 mL - Colony-forming units per 100 milliliters.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-26

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN MAIN STREAM SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criterion	ERA Criterion	DOWNGRAD 01 08SW/SD008 08SW00801 NORMAL 1/9/2005	DOWNGRAD 02 08SW/SD008 08SW00802 NORMAL 6/5/2005	DOWNGRAD 03 08SW/SD008 08SW00803 NORMAL 10/25/2005	DOWNGRAD 01 08SW/SD009 08SW00901 NORMAL 1/9/2005	DOWNGRAD 02 08SW/SD009 08SW00902 NORMAL 6/5/2005
Volatile Organics (µg/L)							
ACETONE	550	1700	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ
Total Metals (µg/L)							
ALUMINUM	50	87	**635 J**	**56.7 J**		**710 J**	41.8 U
BARIUM	260	220	35.6 J	69.1 J		37.9 J	65.3 J
CADMIUM	1.8	0.15	0.05 U	0.06 J		0.05 U	0.07 J
CALCIUM	NA	NA	35000 J	58400 J		32200 J	59400 J
CHROMIUM	11	42	0.97 J	0.39 J		0.89 J	0.66 J
COBALT	73	24	0.18 J	0.12 J		0.23 J	0.27 J
COPPER	150	1.58	1 J	1.6 U		0.99 J	1.9 U
IRON	300	1000	**501 J**	83.8		**588 J**	67.8
LEAD	15	1.17	0.407 U	0.13 J		0.492 U	0.09 J
MAGNESIUM	NA	NA	6810 J	11400		6210 J	9760
MANGANESE	50	NA	7.3 J	**55.2**		16.4 J	**156**
NICKEL	73	28.9	1.2	0.42 J		1.3	0.63 J
POTASSIUM	NA	NA	1080 J	1320		1030 J	1430
SODIUM	NA	NA	16300 J	28700 J		14200 J	24300 J
Dissolved Metals (µg/L)							
BARIUM	260	220	31.5 J	63.3 J		33.1 J	65 J
CADMIUM	1.8	0.15	0.14 J	0.05 U		0.04 J	0.06 U
CALCIUM	NA	NA	34600	56500 J		31200	58700 J
CHROMIUM	11	42	0.46 U	0.2 J		0.49 U	0.44 J
COBALT	73	24	0.15 J	0.088 U		0.14 J	0.21 J
COPPER	150	1.58	0.74 J	1.2 U		0.84 J	1.4 U
IRON	300	1000	239 J	7.1 J		245 J	8.1 J
LEAD	15	1.17	0.181 J	0.1 J		0.193 J	0.27 J
MAGNESIUM	NA	NA	6540 J	10900		6250 J	9580
MANGANESE	50	NA	1.8 J	40.9		2.4 J	**137**
NICKEL	73	28.9	2.7 J	0.45 J		2.7 J	0.75 J
POTASSIUM	NA	NA	770 J	1280		801 J	1380
SODIUM	NA	NA	13200 J	27900 J		12200 J	23600 J
THALLIUM	0.24	10	0.11 J	0.1 U		0.12 J	0.13 U
ZINC	1100	65.7	1.8 U	1.2 J		2 U	2.2 J
Field Parameters (mg/L)							
DISSOLVED OXYGEN	NA	NA			9.3		
DISSOLVED OXYGEN - METER	NA	NA	12.99			13.54	
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	32.3		184	40.5	
PH (S.U.)	NA	NA	7.45		7.35	7.2	
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	0.33		0.347	0.301	
TEMPERATURE (°C)	NA	NA	5.1		10.39	4.68	
TURBIDITY (NTU)	NA	NA	12		2	9.7	

TABLE 3-26

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN MAIN STREAM SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization Sampling Round Location Sample Number Sample Code Sample Date	HHRA Criterion	ERA Criterion	DOWNGRAD 03 08SW/SD009 08SW00903 NORMAL 10/25/2005	UPGRAD 02 08SW/SD010 08SW01001 NORMAL 6/5/2005	UPGRAD 03 08SW/SD010 08SW01002 NORMAL 10/25/2005	DOWNGRAD 02 08SW/SD014 08SW01401 NORMAL 6/5/2005	DOWNGRAD 03 08SW/SD014 08SW01402 NORMAL 10/25/2005	DOWNGRAD 03 08SW/SD021 08SW02101 NORMAL 10/25/2005
Volatile Organics (µg/L)								
ACETONE	550	1700	0.5 U	0.5 UJ	4.5 J	0.5 UJ	1.1 J	2.4 J
Total Metals (µg/L)								
ALUMINUM	50	87		**517 J**		23.7 U		
BARIUM	260	220		53.2 J		57.4 J		
CADMIUM	1.8	0.15		0.06 J		0.06 J		
CALCIUM	NA	NA		42800 J		47100 J		
CHROMIUM	11	42		0.88 J		0.46 J		
COBALT	73	24		0.62 J		0.088 U		
COPPER	150	1.58		1.9 U		2.2 U		
IRON	300	1000		**637**		28.4 J		
LEAD	15	1.17		0.48 J		0.07 J		
MAGNESIUM	NA	NA		6420		8370		
MANGANESE	50	NA		**178**		10.2		
NICKEL	73	28.9		1.3		0.26 J		
POTASSIUM	NA	NA		1190		1210		
SODIUM	NA	NA		14500 J		19600 J		
Dissolved Metals (µg/L)								
BARIUM	260	220		53.1 J		59.1 J		
CADMIUM	1.8	0.15		0.05 U		0.05 U		
CALCIUM	NA	NA		46100 J		47200 J		
CHROMIUM	11	42		0.21 J		0.47 J		
COBALT	73	24		0.22 J		0.088 U		
COPPER	150	1.58		1.4 U		1.6 U		
IRON	300	1000		56.7		6.15 U		
LEAD	15	1.17		0.19 J		0.14 J		
MAGNESIUM	NA	NA		6620		8500		
MANGANESE	50	NA		**99.8**		12		
NICKEL	73	28.9		0.8 J		0.36 J		
POTASSIUM	NA	NA		1180		1210		
SODIUM	NA	NA		15400 J		19800 J		
THALLIUM	0.24	10		0.1 U		0.09 U		
ZINC	1100	65.7		2.2 J		1.4 J		
Field Parameters (mg/L)								
DISSOLVED OXYGEN	NA	NA	8.88		3.48		5.48	5.16
DISSOLVED OXYGEN - METER	NA	NA						
OXIDATION REDUCTION POTENTIAL (mV)	NA	NA	175		155		186	187
PH (S.U.)	NA	NA	7.35		7.12		7.02	6.88
SPECIFIC CONDUCTANCE (mS/cm)	NA	NA	0.323		0.23		0.267	0.329
TEMPERATURE (°C)	NA	NA	9.53		10.76		9.7	9.16
TURBIDITY (NTU)	NA	NA	13		2.7		1.7	0.75

TABLE 3-26

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN MAIN STREAM SURFACE WATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization	HHRA Criterion	ERA Criterion	DOWNGRAD	UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round			03	02	03	02	03	03
Location			08SW/SD009	08SW/SD010	08SW/SD010	08SW/SD014	08SW/SD014	08SW/SD021
Sample Number			08SW00903	08SW01001	08SW01002	08SW01401	08SW01402	08SW02101
Sample Code			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date			10/25/2005	6/5/2005	10/25/2005	6/5/2005	10/25/2005	10/25/2005

°C -Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
DOWNGRAD - Location is a downgradient location.
UPGRAD - Location is an upgradient location.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.

TABLE 3-27

DESCRIPTIVE STATISTICS FOR POND SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)									
1,1,1-TRICHLOROETHANE	1200000	213	3/5	178 J	17300000 J	1.73 - 13.7	4780037	7966726	08SD004011224
1,1-DICHLOROETHANE	51000	0.575	5/5	5 J	1100000 J	--	308056	308056	08SD004011224
1,1-DICHLOROETHENE	12000	19.4	4/5	14 J	1500000 J	1.73	364039	455048	08SD004011224
2-BUTANONE	2200000	42.4	1/5	870 J	870 J	13.7 - 19960	3679	870	08SD012010006
4-METHYL-2-PENTANONE	530000	25.1	1/5	40 J	40 J	13.7 - 19960	3513	40.0	08SD012010006
ACETONE	1400000	9.9	1/5	210 J	210 J	59 - 19960	3551	210	08SD012010006
CARBON DISULFIDE	36000	23.9	1/5	14 J	14 J	1.73 - 19960	3506	14.0	08SD005011224
CHLOROETHANE	3000	NA	3/5	220 J	59880 J	13.7 - 59.3	21036	35048	08SD004010012
CIS-1,2-DICHLOROETHENE	4300	654	4/5	2300	390000 J	1.73	138260	172825	08SD004011224
ETHYLBENZENE	400000	175	1/5	6 J	6 J	13.7 - 19960	3506	6.00	08SD012010006
TOLUENE	520000	1220	5/5	15 J	95000 J	--	31020	31020	08SD004011224
TOTAL XYLENES	27000	433	3/5	15 J	550	15015 - 19960	3618	200	08SD005010012
TRANS-1,2-DICHLOROETHENE	6900	654	2/5	25 J	51000 J	1.73 - 19960	12207	25513	08SD004011224
TRICHLOROETHENE	710	112	4/5	2100 J	27800000 J	1.73	6625220	8281525	08SD004011224
VINYL CHLORIDE	79	202	1/5	54	54	1.73 - 19960	3514	54.0	08SD005011224
Semivolatile Organics (µg/kg)									
2-METHYLNAPHTHALENE	5600	20.2	3/4	14	230 J	4.51	119	158	08SD004010012, 08SD004011224
3&4-METHYLPHENOL	31000	52.4	3/5	280 J	1200 J	91.5 - 119	537	860	08SD004011224
ACENAPHTHENE	370000	6.71	3/4	6 J	120 J	39.5	42.4	50.0	08SD004011224
ACENAPHTHYLENE	370000	5.87	1/4	25 J	25 J	4.51 - 59.5	19.2	25.0	08SD005010012
BENZO(A)ANTHRACENE	620	108	2/4	21 J	74 J	39.5 - 59.5	36.1	47.5	08SD005010012
BENZO(A)PYRENE	62	150	2/4	18	94	39.5 - 59.5	40.4	56.0	08SD005010012
BENZO(B)FLUORANTHENE	620	10400	1/4	100	100	4.51 - 59.5	37.9	100	08SD005010012
BENZO(G,H,I)PERYLENE	50000	170	2/4	28	160	39.5 - 59.5	59.4	94.0	08SD005010012
BENZO(K)FLUORANTHENE	6200	240	1/4	46	46	4.51 - 59.5	24.4	46.0	08SD005010012
BIS(2-ETHYLHEXYL)PHTHALATE	35000	182	5/5	170 J	35000 J	--	8684	8684	08SD004011224
BUTYL BENZYL PHTHALATE	1200000	1970	1/5	210 J	210 J	118 - 401	136	210	08SD005011224
CHRYSENE	62000	166	2/4	27 J	140 J	39.5 - 59.5	54.1	83.5	08SD005010012
DI-N-BUTYL PHTHALATE	610000	1114	2/5	180 J	590 J	91.5 - 401	215	385	08SD004011224
FLUORANTHENE	230000	423	2/4	26 J	110 J	39.5 - 59.5	46.4	68.0	08SD005010012
FLUORENE	270000	77.4	3/4	5 J	130 J	39.5	46.9	56.0	08SD004011224
INDENO(1,2,3-CD)PYRENE	620	200	2/4	18	110	39.5 - 59.5	44.4	64.0	08SD005010012
ISOSAFROLE	NA	NA	1/5	250 J	250 J	91.5 - 401	141	250	08SD005010012
NAPHTHALENE	5600	176	4/4	5 J	360 J	--	156	156	08SD004011224
PHENANTHRENE	230000	204	4/4	33 J	2000 J	--	718	718	08SD004011224
PHENOL	1800000	49.1	1/5	650 J	650 J	91.5 - 401	203	650	08SD004011224
PYRENE	230000	195	2/4	35 J	180 J	39.5 - 59.5	66.1	108	08SD005010012
Inorganics (mg/kg)									
ALUMINUM	7600	NA	1/1	5630	5630	--	5630	5630	08SD012010006
ARSENIC	0.39	9.79	1/1	2.5 J	2.5 J	--	2.50	2.50	08SD012010006
BARIUM	540	NA	1/1	49.1 J	49.1 J	--	49.1	49.1	08SD012010006
BERYLLIUM	15	NA	1/1	0.2 J	0.2 J	--	0.200	0.200	08SD012010006
CADMIUM	3.7	0.99	1/1	2	2	--	2.00	2.00	08SD012010006

TABLE 3-27

DESCRIPTIVE STATISTICS FOR POND SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Inorganics (mg/kg) (Continued)									
CALCIUM	NA	NA	1/1	2550 J	2550 J	--	2550	2550	08SD012010006
CHROMIUM	210	43.4	1/1	26.5 J	26.5 J	--	26.5	26.5	08SD012010006
COBALT	140	50	1/1	2.9 J	2.9 J	--	2.90	2.90	08SD012010006
COPPER	310	31.6	1/1	32.8 J	32.8 J	--	32.8	32.8	08SD012010006
IRON	2300	NA	1/1	8360 J	8360 J	--	8360	8360	08SD012010006
LEAD	400	35.8	1/1	45.8 J	45.8 J	--	45.8	45.8	08SD012010006
MAGNESIUM	NA	NA	1/1	743 J	743 J	--	743	743	08SD012010006
MANGANESE	180	NA	1/1	79.6 J	79.6 J	--	79.6	79.6	08SD012010006
MERCURY	2.3	0.174	1/1	0.033 J	0.033 J	--	0.0330	0.0330	08SD012010006
NICKEL	160	22.7	1/1	5 J	5 J	--	5.00	5.00	08SD012010006
POTASSIUM	NA	NA	1/1	482 J	482 J	--	482	482	08SD012010006
TIN	4700	NA	1/1	3.9 J	3.9 J	--	3.90	3.90	08SD012010006
VANADIUM	7.8	NA	1/1	13.6 J	13.6 J	--	13.6	13.6	08SD012010006
ZINC	2300	121	1/1	236 J	236 J	--	236	236	08SD012010006

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-28

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT TRIBUTARY SEDIMENT SAMPLES SWMU 08 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)									
1,1,1-TRICHLOROETHANE	1200000	213	1/7	2 J	2 J	1.15 - 1.5	0.851	2.00	08SD007010006
TRICHLOROETHENE	710	112	2/7	2 J	4 J	1.15 - 1.5	1.34	3.00	08SD006010006
Semivolatile Organics (µg/kg)									
2-METHYLNAPHTHALENE	5600	20.2	1/5	6 J	6 J	3.95 - 4.25	2.85	6.00	08SD001010006
ACENAPHTHYLENE	370000	5.87	1/5	11	11	3.95 - 4.25	3.85	11.0	08SD001010006
ANTHRACENE	2200000	57.2	1/5	10	10	3.95 - 4.25	3.65	10.0	08SD001010006
BENZO(A)ANTHRACENE	620	108	1/5	51 J	51 J	3.95 - 4.25	11.9	51.0	08SD001010006
BENZO(A)PYRENE	62	150	1/5	69	69	3.95 - 4.25	15.5	69.0	08SD001010006
BENZO(B)FLUORANTHENE	620	10400	1/5	140	140	3.95 - 4.25	29.7	140	08SD001010006
BENZO(G,H,I)PERYLENE	50000	170	1/5	120	120	3.95 - 4.25	25.7	120	08SD001010006
BENZO(K)FLUORANTHENE	6200	240	1/5	67	67	3.95 - 4.25	15.1	67.0	08SD001010006
BIS(2-ETHYLHEXYL)PHTHALATE	35000	182	4/12	240 J	680	80.1 - 87.8	178	450	08SD001010006
CHRYSENE	62000	166	1/5	100 J	100 J	3.95 - 4.25	21.7	100	08SD001010006
DI-N-BUTYL PHTHALATE	610000	1114	1/12	130 J	130 J	80.1 - 99.9	50.6	130	08SD002020006
DIBENZO(A,H)ANTHRACENE	62	33	1/5	20	20	3.95 - 4.25	5.65	20.0	08SD001010006
FLUORANTHENE	230000	423	1/5	85	85	3.95 - 4.25	18.7	85.0	08SD001010006
INDENO(1,2,3-CD)PYRENE	620	200	1/5	81	81	3.95 - 4.25	17.9	81.0	08SD001010006
NAPHTHALENE	5600	176	1/5	8 J	8 J	3.95 - 4.25	3.25	8.00	08SD001010006
PHENANTHRENE	230000	204	2/5	10	36	3.95 - 4.25	10.4	23.0	08SD001010006
PYRENE	230000	195	4/5	6 J	210 J	4.12	46.6	57.8	08SD001010006
Inorganics (mg/kg)									
ALUMINUM	7600	NA	2/2	12800	17800	--	15300	15300	08SD011010006
ANTIMONY	3.1	NA	1/2	0.92 J	0.92 J	0.29	0.533	0.920	08SD015010006
ARSENIC	0.39	9.79	2/2	5.1 J	18.7 J	--	11.9	11.9	08SD015010006
BARIUM	540	NA	2/2	58.9 J	133 J	--	96.0	96.0	08SD015010006
BERYLLIUM	15	NA	2/2	0.5	2.2	--	1.35	1.35	08SD015010006
CADMIUM	3.7	0.99	2/2	0.2 J	0.86	--	0.530	0.530	08SD015010006
CALCIUM	NA	NA	2/2	1710 J	7450 J	--	4580	4580	08SD015010006
CHROMIUM	210	43.4	2/2	16.9 J	60.4 J	--	38.7	38.7	08SD015010006
COBALT	140	50	2/2	5.3 J	27.8 J	--	16.6	16.6	08SD015010006
COPPER	310	31.6	2/2	8.7 J	15.9 J	--	12.3	12.3	08SD015010006
IRON	2300	NA	2/2	18200 J	71900 J	--	45050	45050	08SD015010006
LEAD	400	35.8	2/2	9.8 J	34.9 J	--	22.4	22.4	08SD015010006
MAGNESIUM	NA	NA	2/2	1740 J	1880 J	--	1810	1810	08SD015010006
MANGANESE	180	NA	2/2	336 J	3130 J	--	1733	1733	08SD015010006
MERCURY	2.3	0.174	2/2	0.022 J	0.029 J	--	0.0255	0.0255	08SD011010006
NICKEL	160	22.7	2/2	11.3 J	17.1 J	--	14.2	14.2	08SD015010006
POTASSIUM	NA	NA	2/2	788 J	1410 J	--	1099	1099	08SD011010006
SELENIUM	39	NA	2/2	0.22 J	0.75 J	--	0.485	0.485	08SD015010006
VANADIUM	7.8	NA	2/2	28.6 J	53.1 J	--	40.9	40.9	08SD015010006
ZINC	2300	121	2/2	26.3 J	93.3 J	--	59.8	59.8	08SD015010006

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-29

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT
MAIN STREAM SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	ERA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (µg/kg)									
1,1,1-TRICHLOROETHANE	1200000	213	1/3	2 J	2 J	1.2 - 1.25	1.08	2.00	08SD009010006
TRICHLOROETHENE	710	112	1/3	3 J	3 J	1.24 - 1.25	1.42	3.00	08SD008010006
Semivolatile Organics (µg/kg)									
2-METHYLNAPHTHALENE	5600	20.2	1/2	13	13	3.97	7.49	13.0	08SD009010006
BENZO(A)ANTHRACENE	620	108	2/2	9	12	--	10.5	10.5	08SD009010006
BENZO(A)PYRENE	62	150	2/2	10	10	--	10.0	10.0	08SD008010006, 08SD009010006
BENZO(B)FLUORANTHENE	620	10400	2/2	11	13	--	12.0	12.0	08SD009010006
BENZO(G,H,I)PERYLENE	50000	170	2/2	13	14	--	13.5	13.5	08SD008010006
BENZO(K)FLUORANTHENE	6200	240	2/2	9	10	--	9.50	9.50	08SD008010006
BIS(2-ETHYLHEXYL)PHTHALATE	35000	182	1/5	210 J	210 J	80.6 - 95.7	76.1	210	08SD009010006
CHRYSENE	62000	166	2/2	11	12	--	11.5	11.5	08SD009010006
FLUORANTHENE	230000	423	2/2	10	13	--	11.5	11.5	08SD008010006
INDENO(1,2,3-CD)PYRENE	620	200	2/2	10	11	--	10.5	10.5	08SD009010006
NAPHTHALENE	5600	176	1/2	6 J	6 J	3.97	3.99	6.00	08SD009010006
PHENANTHRENE	230000	204	1/2	14	14	4.27	8.07	14.0	08SD008010006
PYRENE	230000	195	2/2	18 J	25 J	--	21.5	21.5	08SD008010006
Inorganics (mg/kg)									
ALUMINUM	7600	NA	1/1	11800	11800	--	11800	11800	08SD014010006
ANTIMONY	3.1	NA	1/1	1.4 J	1.4 J	--	1.40	1.40	08SD014010006
ARSENIC	0.39	9.79	1/1	19.7 J	19.7 J	--	19.7	19.7	08SD014010006
BARIUM	540	NA	1/1	83.3 J	83.3 J	--	83.3	83.3	08SD014010006
BERYLLIUM	15	NA	1/1	1.6	1.6	--	1.60	1.60	08SD014010006
CADMIUM	3.7	0.99	1/1	0.79	0.79	--	0.790	0.790	08SD014010006
CALCIUM	NA	NA	1/1	1540 J	1540 J	--	1540	1540	08SD014010006
CHROMIUM	210	43.4	1/1	61.2 J	61.2 J	--	61.2	61.2	08SD014010006
COBALT	140	50	1/1	18.9 J	18.9 J	--	18.9	18.9	08SD014010006
COPPER	310	31.6	1/1	11.6 J	11.6 J	--	11.6	11.6	08SD014010006
IRON	2300	NA	1/1	71400 J	71400 J	--	71400	71400	08SD014010006
LEAD	400	35.8	1/1	27.6 J	27.6 J	--	27.6	27.6	08SD014010006
MAGNESIUM	NA	NA	1/1	855 J	855 J	--	855	855	08SD014010006
MANGANESE	180	NA	1/1	1790 J	1790 J	--	1790	1790	08SD014010006
MERCURY	2.3	0.174	1/1	0.04 J	0.04 J	--	0.0400	0.0400	08SD014010006
NICKEL	160	22.7	1/1	17.5 J	17.5 J	--	17.5	17.5	08SD014010006
POTASSIUM	NA	NA	1/1	735 J	735 J	--	735	735	08SD014010006
SELENIUM	39	NA	1/1	0.59 J	0.59 J	--	0.590	0.590	08SD014010006
VANADIUM	7.8	NA	1/1	54.3 J	54.3 J	--	54.3	54.3	08SD014010006
ZINC	2300	121	1/1	59.3 J	59.3 J	--	59.3	59.3	08SD014010006

Data qualifiers (e.g., U, J) are defined in Appendix H.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.

TABLE 3-30

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization			DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round			01	01	01	01	02	02
Location	HHRA	ERA	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD012	08SW/SD012
Sample Number	Criterion	Criterion	08SD004010012	08SD004011224	08SD005010012	08SD005011224	08SD012010006	08SD012010006-D
Sample Code			NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
Depth Range			0 - 1	1 - 2	0 - 1	1 - 2	0 - 0.5	0 - 0.5
Sample Date			1/10/2005	1/10/2005	1/10/2005	1/10/2005	6/5/2005	6/5/2005
Volatile Organics (µg/kg)								
1,1,1-TRICHLOROETHANE	1200000	213	**6600000 J**	**17300000 J**	178 J	13.7 U	1.73 U	1.59 U
1,1-DICHLOROETHANE	51000	0.575	**440000 J**	**1100000 J**	**200 J**	**75**	**5 J**	**84 J**
1,1-DICHLOROETHENE	12000	19.4	**320000 J**	**1500000 J**	**178 J**	14 J	1.73 U	1.59 U
2-BUTANONE	2200000	42.4	19960 UJ	15015 UJ	59.3 U	13.7 U	**870 J**	**79 J**
4-METHYL-2-PENTANONE	530000	25.1	19960 UJ	15015 UJ	59.3 U	13.7 UJ	**40 J**	10 J
ACETONE	1400000	9.9	19960 UJ	15015 UJ	59.3 UJ	59 U	**210 J**	**120 J**
CARBON DISULFIDE	36000	23.9	19960 UJ	15015 UJ	59.3 U	14 J	1.73 U	1.59 U
CHLOROETHANE	3000	NA	**59880 J**	**45045 J**	59.3 U	13.7 U	220 J	180
CIS-1,2-DICHLOROETHENE	4300	654	**290000 J**	**390000 J**	**9000**	**2300**	1.73 U	1.59 U
ETHYLBENZENE	400000	175	19960 UJ	15015 UJ	59.3 U	13.7 U	6 J	1.59 UJ
TOLUENE	520000	1220	**59880 J**	**95000 J**	178 J	15 J	27 J	13 J
TOTAL XYLENES	27000	433	19960 UJ	15015 UJ	**550**	15 J	35 J	6 J
TRANS-1,2-DICHLOROETHENE	6900	654	19960 UJ	**51000 J**	59.3 U	25 J	1.73 U	1.59 U
TRICHLOROETHENE	710	112	**5300000 J**	**27800000 J**	**24000**	**2100 J**	1.73 U	1.59 U
VINYL CHLORIDE	79	202	19960 UJ	15015 UJ	59.3 U	54	1.73 U	1.59 U
Semivolatile Organics (µg/kg)								
2-METHYLNAPHTHALENE	5600	20.2	**230 J**	**230 J**	14	4.51 U		
3&4-METHYLPHENOL	31000	52.4	**1100 J**	**1200 J**	119 U	91.5 U	**280 J**	109 U
ACENAPHTHENE	370000	6.71	39.5 UJ	**120 J**	**24 J**	6 J		
ACENAPHTHYLENE	370000	5.87	39.5 UJ	59.5 UJ	**25 J**	4.51 U		
BENZO(A)ANTHRACENE	620	108	39.5 UJ	59.5 UJ	74 J	21 J		
BENZO(A)PYRENE	62	150	39.5 UJ	59.5 UJ	**94**	18		
BENZO(B)FLUORANTHENE	620	10400	39.5 UJ	59.5 UJ	100	4.51 U		
BENZO(G,H,I)PERYLENE	50000	170	39.5 UJ	59.5 UJ	160	28		
BENZO(K)FLUORANTHENE	6200	240	39.5 UJ	59.5 UJ	46	4.51 U		
BIS(2-ETHYLHEXYL)PHTHALATE	35000	182	**6000 J**	**35000 J**	**950**	170 J	**1300 J**	**690 J**
BUTYL BENZYL PHTHALATE	1200000	1970	401 UJ	302 UJ	119 U	210 J	118 U	109 U
CHRYSENE	62000	166	39.5 UJ	59.5 UJ	140 J	27 J		
DI-N-BUTYL PHTHALATE	610000	1114	401 UJ	590 J	119 U	91.5 U	180 J	109 U
FLUORANTHENE	230000	423	39.5 UJ	59.5 UJ	110 J	26 J		
FLUORENE	270000	77.4	39.5 UJ	**130 J**	33 J	5 J		
INDENO(1,2,3-CD)PYRENE	620	200	39.5 UJ	59.5 UJ	110	18		
ISOSAFROLE	NA	NA	401 UJ	302 UJ	250 J	91.5 U	118 U	109 U
NAPHTHALENE	5600	176	**240 J**	**360 J**	20	5 J		
PHENANTHRENE	230000	204	**470 J**	**2000 J**	**370 J**	33 J		
PHENOL	1800000	49.1	401 UJ	**650 J**	119 U	91.5 U	118 U	109 U
PYRENE	230000	195	39.5 UJ	59.5 UJ	180 J	35 J		
Inorganics (mg/kg)								
ALUMINUM	7600	NA					5630	7000
ARSENIC	0.39	9.79					**2.5 J**	**3 J**
BARIUM	540	NA					49.1 J	42.1 J

TABLE 3-30

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN POND SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization			DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round			01	01	01	01	02	02
Location	HHRA	ERA	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD012	08SW/SD012
Sample Number	Criterion	Criterion	08SD004010012	08SD004011224	08SD005010012	08SD005011224	08SD012010006	08SD012010006-D
Sample Code			NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
Depth Range			0 - 1	1 - 2	0 - 1	1 - 2	0 - 0.5	0 - 0.5
Sample Date			1/10/2005	1/10/2005	1/10/2005	1/10/2005	6/5/2005	6/5/2005
Inorganics (mg/kg) (Continued)								
BERYLLIUM	15	NA					0.2 J	0.28 J
CADMIUM	3.7	0.99					**2**	**2**
CALCIUM	NA	NA					2550 J	1510 J
CHROMIUM	210	43.4					26.5 J	**53.1 J**
COBALT	140	50					2.9 J	4.3 J
COPPER	310	31.6					**32.8 J**	**34.1 J**
IRON	2300	NA					**8360 J**	**8870 J**
LEAD	400	35.8					**45.8 J**	**47.4 J**
MAGNESIUM	NA	NA					743 J	698 J
MANGANESE	180	NA					79.6 J	76.7 J
MERCURY	2.3	0.174					0.033 J	0.026 J
NICKEL	160	22.7					5 J	5.9 J
POTASSIUM	NA	NA					482 J	587 J
TIN	4700	NA					3.9 J	7.9 J
VANADIUM	7.8	NA					**13.6 J**	**17 J**
ZINC	2300	121					**236 J**	**294 J**

Data qualifiers (e.g., U, J) are defined in Appendix H.
DOWNGRAD - Location is a downgradient location.
UPGRAD - Location is an upgradient location.
ERA - Ecological risk assessment.
HHRA - human health risk assessmentH.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-31

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization			DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round			01	02	01	02	01	02	01	02
Location	HHRA	ERA	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD006	08SW/SD006
Sample Number	Criterion	Criterion	08SD001010006	08SD001020006	08SD002010006	08SD002020006	08SD003010006	08SD003020006	08SD006010006	08SD006020006
Sample Code			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range			0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date			1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005
Volatile Organics (µg/kg)										
1,1,1-TRICHLOROETHANE	1200000	213	1.46 U		1.27 U		1.15 U		1.2 U	
TRICHLOROETHENE	710	112	1.46 U		1.27 U		1.15 U		4 J	
Semivolatile Organics (µg/kg)										
2-METHYLNAPHTHALENE	5600	20.2	6 J		4.19 U		3.95 U		4.12 U	
ACENAPHTHYLENE	370000	5.87	**11**		4.19 U		3.95 U		4.12 U	
ANTHRACENE	2200000	57.2	10		4.19 U		3.95 U		4.12 U	
BENZO(A)ANTHRACENE	620	108	51 J		4.19 U		3.95 U		4.12 U	
BENZO(A)PYRENE	62	150	**69**		4.19 U		3.95 U		4.12 U	
BENZO(B)FLUORANTHENE	620	10400	140		4.19 U		3.95 U		4.12 U	
BENZO(G,H,I)PERYLENE	50000	170	120		4.19 U		3.95 U		4.12 U	
BENZO(K)FLUORANTHENE	6200	240	67		4.19 U		3.95 U		4.12 U	
BIS(2-ETHYLHEXYL)PHTHALATE	35000	182	**680**	**250 J**	85.1 U	**630**	80.1 U	**240 J**	83.6 U	85.5 U
CHRYSENE	62000	166	100 J		4.19 U		3.95 U		4.12 U	
DI-N-BUTYL PHTHALATE	610000	1114	99.9 U	87.1 U	85.1 U	130 J	80.1 U	91.5 UJ	83.6 U	85.5 U
DIBENZO(A,H)ANTHRACENE	62	33	20		4.19 U		3.95 U		4.12 U	
FLUORANTHENE	230000	423	85		4.19 U		3.95 U		4.12 U	
INDENO(1,2,3-CD)PYRENE	620	200	81		4.19 U		3.95 U		4.12 U	
NAPHTHALENE	5600	176	8 J		4.19 U		3.95 U		4.12 U	
PHENANTHRENE	230000	204	36		10		3.95 U		4.12 U	
PYRENE	230000	195	**210 J**		8 J		6 J		4.12 U	
Inorganics (mg/kg)										
ALUMINUM	7600	NA								
ANTIMONY	3.1	NA								
ARSENIC	0.39	9.79								
BARIUM	540	NA								
BERYLLIUM	15	NA								
CADMIUM	3.7	0.99								
CALCIUM	NA	NA								
CHROMIUM	210	43.4								
COBALT	140	50								
COPPER	310	31.6								
IRON	2300	NA								
LEAD	400	35.8								
MAGNESIUM	NA	NA								
MANGANESE	180	NA								
MERCURY	2.3	0.174								
NICKEL	160	22.7								
POTASSIUM	NA	NA								
SELENIUM	39	NA								
VANADIUM	7.8	NA								
ZINC	2300	121								

TABLE 3-31

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization			DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD
Sampling Round			01	01	02	02	02	02
Location	HHRA	ERA	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD011	08SW/SD013	08SW/SD015
Sample Number	Criterion	Criterion	08SD007010006	08SD007010006-D	08SD007020006	08SD011010006	08SD013010006	08SD015010006
Sample Code			ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range			0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date			1/9/2005	1/9/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005
Volatile Organics (ug/kg)								
1,1,1-TRICHLOROETHANE	1200000	213	2 J	2 J		1.5 U	1.04 U	1.34 U
TRICHLOROETHENE	710	112	2 J	2 J		1.5 U	1.04 U	1.34 UJ
Semivolatile Organics (ug/kg)								
2-METHYLNAPHTHALENE	5600	20.2	4.25 U	4.24 U				
ACENAPHTHYLENE	370000	5.87	4.25 U	4.24 U				
ANTHRACENE	2200000	57.2	4.25 U	4.24 U				
BENZO(A)ANTHRACENE	620	108	4.25 U	4.24 U				
BENZO(A)PYRENE	62	150	4.25 U	4.24 U				
BENZO(B)FLUORANTHENE	620	10400	4.25 U	4.24 U				
BENZO(G,H,I)PERYLENE	50000	170	4.25 U	4.24 U				
BENZO(K)FLUORANTHENE	6200	240	4.25 U	4.24 U				
BIS(2-ETHYLHEXYL)PHTHALATE	35000	182	86.3 U	86 U	86.3 U	82.2 U	180 J	87.8 U
CHRYSENE	62000	166	4.25 U	4.24 U				
DI-N-BUTYL PHTHALATE	610000	1114	86.3 U	86 U	86.3 U	82.2 U	69.7 U	87.8 U
DIBENZO(A,H)ANTHRACENE	62	33	4.25 U	4.24 U				
FLUORANTHENE	230000	423	4.25 U	4.24 U				
INDENO(1,2,3-CD)PYRENE	620	200	4.25 U	4.24 U				
NAPHTHALENE	5600	176	4.25 U	4.24 U				
PHENANTHRENE	230000	204	4.25 U	4.24 U				
PYRENE	230000	195	7 J	6 J				
Inorganics (mg/kg)								
ALUMINUM	7600	NA				**17800**	**8400**	**12800**
ANTIMONY	3.1	NA				0.29 U	0.59 J	0.92 J
ARSENIC	0.39	9.79				**5.1 J**	**4.4 J**	**18.7 J**
BARIUM	540	NA				58.9 J	64.8 J	133 J
BERYLLIUM	15	NA				0.5	0.27 J	2.2
CADMIUM	3.7	0.99				0.2 J	**1.8**	0.86
CALCIUM	NA	NA				1710 J	189000 J	7450 J
CHROMIUM	210	43.4				16.9 J	22.7 J	**60.4 J**
COBALT	140	50				5.3 J	4.4 J	27.8 J
COPPER	310	31.6				8.7 J	16.3 J	15.9 J
IRON	2300	NA				**18200 J**	**11800 J**	**71900 J**
LEAD	400	35.8				9.8 J	**263 J**	34.9 J
MAGNESIUM	NA	NA				1740 J	11700 J	1880 J
MANGANESE	180	NA				**336 J**	**290 J**	**3130 J**
MERCURY	2.3	0.174				0.029 J	0.1 J	0.022 J
NICKEL	160	22.7				11.3 J	**48.7 J**	17.1 J
POTASSIUM	NA	NA				1410 J	889 J	788 J
SELENIUM	39	NA				0.22 J	0.21 J	0.75 J
VANADIUM	7.8	NA				**28.6 J**	**56.4 J**	**53.1 J**
ZINC	2300	121				26.3 J	**157 J**	93.3 J

TABLE 3-31

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN TRIBUTARY SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization			**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**UPGRAD**	**DOWNGRAD**
Sampling Round			**01**	**01**	**02**	**02**	**02**	**02**
Location	**HHRA**	**ERA**	**08SW/SD007**	**08SW/SD007**	**08SW/SD007**	**08SW/SD011**	**08SW/SD013**	**08SW/SD015**
Sample Number	**Criterion**	**Criterion**	**08SD007010006**	**08SD007010006-D**	**08SD007020006**	**08SD011010006**	**08SD013010006**	**08SD015010006**
Sample Code			**ORIG**	**DUP**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Depth Range			**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**	**0 - 0.5**
Sample Date			**1/9/2005**	**1/9/2005**	**6/5/2005**	**6/5/2005**	**6/5/2005**	**6/5/2005**

Data qualifiers (e.g., U, J) are defined in Appendix H.
DOWNGRAD - Location is a downgradient location.
UPGRAD - Location is an upgradient location.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µg/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-32

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN MAIN STREAM SEDIMENT SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization	HHRA Criterion	ERA Criterion	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD
Sampling Round			01	02	01	02	02	02
Location			08SW/SD008	08SW/SD008	08SW/SD009	08SW/SD009	08SW/SD010	08SW/SD014
Sample Number			08SD008010006	08SD008020006	08SD009010006	08SD009020006	08SD010010006	08SD014010006
Sample Code			NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range			0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date			1/9/2005	6/5/2005	1/9/2005	6/5/2005	6/5/2005	6/5/2005
Volatile Organics (µg/kg)								
1,1,1-TRICHLOROETHANE	1200000	213	1.2 U		2 J		1.39 U	1.25 U
TRICHLOROETHENE	710	112	3 J		1.24 U		1.39 U	1.25 U
Semivolatile Organics (µg/kg)								
2-METHYLNAPHTHALENE	5600	20.2	3.97 U		13			
BENZO(A)ANTHRACENE	620	108	9		12			
BENZO(A)PYRENE	62	150	10		10			
BENZO(B)FLUORANTHENE	620	10400	11		13			
BENZO(G,H,I)PERYLENE	50000	170	14		13			
BENZO(K)FLUORANTHENE	6200	240	10		9			
BIS(2-ETHYLHEXYL)PHTHALATE	35000	182	80.6 U	95.7 U	**210 J**	80.6 U	93.3 U	84 U
CHRYSENE	62000	166	11		12			
FLUORANTHENE	230000	423	13		10			
INDENO(1,2,3-CD)PYRENE	620	200	10		11			
NAPHTHALENE	5600	176	3.97 U		6 J			
PHENANTHRENE	230000	204	14		4.27 U			
PYRENE	230000	195	25 J		18 J			
Inorganics (mg/kg)								
ALUMINUM	7600	NA					**19600**	**11800**
ANTIMONY	3.1	NA					2.2 J	1.4 J
ARSENIC	0.39	9.79					**27.6 J**	**19.7 J**
BARIUM	540	NA					247 J	83.3 J
BERYLLIUM	15	NA					3.1	1.6
CADMIUM	3.7	0.99					0.62	0.79
CALCIUM	NA	NA					**2970 J**	**1540 J**
CHROMIUM	210	43.4					**132 J**	**61.2 J**
COBALT	140	50					**71.2 J**	18.9 J
COPPER	310	31.6					12 J	11.6 J
IRON	2300	NA					**120000 J**	**71400 J**
LEAD	400	35.8					**66.2 J**	27.6 J
MAGNESIUM	NA	NA					**1580 J**	**855 J**
MANGANESE	180	NA					**7160 J**	**1790 J**
MERCURY	2.3	0.174					0.084 J	0.04 J
NICKEL	160	22.7					**42.6 J**	17.5 J
POTASSIUM	NA	NA					**1010 J**	**735 J**
SELENIUM	39	NA					1.3 J	0.59 J
VANADIUM	7.8	NA					**99.3 J**	**54.3 J**
ZINC	2300	121					56.7 J	59.3 J

Data qualifiers (e.g., U, J) are defined in Appendix H.
DOWNGRAD - Location is a downgradient location.
UPGRAD - Location is an upgradient location.
ERA - Ecological risk assessment.
HHRA - Human health risk assessment.
mg/kg - Milligrams per kilogram.
NA - No applicable criterion.
µ/kg - Micrograms per kilogram.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-33

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
Volatile Organics (ug/L)								
1,1,1-TRICHLOROETHANE	200	9/18	1.2	850	0.3 - 0.3	60.88	121.61	08GWTW002
1,1,2-TRICHLOROETHANE	0.2	1/18	4.1	4.1	0.3 - 0.3	0.37	4.10	08GWTW002
1,1-DICHLOROETHANE	81	13/18	1.3	2500	0.3 - 0.3	160.01	221.50	08GWTW002
1,1-DICHLOROETHENE	7	7/18	3.8	200	0.3 - 0.3	16.05	41.04	08GWTW002
1,2-DICHLOROETHANE	0.12	1/18	7.8	7.8	0.3 - 0.3	0.58	7.80	08GWTW002
2-BUTANONE	700	1/18	81	81	0.5 - 0.5	4.74	81.00	08GWTW002
2-HEXANONE	NA	1/18	1.8 J	1.8 J	0.5 - 0.5	0.34	1.80	08GWTW002
ACETONE	550	4/18	2.3 J	69 J	0.5 - 4.2	5.32	22.60	08GWTW002
BENZENE	0.35	3/18	0.6 J	1.3	0.3 - 0.3	0.28	0.90	08GWTW002
CHLOROETHANE	4.6	9/18	1.1	5900	0.5 - 0.5	330.69	661.12	08GWTW002
CIS-1,2-DICHLOROETHENE	6.1	10/18	0.9 J	380	0.3 - 0.3	37.18	66.80	08GWTW002
ETHYLBENZENE	130	1/18	0.8 J	0.8 J	0.3 - 0.3	0.19	0.80	08GWTW002
TOLUENE	72	1/18	87	87	0.3 - 0.3	4.98	87.00	08GWTW002
TOTAL XYLENES	21	1/18	4.4	4.4	0.3 - 0.3	0.39	4.40	08GWTW002
TRANS-1,2-DICHLOROETHENE	12	2/18	0.9 J	15	0.3 - 0.3	1.02	7.95	08GWTW002
TRICHLOROETHENE	1.4	11/18	0.54 J	180	0.3 - 0.3	16.20	26.41	08GWTW006
VINYL CHLORIDE	0.02	7/18	0.72 J	120	0.3 - 0.3	8.67	22.06	08GWTW002
Semivolatile Organics (ug/L)								
1,4-DIOXANE	6.1	10/17	3 J	64 J	0.94 - 1.3	9.28	15.40	08GWTW002
2,4-DIMETHYLPHENOL	73	1/8	2 J	2 J	0.94 - 1.3	0.70	2.00	08GWTW002
2-METHYLNAPHTHALENE	0.62	1/8	0.08 J	0.08 J	0.052 - 1.3	0.29	0.08	08GWTW002
3&4-METHYLPHENOL	18	1/8	22	22	0.94 - 1.3	3.20	22.00	08GWTW002
FLUORANTHENE	150	1/8	0.07 J	0.07 J	0.052 - 1.3	0.29	0.07	08GWTW004
FLUORENE	24	1/8	0.11	0.11	0.052 - 1.3	0.30	0.11	08GWTW002
PHENANTHRENE	18	2/8	0.08 J	0.17	0.052 - 1.3	0.31	0.13	08GWTW002
PHENOL	1100	1/8	2 J	2 J	0.94 - 1.3	0.70	2.00	08GWTW002
PYRENE	18	1/8	0.11 J	0.11 J	0.052 - 1.3	0.30	0.11	08GWTW004
Energetics (ug/L)								
4-AMINO-2,6-DINITROTOLUENE	0.73	1/4	0.58 J	0.58 J	0.25 - 0.26	0.24	0.58	08GWTW002
HMX	180	1/4	3.9 J	3.9 J	0.25 - 0.26	1.07	3.90	08GWTW002
Total Metals (ug/L)								
ALUMINUM	50	5/8	63.4 J	68200 J	21.7 - 33.8	11045.36	17664.68	08GWT00601
ANTIMONY	1.5	1/8	1.9 J	1.9 J	0.085 - 0.27	0.31	1.90	08GWTW002
ARSENIC	0.045	6/8	3.7 J	26.4 J	0.34 - 0.46	9.01	11.95	08GWT00601
BARIUM	260	8/8	46 J	589 J	-	141.35	141.35	08GWT00601
BERYLLIUM	4	2/8	0.29 J	6.1 J	0.02 - 0.23	0.83	3.20	08GWT00601
CADMIUM	1.8	7/8	0.06 J	4.9 J	0.16 - 0.16	1.90	2.16	08GWTW004
CALCIUM	NA	8/8	16900 J	97500 J	-	49687.50	49687.50	08GWT00601
CHROMIUM	11	7/8	0.23 J	34.9	0.94 - 0.94	10.88	12.36	08GWT00601
COBALT	73	8/8	2.3 J	80 J	-	16.74	16.74	08GWTW004
COPPER	150	5/8	0.64 J	41.7 J	1.9 - 2.5	12.97	20.09	08GWT00601
IRON	300	8/8	48.5 J	45600	-	15551.56	15551.56	08GWT00601
LEAD	15	5/8	0.18 J	112 J	0.069 - 0.09	28.30	45.26	08GWTW002

TABLE 3-33

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample with Maximum Detection
MAGNESIUM	NA	8/8	3430 J	22400	-	11213.75	11213.75	08GWT00801
MANGANESE	50	8/8	73.6 J	4120 J	-	1587.70	1587.70	08GWTW004
MERCURY	1.1	2/8	0.049 J	0.071 J	0.03 - 0.03	0.03	0.06	08GWTW001
NICKEL	73	7/8	3.9 J	41.3	0.1 - 0.1	19.38	22.14	08GWT00601
POTASSIUM	NA	8/8	922	5590 J	-	2276.50	2276.50	08GWT00201
SELENIUM	18	6/8	0.18 J	2.3	0.094 - 0.2	0.80	1.05	08GWTW004
SODIUM	NA	8/8	1570 J	304000 J	-	68507.50	68507.50	08GWTW002
THALLIUM	0.24	4/8	0.18 J	0.58 J	0.043 - 0.23	0.18	0.30	08GWT00601
TIN	2200	4/8	0.43 J	6.8 J	0.048 - 0.53	1.13	2.16	08GWTW002
VANADIUM	3.6	4/8	11.2 J	38.3	1.14 - 1.14	12.66	24.75	08GWT00601
ZINC	1100	6/8	6.4 J	871 J	1.7 - 4	231.56	308.27	08GWT00601
Dissolved Metals (ug/L)								
ANTIMONY	1.5	1/4	1.8 J	1.8 J	0.16 - 0.5	0.56	1.80	08GWTW002
ARSENIC	0.045	2/4	1.5 J	11 J	0.047 - 0.46	3.19	6.25	08GWTW002
BARIUM	260	4/4	23.1 J	121 J	-	64.53	64.53	08GWT00601
CADMIUM	1.8	2/4	0.68 J	3.1 J	0.25 - 0.28	1.01	1.89	08GWTW004
CALCIUM	NA	4/4	16100	69300 J	-	41325.00	41325.00	08GWT00601
CHROMIUM	11	2/4	0.17 J	11.7 J	0.95 - 0.96	3.21	5.94	08GWTW002
COBALT	73	4/4	0.28 J	35.9 J	-	11.65	11.65	08GWTW004
COPPER	150	3/4	0.61 J	8.4 J	1.9 - 1.9	2.69	3.27	08GWTW002
IRON	300	4/4	57.2	6380 J	-	2478.30	2478.30	08GWTW004
LEAD	15	2/4	0.16 J	2.5 J	0.11 - 0.12	0.69	1.33	08GWTW002
MAGNESIUM	NA	4/4	4240 J	8590 J	-	6375.00	6375.00	08GWTW001
MANGANESE	50	4/4	9.7 J	2380 J	-	872.93	872.93	08GWTW004
NICKEL	73	4/4	3.6 J	15.8 J	-	9.63	9.63	08GWTW004
POTASSIUM	NA	4/4	705 J	4610 J	-	2243.25	2243.25	08GWTW001
SELENIUM	18	4/4	0.27 J	3.1	-	1.52	1.52	08GWT00601
SODIUM	NA	3/4	6500 J	316000 J	2490 - 2490	130436.25	173500.00	08GWTW002
THALLIUM	0.24	1/4	0.06 J	0.06 J	0.043 - 0.14	0.04	0.06	08GWTW004
TIN	2200	1/4	1.1 J	1.1 J	0.05 - 0.12	0.31	1.10	08GWTW002
VANADIUM	3.6	1/4	1.8 J	1.8 J	1.14 - 1.14	0.88	1.80	08GWTW002
ZINC	1100	2/4	24.6 J	486 J	4 - 4.4	128.70	255.30	08GWTW004
Miscellaneous Parameters (CFU/100 mL)								
FECAL COLIFORM	NA	2/4	0.3	5	0.1 - 1	1.46	2.65	08GWTW001
Field Parameters								
DISSOLVED OXYGEN (mg/L)	NA	4/4	0.26	2.41	-	1.13	1.13	08GWT00202
DISSOLVED OXYGEN - METER (mg/L)	NA	4/4	0.29	7.79	-	3.56	3.56	08GWTW001
OXIDATION REDUCTION POTENTIAL (MV	NA	8/8	-109.1	216.1	-	25.76	25.76	08GWT00802
PH (S.U.)	NA	8/8	5.78	7.27	-	6.52	6.52	08GWTW001
SPECIFIC CONDUCTANCE (MS/CM)	NA	8/8	0.12	1.577	-	0.54	0.54	08GWTW002
TEMPERATURE (C)	NA	8/8	7.94	19.01	-	13.98	13.98	08GWT00802
TURBIDITY (NTU)	NA	8/8	0.87	1000 >	-	393.48	393.48	08GWTW001
TURBIDITY (NTU)	NA	8/8	0.87	1000 >	-	393.48	393.48	08GWTW004

TABLE 3-34

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT INTERMEDIATE ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positve Detects	Sample with Maximum Detection
Volatile Organics (µg/L)								
1,1,1-TRICHLOROETHANE	200	9/9	7.5	3900	---	1087	1087	08GWT00502
1,1,2-TRICHLOROETHANE	0.2	6/9	2.4	9.9	0.3	3.81	5.63	08GWT00501
1,1-DICHLOROETHANE	81	8/9	4	450	0.3	204	229	08GWT00102
1,1-DICHLOROETHENE	7	9/9	1.6	2600	---	740	740	08GWT00502
1,2-DICHLOROETHANE	0.12	6/9	0.9 J	3.3	0.3	1.45	2.10	08GWT00502
ACETONE	550	1/9	2.9 J	2.9 J	0.5	0.544	2.90	08GWT00502
CHLOROETHANE	4.6	6/9	1.8	4.2	0.5	1.81	2.58	08GWT00102
CHLOROFORM	0.17	6/9	0.8 J	2	0.3	0.917	1.30	08GWT00101
CIS-1,2-DICHLOROETHENE	6.1	6/9	8.1	300	0.3	74.2	111	08GWT00102
TETRACHLOROETHENE	0.1	2/9	0.8 J	1.4	0.3	0.361	1.10	08GWT00502
TOLUENE	72	1/9	0.5 J	0.5 J	0.3	0.189	0.500	08GWT00301
TRANS-1,2-DICHLOROETHENE	12	6/9	1.4	14	0.3	3.58	5.30	08GWT00502
TRICHLOROETHENE	1.4	6/9	1.9	8200	0.3	2023	3034	08GWT00102
VINYL CHLORIDE	0.02	6/9	2	5	0.3	2.35	3.45	08GWT00301
Semivolatile Organics (µg/L)								
1,4-DIOXANE	6.1	7/9	3 J	150	0.99 - 1	53.3	68.4	08GWT00301
Total Metals (µg/L)								
ALUMINUM	50	4/4	48.5 J	308 J	---	137	137	08GWT00501
ARSENIC	0.045	1/4	0.8 J	0.8 J	0.34 - 0.72	0.379	0.800	08GWT00901
BARIUM	260	4/4	30.3 J	44.4 J	---	36.3	36.3	08GWT00901
BERYLLIUM	4	2/4	0.2 J	0.28 J	0.02 - 0.04	0.128	0.240	08GWT00901
CADMIUM	1.8	4/4	0.12 J	0.9 J	---	0.390	0.390	08GWT00501
CALCIUM	NA	4/4	47600 J	103000 J	---	79525	79525	08GWT00901
CHROMIUM	11	4/4	0.4 J	2.5	---	1.14	1.14	08GWT00101
COBALT	73	4/4	10.2 J	306 J	---	91.2	91.2	08GWT00901
COPPER	150	1/4	3.4 J	3.4 J	1.8 - 2.7	1.65	3.40	08GWT00501
IRON	300	4/4	88 J	9510 J	---	2637	2637	08GWT00901
LEAD	15	3/4	0.19 J	0.56 J	0.12	0.258	0.323	08GWT00501
MAGNESIUM	NA	4/4	31300 J	64600 J	---	45650	45650	08GWT00901
MANGANESE	50	4/4	178 J	10700 J	---	4117	4117	08GWT00901
NICKEL	73	4/4	15.3 J	820 J	---	270	270	08GWT00901
POTASSIUM	NA	4/4	3140 J	8050 J	---	5105	5105	08GWT00901
SELENIUM	18	2/4	0.28 J	1 J	0.1 - 0.13	0.349	0.640	08GWT00901
SODIUM	NA	4/4	28600 J	48000 J	---	41025	41025	08GWT00101
ZINC	1100	4/4	8.9 J	310 J	---	116	116	08GWT00901
Field Parameters (mg/L)								
DISSOLVED OXYGEN	NA	5/5	0.24	8.78	---	3.93	3.93	08GWT00102
OXIDATION REDUCTION POTENTIAL (mV)	NA	5/5	227	709	---	371	371	08GWT00902
PH (S.U.)	NA	5/5	4.22	5.62	---	4.96	4.96	08GWT00102
SPECIFIC CONDUCTANCE (mS/cm)	NA	5/5	0.431	1.008	---	0.723	0.723	08GWT01201
TEMPERATURE (°C)	NA	5/5	15.89	18.39	---	17.4	17.4	08GWT00302
TURBIDITY (NTU)	NA	5/5	3	9.2	---	6.68	6.68	08GWT00302

°C - Celsius
Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NA - No applicable criterion.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.

TABLE 3-35

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT DEEP ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positve Detects	Sample with Maximum Detection
Volatile Organics (µg/L)								
1,1,1-TRICHLOROETHANE	200	1/6	1.5	1.5	0.3	0.375	1.5	08GWT01401
1,1-DICHLOROETHANE	81	1/6	0.9 J	0.9 J	0.3	0.275	0.9	08GWT01401
1,1-DICHLOROETHENE	7	1/6	0.8 J	0.8 J	0.3	0.258	0.8	08GWT01401
ACETONE	550	2/6	5 J	12 J	0.5	3	8.5	08GWT01301
Semivolatile Organics (µg/L)								
1,4-DIOXANE	6.1	2/6	32	44	0.971 - 4.04	13.3	38	08GWT01101
Total Metals (µg/L)								
ALUMINUM	50	1/2	5210 J	5210 J	14.4	2609	5210	08GWT01101
ARSENIC	0.045	2/2	3.8 J	4.5 J	---	4.15	4.15	08GWT01101
BARIUM	260	2/2	38.5 J	89.1 J	---	63.8	63.8	08GWT01101
BERYLLIUM	4	1/2	0.44 J	0.44 J	0.02	0.225	0.44	08GWT01101
CADMIUM	1.8	2/2	0.06 J	0.13 J	---	0.095	0.095	08GWT01101
CALCIUM	NA	2/2	12000 J	93000 J	---	52500	52500	08GWT01001
CHROMIUM	11	2/2	0.27 J	10.3	---	5.29	5.29	08GWT01101
COBALT	73	2/2	1.4	10.2	---	5.8	5.8	08GWT01101
COPPER	150	1/2	7.1 J	7.1 J	1.5	3.93	7.1	08GWT01101
IRON	300	2/2	400	13400	---	6900	6900	08GWT01101
LEAD	15	2/2	0.13 J	6	---	3.07	3.07	08GWT01101
MAGNESIUM	NA	2/2	6100	27900	---	17000	17000	08GWT01001
MANGANESE	50	2/2	110	533	---	322	322	08GWT01101
MERCURY	1.1	1/2	0.07 J	0.07 J	0.03	0.0425	0.07	08GWT01101
NICKEL	73	2/2	7.7	22.8	---	15.3	15.3	08GWT01101
POTASSIUM	NA	2/2	2690	3270	---	2980	2980	08GWT01101
SELENIUM	18	2/2	0.31 J	0.76 J	---	0.535	0.535	08GWT01101
SODIUM	NA	2/2	34300 J	43000 J	---	38650	38650	08GWT01001
TIN	2200	1/2	0.4 J	0.4 J	0.1	0.225	0.4	08GWT01101
VANADIUM	3.6	1/2	10.9	10.9	1.14	5.74	10.9	08GWT01101
ZINC	1100	1/2	23.4 J	23.4 J	2.8	12.4	23.4	08GWT01101
Dissolved Metals (ug/L)								
ALUMINUM	50	1/1	15.1 J	15.1 J	---	15.1	15.1	08GWT01101
BARIUM	260	1/1	55.1 J	55.1 J	---	55.1	55.1	08GWT01101
CALCIUM	NA	1/1	12600 J	12600 J	---	12600	12600	08GWT01101
CHROMIUM	11	1/1	0.18 J	0.18 J	---	0.18	0.18	08GWT01101
COBALT	73	1/1	5.8	5.8	---	5.8	5.8	08GWT01101
IRON	300	1/1	24.3 J	24.3 J	---	24.3	24.3	08GWT01101
MAGNESIUM	NA	1/1	5520	5520	---	5520	5520	08GWT01101
MANGANESE	50	1/1	370	370	---	370	370	08GWT01101
NICKEL	73	1/1	13.1	13.1	---	13.1	13.1	08GWT01101
POTASSIUM	NA	1/1	2300	2300	---	2300	2300	08GWT01101
SELENIUM	18	1/1	0.84 J	0.84 J	---	0.84	0.84	08GWT01101
SODIUM	NA	1/1	36700 J	36700 J	---	36700	36700	08GWT01101
ZINC	1100	1/1	2.6 J	2.6 J	---	2.6	2.6	08GWT01101

TABLE 3-35

DESCRIPTIVE STATISTICS FOR DOWNGRADIENT DEEP ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positve Detects	Sample with Maximum Detection
Field Parameters (mg/L)								
DISSOLVED OXYGEN	NA	4/4	0.37	2.61	---	1.21	1.21	08GWT01401
OXIDATION REDUCTION POTENTIAL (mV)	NA	4/4	-29.4	261	---	115	115	08GWT01401
PH (S.U.)	NA	4/4	5.76	11.96	---	8.37	8.37	08GWT01301
SPECIFIC CONDUCTANCE (mS/cm)	NA	4/4	0.195	1.061	---	0.632	0.632	08GWT01301
TEMPERATURE (°C)	NA	4/4	15.53	16.78	---	16.2	16.2	08GWT01102
TURBIDITY (NTU)	NA	4/4	8.05	1000 >	---	529	529	08GWT01301, 08GWT01401

°C - Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NA - No applicable criterion.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		02	03	02	02	03	02
Location	HHRA	08MWT007	08MWT007	08MWT002	08MWT002	08MWT002	08MWT004
Sample Number	Criterion	08GWT00701	08GWT00702	08GWT00201	08GWT00201-D	08GWT00202	08GWT00401
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		6/2/2005	10/15/2005	6/2/2005	6/2/2005	10/11/2005	6/3/2005
Volatile Organics (ug/L)							
1,1,1-TRICHLOROETHANE	200	0.3 U	0.3 U	1.4	1.4	0.3 U	0.3 U
1,1,2-TRICHLOROETHANE	0.2	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHANE	81	0.3 U	0.3 U	27	26	2.9	30
1,1-DICHLOROETHENE	7	0.3 U	0.3 U	4.2	3.9	0.3 U	0.3 U
1,2-DICHLOROETHANE	0.12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
2-BUTANONE	700	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-HEXANONE	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	550	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
BENZENE	0.35	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROETHANE	4.6	0.5 U	0.5 U	1.2	1.1	0.5 U	6.5
CIS-1,2-DICHLOROETHENE	6.1	0.3 U	0.3 U	20	19	1.8	5.8
ETHYLBENZENE	130	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOLUENE	72	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOTAL XYLENES	21	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	1.4	0.3 U	0.3 U	12	11	1.6	0.3 U
VINYL CHLORIDE	0.02	0.3 U	0.3 U	6.8	6.4	0.3 U	1.5
Semivolatile Organics (ug/L)							
1,4-DIOXANE	6.1	0.971 U	0.971 U	35	34	5	4 J
2,4-DIMETHYLPHENOL	73						
2-METHYLNAPHTHALENE	0.62						
3&4-METHYLPHENOL	18						
FLUORANTHENE	150						
FLUORENE	24						
PHENANTHRENE	18						
PHENOL	1100						
PYRENE	18						
Energetics (ug/L)							
4-AMINO-2,6-DINITROTOLUENE	0.73						
HMX	180						
Total Metals (ug/L)							
ALUMINUM	50	463 J		23.5 U	36.8 J		63.4 J
ANTIMONY	1.5	0.2 U		0.27 U	0.085 U		0.11 U
ARSENIC	0.045	0.45 U		0.34 U	0.29 U		10.3 J
BARIUM	260	19.5 J		63 J	72.5 J		71.9 J
BERYLLIUM	4	0.05 U		0.07 U	0.11 J		0.02 U

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		02	03	02	02	03	02
Location	HHRA	08MWT007	08MWT007	08MWT002	08MWT002	08MWT002	08MWT004
Sample Number	Criterion	08GWT00701	08GWT00702	08GWT00201	08GWT00201-D	08GWT00202	08GWT00401
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		6/2/2005	10/15/2005	6/2/2005	6/2/2005	10/11/2005	6/3/2005
CADMIUM	1.8	0.08 J		4.4 J	11.2 J		0.08 J
CALCIUM	NA	9640 J		39900 J	42500 J		62300 J
CHROMIUM	11	0.58 J		0.23 J	0.32 J		0.26 J
COBALT	73	5.3 J		8.6 J	17.2 J		2.3 J
COPPER	150	2.1 U		2.5 U	2.2 U		1.9 U
IRON	300	681 J		164 J	546 J		12500 J
LEAD	15	0.54 J		0.09 U	0.2 J		0.18 J
MAGNESIUM	NA	6750 J		8080 J	10600 J		16100 J
MANGANESE	50	93.9 J		636 J	756 J		2720 J
MERCURY	1.1	0.03 U		0.03 U	0.03 U		0.03 U
NICKEL	73	7.8 J		24.3 J	47.8 J		0.1 UJ
POTASSIUM	NA	518 J		5590 J	6530 J		1470 J
SELENIUM	18	0.33 J		0.2 U	0.19 U		0.094 U
SODIUM	NA	36500 J		20000 J	23000 J		32900 J
THALLIUM	0.24	0.26 U		0.23 U	0.21 U		0.22 U
TIN	2200	0.1 U		0.43 J	0.25 U		0.048 U
VANADIUM	3.6	1.14 U		1.14 U	1.14 U		1.14 U
ZINC	1100	12.4 J		40.4 J	114 J		1.7 U
Dissolved Metals (ug/L)							
ANTIMONY	1.5	0.085 U					
ARSENIC	0.045	0.15 U					
BARIUM	260	19.8 J					
CADMIUM	1.8	0.1 J					
CALCIUM	NA	9620 J					
CHROMIUM	11	0.11 J					
COBALT	73	5.1 J					
COPPER	150	1.9 U					
IRON	300	6.15 UJ					
LEAD	15	0.15 J					
MAGNESIUM	NA	6510 J					
MANGANESE	50	91.2 J					
NICKEL	73	7.4 J					
POTASSIUM	NA	388					
SELENIUM	18	0.31 J					
SODIUM	NA	36300 J					
THALLIUM	0.24	0.14 U					
TIN	2200	0.048 U					

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		02	03	02	02	03	02
Location	HHRA	08MWT007	08MWT007	08MWT002	08MWT002	08MWT002	08MWT004
Sample Number	Criterion	08GWT00701	08GWT00702	08GWT00201	08GWT00201-D	08GWT00202	08GWT00401
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		6/2/2005	10/15/2005	6/2/2005	6/2/2005	10/11/2005	6/3/2005
VANADIUM	3.6	1.14 U					
ZINC	1100	10.1 J					
Miscellaneous Parameters (ug/L)							
PERCHLORATE	NA						
Field Parameters							
DISSOLVED OXYGEN (MG/L)	NA		2.23			2.41	
DISSOLVED OXYGEN - METER (MG/L)	NA						
OXIDATION REDUCTION POTENTIAL (MV)	NA		215.4			142.4	
PH (S.U.)	NA		6.09			6.06	
SPECIFIC CONDUCTANCE (MS/CM)	NA		0.316			0.454	
TEMPERATURE (C)	NA		19.51			17.56	
TURBIDITY (NTU)	NA		5.5			1.27	

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		03	02	03	02	03	01
Location	HHRA	08MWT004	08MWT006	08MWT006	08MWT008	08MWT008	08SB006/TW001
Sample Number	Criterion	08GWT00402	08GWT00601	08GWT00602	08GWT00801	08GWT00802	08GWTW001
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		10/11/2005	6/3/2005	10/12/2005	6/4/2005	10/15/2005	1/7/2005
Volatile Organics (ug/L)							
1,1,1-TRICHLOROETHANE	200	0.3 U	1.2	27	0.3 U	0.3 U	0.3 U
1,1,2-TRICHLOROETHANE	0.2	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHANE	81	7.2	11	89	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHENE	7	0.3 U	3.8	29	0.3 U	0.3 U	0.3 U
1,2-DICHLOROETHANE	0.12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
2-BUTANONE	700	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-HEXANONE	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	550	0.5 U	0.5 UJ	0.5 U	0.5 UJ	2.3 J	0.5 UJ
BENZENE	0.35	0.3 U	0.3 U	0.8 J	0.3 U	0.3 U	0.3 U
CHLOROETHANE	4.6	12	1.1	5.8	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	6.1	0.9 J	0.3 U	1.8	0.3 U	0.3 U	1.1
ETHYLBENZENE	130	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOLUENE	72	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOTAL XYLENES	21	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	1.4	0.3 U	1.8	19	1.6	0.7 J	12
VINYL CHLORIDE	0.02	0.3 U	0.3 U	1.4	0.3 U	0.3 U	0.3 U
Semivolatile Organics (ug/L)							
1,4-DIOXANE	6.1	5	3 J	21	1.06 U	1.04 U	0.95 UJ
2,4-DIMETHYLPHENOL	73						0.95 U
2-METHYLNAPHTHALENE	0.62						0.06 U
3&4-METHYLPHENOL	18						0.95 U
FLUORANTHENE	150						0.06 U
FLUORENE	24						0.06 U
PHENANTHRENE	18						0.06 U
PHENOL	1100						0.95 U
PYRENE	18						0.06 U
Energetics (ug/L)							
4-AMINO-2,6-DINITROTOLUENE	0.73						0.25 U
HMX	180						0.25 U
Total Metals (ug/L)							
ALUMINUM	50		68200 J		33.8 U		8220 J
ANTIMONY	1.5		0.085 U		0.085 U		0.19 U
ARSENIC	0.045		26.4 J		0.46 U		3.8 J
BARIUM	260		589 J		46 J		92.1 J
BERYLLIUM	4		6.1 J		0.02 U		0.29 J

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		03	02	03	02	03	01
Location	HHRA	08MWT004	08MWT006	08MWT006	08MWT008	08MWT008	08SB006/TW001
Sample Number	Criterion	08GWT00402	08GWT00601	08GWT00602	08GWT00801	08GWT00802	08GWTW001
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		10/11/2005	6/3/2005	10/12/2005	6/4/2005	10/15/2005	1/7/2005
CADMIUM	1.8		2.8		0.06 J		1.4 J
CALCIUM	NA		97500 J		31600 J		28800 J
CHROMIUM	11		34.9		0.26 J		12.6 J
COBALT	73		22.6		6		3 J
COPPER	150		41.7 J		2.2 U		9.4 J
IRON	300		45600		48.5 J		12400 J
LEAD	15		87.7		0.069 U		9.5 J
MAGNESIUM	NA		12700		22400		5810 J
MANGANESE	50		1510		1410		73.6 J
MERCURY	1.1		0.03 U		0.03 U		0.071 J
NICKEL	73		41.3		21.5		11.1 J
POTASSIUM	NA		4880		922		1830 J
SELENIUM	18		1.9		0.18 J		0.45 J
SODIUM	NA		142000 J		27900 J		1570 J
THALLIUM	0.24		0.58 J		0.1 U		0.18 J
TIN	2200		0.62 J		0.05 U		0.53 U
VANADIUM	3.6		38.3		1.14 U		22.2 J
ZINC	1100		871 J		6.4 J		42 J
Dissolved Metals (ug/L)							
ANTIMONY	1.5		0.5 U				0.16 U
ARSENIC	0.045		0.46 U				0.047 U
BARIUM	260		121 J				23.1 J
CADMIUM	1.8		0.68 J				0.25 U
CALCIUM	NA		69300 J				29600
CHROMIUM	11		0.17 J				0.96 U
COBALT	73		6.6				0.28 J
COPPER	150		1.9 U				0.81 J
IRON	300		57.2				196 J
LEAD	15		0.16 J				0.11 U
MAGNESIUM	NA		4440				8590 J
MANGANESE	50		894				9.7 J
NICKEL	73		7				3.6 J
POTASSIUM	NA		2790				4610 J
SELENIUM	18		3.1				0.27 J
SODIUM	NA		198000 J				2490 U
THALLIUM	0.24		0.14 U				0.043 U
TIN	2200		0.05 U				0.12 U

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		03	02	03	02	03	01
Location	HHRA	08MWT004	08MWT006	08MWT006	08MWT008	08MWT008	08SB006/TW001
Sample Number	Criterion	08GWT00402	08GWT00601	08GWT00602	08GWT00801	08GWT00802	08GWTW001
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		10/11/2005	6/3/2005	10/12/2005	6/4/2005	10/15/2005	1/7/2005
VANADIUM	3.6		1.14 U				1.14 U
ZINC	1100		24.6 J				4 U
Miscellaneous Parameters (ug/L)							
PERCHLORATE	NA						2 U
Field Parameters							
DISSOLVED OXYGEN (MG/L)	NA	0.26		0.37		1.48	
DISSOLVED OXYGEN - METER (MG/L)	NA						7.79
OXIDATION REDUCTION POTENTIAL (MV)	NA	-102.8		84.2		216.1	22.7
PH (S.U.)	NA	6.67		5.78		6.16	7.27
SPECIFIC CONDUCTANCE (MS/CM)	NA	0.468		0.608		0.284	0.12
TEMPERATURE (C)	NA	18.63		17.33		19.01	7.94
TURBIDITY (NTU)	NA	4.6		154		0.87	1000 >

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		01	01	01	01	01	02
Location	HHRA	08SB007/TW002	08SB007/TW002	08SB010/TW003	08SB010/TW003	08SB013/TW004	08TW006
Sample Number	Criterion	08GWTW002	08GWTW002-D	08GWTW003	08GWTW003-D	08GWTW004	08GWTW006
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		1/7/2005	1/7/2005	1/7/2005	1/6/2005	1/7/2005	6/4/2005
Volatile Organics (ug/L)							
1,1,1-TRICHLOROETHANE	200	850		0.3 U		11	190
1,1,2-TRICHLOROETHANE	0.2	4.1		0.3 U		0.3 U	0.3 U
1,1-DICHLOROETHANE	81	2500		1.3		89	97
1,1-DICHLOROETHENE	7	200		0.3 U		18	26
1,2-DICHLOROETHANE	0.12	7.8		0.3 U		0.3 U	0.3 U
2-BUTANONE	700	81		0.5 U		0.5 U	0.5 U
2-HEXANONE	NA	1.8 J		0.5 U		0.5 U	0.5 U
ACETONE	550	69 J		0.5 UJ		4.2 U	0.5 UJ
BENZENE	0.35	1.3		0.3 U		0.6 J	0.3 U
CHLOROETHANE	4.6	5900		0.5 U		7.8	13
CIS-1,2-DICHLOROETHENE	6.1	380		5.5		1.1	250
ETHYLBENZENE	130	0.8 J		0.3 U		0.3 U	0.3 U
TOLUENE	72	87		0.3 U		0.3 U	0.3 U
TOTAL XYLENES	21	4.4		0.3 U		0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	12	15		0.3 U		0.3 U	0.9 J
TRICHLOROETHENE	1.4	55		0.3 U		6.3	180
VINYL CHLORIDE	0.02	120		21		3	0.3 U
Semivolatile Organics (ug/L)							
1,4-DIOXANE	6.1	64 J		3 J		8 J	6 J
2,4-DIMETHYLPHENOL	73	2 J		0.97 U		0.96 U	
2-METHYLNAPHTHALENE	0.62	0.08 J		0.052 U		0.059 U	
3&4-METHYLPHENOL	18	22		0.97 U		0.96 U	
FLUORANTHENE	150	0.052 U		0.052 U		0.07 J	
FLUORENE	24	0.11		0.052 U		0.059 U	
PHENANTHRENE	18	0.17		0.052 U		0.08 J	
PHENOL	1100	2 J		0.97 U		0.96 U	
PYRENE	18	0.052 U		0.052 U		0.11 J	
Energetics (ug/L)							
4-AMINO-2,6-DINITROTOLUENE	0.73	0.58 J		0.26 U	0.266 U	0.255 U	
HMX	180	3.9 J		0.26 U	0.266 U	0.255 U	
Total Metals (ug/L)							
ALUMINUM	50	8470 J		21.7 U		3370 J	
ANTIMONY	1.5	1.9 J		0.14 U		0.23 U	
ARSENIC	0.045	17.1 J		10.4 J		3.7 J	
BARIUM	260	106 J		66.5 J		96.3 J	
BERYLLIUM	4	0.23 U		0.02 UJ		0.18 U	

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		01	01	01	01	01	02
Location	HHRA	08SB007/TW002	08SB007/TW002	08SB010/TW003	08SB010/TW003	08SB013/TW004	08TW006
Sample Number	Criterion	08GWTW002	08GWTW002-D	08GWTW003	08GWTW003-D	08GWTW004	08GWTW006
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		1/7/2005	1/7/2005	1/7/2005	1/6/2005	1/7/2005	6/4/2005
CADMIUM	1.8	1.5 J		0.16 U		4.9 J	
CALCIUM	NA	16900 J		63500 J		57000 J	
CHROMIUM	11	31.6 J		0.94 U		6.7 J	
COBALT	73	8.1 J		3.3 J		80 J	
COPPER	150	36.9 J		0.64 J		11.8 J	
IRON	300	20000 J		13700 J		20000 J	
LEAD	15	112 J		0.09 U		16.9 J	
MAGNESIUM	NA	3430 J		13800 J		7390 J	
MANGANESE	50	282 J		1950 J		4120 J	
MERCURY	1.1	0.049 J		0.03 UJ		0.03 UJ	
NICKEL	73	21.4 J		3.9 J		31.5 J	
POTASSIUM	NA	1100 J		1360 J		1060 J	
SELENIUM	18	1		0.46 J		2.3	
SODIUM	NA	304000 J		13600 J		6090 J	
THALLIUM	0.24	0.21 J		0.043 U		0.21 J	
TIN	2200	6.8 J		0.18 U		0.79 J	
VANADIUM	3.6	27.3 J		1.14 U		11.2 J	
ZINC	1100	70.8 J		4 U		819 J	
Dissolved Metals (ug/L)							
ANTIMONY	1.5	1.8 J				0.2 U	
ARSENIC	0.045	11 J				1.5 J	
BARIUM	260	43 J				71 J	
CADMIUM	1.8	0.28 U				3.1 J	
CALCIUM	NA	16100				50300	
CHROMIUM	11	11.7 J				0.95 U	
COBALT	73	3.8 J				35.9 J	
COPPER	150	8.4 J				0.61 J	
IRON	300	3280 J				6380 J	
LEAD	15	2.5 J				0.12 U	
MAGNESIUM	NA	4240 J				8230 J	
MANGANESE	50	208 J				2380 J	
NICKEL	73	12.1 J				15.8 J	
POTASSIUM	NA	705 J				868 J	
SELENIUM	18	0.8 J				1.9	
SODIUM	NA	316000 J				6500 J	
THALLIUM	0.24	0.043 U				0.06 J	
TIN	2200	1.1 J				0.11 U	

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		01	01	01	01	01	02
Location	HHRA	08SB007/TW002	08SB007/TW002	08SB010/TW003	08SB010/TW003	08SB013/TW004	08TW006
Sample Number	Criterion	08GWTW002	08GWTW002-D	08GWTW003	08GWTW003-D	08GWTW004	08GWTW006
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		1/7/2005	1/7/2005	1/7/2005	1/6/2005	1/7/2005	6/4/2005
VANADIUM	3.6	1.8 J				1.14 U	
ZINC	1100	4.4 U				486 J	
Miscellaneous Parameters (ug/L)							
PERCHLORATE	NA	10 U		4 U	4 U	4 U	
Field Parameters							
DISSOLVED OXYGEN (MG/L)	NA						
DISSOLVED OXYGEN - METER (MG/L)	NA	2.29		0.29		3.87	
OXIDATION REDUCTION POTENTIAL (MV)	NA	-109.1		-41.6		-5.8	
PH (S.U.)	NA	7		6.54		6.65	
SPECIFIC CONDUCTANCE (MS/CM)	NA	1.577		0.365		0.467	
TEMPERATURE (C)	NA	9.16		12.51		9.73	
TURBIDITY (NTU)	NA	980		7.1		1000 >	

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	
Sampling Round		04	04	04	04	04	04
Location	HHRA	08SB056/TW012	08SB057/TW013	08SB059/TW014	08SB060/TW015	08SB060/TW015	08SB062/TW017
Sample Number	Criterion	08GWTW12	08GWTW13	08GWTW14	08GWTW15	08GWTW15-D	08GWTW17
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		10/25/2006	10/25/2006	10/24/2006	10/24/2006	10/24/2006	10/24/2006
Volatile Organics (ug/L)							
1,1,1-TRICHLOROETHANE	200	1.5	0.3 U	8.8	3.6	3.6	0.3 U
1,1,2-TRICHLOROETHANE	0.2	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHANE	81	18	0.3 U	2.2	4.9	4.9	0.3 U
1,1-DICHLOROETHENE	7	6.3	0.3 U	0.3 UJ	0.3 U	0.3 U	0.3 U
1,2-DICHLOROETHANE	0.12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
2-BUTANONE	700	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-HEXANONE	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	550	7.1 J	12 J	0.5 U	0.5 U	0.5 U	0.5 U
BENZENE	0.35	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROETHANE	4.6	2.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	6.1	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
ETHYLBENZENE	130	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOLUENE	72	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOTAL XYLENES	21	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	12	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	1.4	0.54 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
VINYL CHLORIDE	0.02	0.72 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Semivolatile Organics (ug/L)							
1,4-DIOXANE	6.1		1.3 U	1 U	0.94 U	1 U	1.1 U
2,4-DIMETHYLPHENOL	73		1.3 U	1 U	0.94 U	1 U	1.1 U
2-METHYLNAPHTHALENE	0.62		1.3 U	1 U	0.94 U	1 U	1.1 U
3&4-METHYLPHENOL	18		1.3 U	1 U	0.94 U	1 U	1.1 U
FLUORANTHENE	150		1.3 U	1 U	0.94 U	1 U	1 U
FLUORENE	24		1.3 U	1 U	0.94 U	1 U	1 U
PHENANTHRENE	18		1.3 U	1 U	0.94 U	1 U	1 U
PHENOL	1100		1.3 U	1 U	0.94 U	1 U	1 U
PYRENE	18		1.3 U	1 U	0.94 U	1 U	1 U
Energetics (ug/L)							
4-AMINO-2,6-DINITROTOLUENE	0.73						
HMX	180						
Total Metals (ug/L)							
ALUMINUM	50						
ANTIMONY	1.5						
ARSENIC	0.045						
BARIUM	260						
BERYLLIUM	4						

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	
Sampling Round		04	04	04	04	04	04
Location	HHRA	08SB056/TW012	08SB057/TW013	08SB059/TW014	08SB060/TW015	08SB060/TW015	08SB062/TW017
Sample Number	Criterion	08GWTW12	08GWTW13	08GWTW14	08GWTW15	08GWTW15-D	08GWTW17
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		10/25/2006	10/25/2006	10/24/2006	10/24/2006	10/24/2006	10/24/2006
CADMIUM	1.8						
CALCIUM	NA						
CHROMIUM	11						
COBALT	73						
COPPER	150						
IRON	300						
LEAD	15						
MAGNESIUM	NA						
MANGANESE	50						
MERCURY	1.1						
NICKEL	73						
POTASSIUM	NA						
SELENIUM	18						
SODIUM	NA						
THALLIUM	0.24						
TIN	2200						
VANADIUM	3.6						
ZINC	1100						
Dissolved Metals (ug/L)							
ANTIMONY	1.5						
ARSENIC	0.045						
BARIUM	260						
CADMIUM	1.8						
CALCIUM	NA						
CHROMIUM	11						
COBALT	73						
COPPER	150						
IRON	300						
LEAD	15						
MAGNESIUM	NA						
MANGANESE	50						
NICKEL	73						
POTASSIUM	NA						
SELENIUM	18						
SODIUM	NA						
THALLIUM	0.24						
TIN	2200						

TABLE 3-36

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SHALLOW BEDROCK AND OVERBURDEN GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	
Sampling Round		04	04	04	04	04	04
Location	HHRA	08SB056/TW012	08SB057/TW013	08SB059/TW014	08SB060/TW015	08SB060/TW015	08SB062/TW017
Sample Number	Criterion	08GWTW12	08GWTW13	08GWTW14	08GWTW15	08GWTW15-D	08GWTW17
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date		10/25/2006	10/25/2006	10/24/2006	10/24/2006	10/24/2006	10/24/2006
VANADIUM	3.6						
ZINC	1100						
Miscellaneous Parameters (ug/L)							
PERCHLORATE	NA						
Field Parameters							
DISSOLVED OXYGEN (MG/L)	NA						
DISSOLVED OXYGEN - METER (MG/L)	NA						
OXIDATION REDUCTION POTENTIAL (MV)	NA						
PH (S.U.)	NA						
SPECIFIC CONDUCTANCE (MS/CM)	NA						
TEMPERATURE (C)	NA						
TURBIDITY (NTU)	NA						

TABLE 3-37

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN INTERMEDIATE ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Sampling Round		02	03	02	03	02	03	03
Location	HHRA	08MWT007	08MWT007	08MWT001	08MWT001	08MWT003	08MWT003	08MWT003
Sample Number	Criterion	08GWT00701	08GWT00702	08GWT00101	08GWT00102	08GWT00301	08GWT00302	08GWT00302-D
Sample Code		NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
Sample Date		6/2/2005	10/15/2005	6/2/2005	10/13/2005	6/2/2005	10/14/2005	10/14/2005
Volatile Organics (µg/L)								
1,1,1-TRICHLOROETHANE	200	0.3 U	0.3 U	**580**	**1000**	**610**	**930**	**870**
1,1,2-TRICHLOROETHANE	0.2	0.3 U	0.3 U	**5.4**	**3.7**	**2.4**	**3.2**	**3.1**
1,1-DICHLOROETHANE	81	0.3 U	0.3 U	**260**	**450**	**200**	**330**	**310**
1,1-DICHLOROETHENE	7	0.3 U	0.3 U	**370**	**630**	**550**	**800**	**750**
1,2-DICHLOROETHANE	0.12	0.3 U	0.3 U	**1.9**	**2.1**	**0.9 J**	**1.6**	**1.5**
ACETONE	550	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
CHLOROETHANE	4.6	0.5 U	0.5 U	1.8	4.2	1.9	2.1	2.1
CHLOROFORM	0.17	0.3 U	0.3 U	**2**	**1.8**	**1.2**	**1.1**	**1.1**
CIS-1,2-DICHLOROETHENE	6.1	0.3 U	0.3 U	**120**	**300**	**120**	**110**	**120**
TETRACHLOROETHENE	0.1	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOLUENE	72	0.3 U	0.3 U	0.3 U	0.3 U	0.5 J	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	12	0.3 U	0.3 U	1.7	1.8	1.4	1.9	1.9
TRICHLOROETHENE	1.4	0.3 U	0.3 U	**2300**	**8200**	**3700**	**4000**	**3900**
VINYL CHLORIDE	0.02	0.3 U	0.3 U	**2.4**	**3.4**	**5**	**4.6**	**4.6**
Semivolatile Organics (µg/L)								
1,4-DIOXANE	6.1	0.971 U	0.971 U	**110**	**46**	**150**	**130**	**140**
Total Metals (µg/L)								
ALUMINUM	50	**463 J**		48.5 J		**70.8 J**		
ARSENIC	0.045	0.45 U		0.34 U		0.37 U		
BARIUM	260	19.5 J		30.3 J		32.7 J		
BERYLLIUM	4	0.05 U		0.02 U		0.04 U		
CADMIUM	1.8	0.08 J		0.24 J		0.12 J		
CALCIUM	NA	9640 J		93000 J		47600 J		
CHROMIUM	11	0.58 J		2.5		0.65 J		
COBALT	73	5.3 J		10.2 J		10.6 J		
COPPER	150	2.1 U		1.9 U		1.8 U		
IRON	300	**681 J**		88 J		194 J		
LEAD	15	0.54 J		0.12 U		0.19 J		
MAGNESIUM	NA	6750 J		42600 J		31300 J		
MANGANESE	50	**93.9 J**		**178 J**		**260 J**		
NICKEL	73	7.8 J		15.3 J		20.8 J		
POTASSIUM	NA	518 J		5060 J		3140 J		
SELENIUM	18	0.33 J		0.28 J		0.13 U		
SODIUM	NA	36500 J		48000 J		42000 J		
ZINC	1100	12.4 J		8.9 J		9.4 J		

TABLE 3-37

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN INTERMEDIATE ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		**UPGRAD**	**UPGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**
Sampling Round		**02**	**03**	**02**	**03**	**02**	**03**	**03**
Location	**HHRA**	**08MWT007**	**08MWT007**	**08MWT001**	**08MWT001**	**08MWT003**	**08MWT003**	**08MWT003**
Sample Number	**Criterion**	**08GWT00701**	**08GWT00702**	**08GWT00101**	**08GWT00102**	**08GWT00301**	**08GWT00302**	**08GWT00302-D**
Sample Code		**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**ORIG**	**DUP**
Sample Date		**6/2/2005**	**10/15/2005**	**6/2/2005**	**10/13/2005**	**6/2/2005**	**10/14/2005**	**10/14/2005**
Dissolved Metals (µg/L)								
BARIUM	200	19.8 J						
CADMIUM	1.8	0.1 J						
CALCIUM	NA	9620 J						
CHROMIUM	11	0.11 J						
COBALT	73	5.1 J						
LEAD	15	0.15 J						
MAGNESIUM	NA	6510 J						
MANGANESE	50	91.2 J						
NICKEL	73	7.4 J						
POTASSIUM	NA	388						
SELENIUM	18	0.31 J						
SODIUM	NA	36300 J						
ZINC	1100	10.1 J						
Field Parameters (mg/L)								
DISSOLVED OXYGEN	NA		2.23		8.78		6.43	
OXIDATION REDUCTION POTENTIAL (mV)	NA		215.4		267.9		337.2	
PH (S.U.)	NA		6.09		5.62		5.38	
SPECIFIC CONDUCTANCE (mS/cm)	NA		0.316		0.894		0.431	
TEMPERATURE (°C)	NA		19.51		17.28		18.39	
TURBIDITY (NTU)	NA		5.5		8.7		9.2	

TABLE 3-37

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN INTERMEDIATE ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**
Sampling Round	**02**	**03**	**02**	**03**	**03**
Location	**08MWT005**	**08MWT005**	**08MWT009**	**08MWT009**	**08MWT012**
Sample Number	**08GWT00501**	**08GWT00502**	**08GWT00901**	**08GWT00902**	**08GWT01201**
Sample Code	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Date	**6/3/2005**	**10/14/2005**	**6/3/2005**	**10/15/2005**	**10/17/2005**
Volatile Organics (µg/L)					
1,1,1-TRICHLOROETHANE	**2700**	**3900**	16	36	7.5
1,1,2-TRICHLOROETHANE	**9.9**	**9.2**	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHANE	**240**	**340**	4	8.8	0.3 U
1,1-DICHLOROETHENE	**1700**	**2600**	3.1	5.5	1.6
1,2-DICHLOROETHANE	**2.8**	**3.3**	0.3 U	0.3 U	0.3 U
ACETONE	0.5 UJ	2.9 J	0.5 UJ	0.5 U	0.5 U
CHLOROETHANE	2.5	3	0.5 U	0.5 U	0.5 U
CHLOROFORM	**0.8 J**	**0.9 J**	0.3 U	0.3 U	0.3 U
CIS-1,2-DICHLOROETHENE	**8.1**	**9**	0.3 U	0.3 U	0.3 U
TETRACHLOROETHENE	**0.8 J**	**1.4**	0.3 U	0.3 U	0.3 U
TOLUENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	11	**14**	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	**1.9**	**2.5**	0.3 U	0.3 U	0.3 U
VINYL CHLORIDE	**2**	**3.3**	0.3 U	0.3 U	0.3 U
Semivolatile Organics (µg/L)					
1,4-DIOXANE	**21**	**19**	0.99 U	3 J	1 U
Total Metals (µg/L)					
ALUMINUM	**308 J**		**120 J**		
ARSENIC	0.72 U		**0.8 J**		
BARIUM	37.7 J		44.4 J		
BERYLLIUM	0.2 J		0.28 J		
CADMIUM	0.9 J		0.3 J		
CALCIUM	74500 J		103000 J		
CHROMIUM	1		0.4 J		
COBALT	38.1 J		**306 J**		
COPPER	3.4 J		2.7 U		
IRON	**756 J**		**9510 J**		
LEAD	0.56 J		0.22 J		
MAGNESIUM	44100 J		64600 J		
MANGANESE	**5330 J**		**10700 J**		
NICKEL	**223 J**		**820 J**		
POTASSIUM	4170 J		8050 J		
SELENIUM	0.1 U		1 J		
SODIUM	28600 J		45500 J		
ZINC	134 J		310 J		

TABLE 3-37

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN INTERMEDIATE ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**
Sampling Round	**02**	**03**	**02**	**03**	**03**
Location	**08MWT005**	**08MWT005**	**08MWT009**	**08MWT009**	**08MWT012**
Sample Number	**08GWT00501**	**08GWT00502**	**08GWT00901**	**08GWT00902**	**08GWT01201**
Sample Code	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Date	**6/3/2005**	**10/14/2005**	**6/3/2005**	**10/15/2005**	**10/17/2005**
Field Parameters (mg/L)					
DISSOLVED OXYGEN		3.73		0.47	0.24
OXIDATION REDUCTION POTENTIAL (mV)		311.5		709	227
PH (S.U.)		5.22		4.22	4.35
SPECIFIC CONDUCTANCE (mS/cm)		0.518		0.762	1.008
TEMPERATURE (°C)		17.42		18.06	15.89
TURBIDITY (NTU)		8.29		4.2	3

°C - Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
DOWNGRAD - Location is a downgradient location.
UPGRAD - Location is an upgradient location.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

TABLE 3-38

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN DEEP ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		**UPGRAD**	**UPGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**
Sampling Round		**02**	**03**	**02**	**03**	**02**	**03**	**03**	**03**
Location	**HHRA**	**08MWT007**	**08MWT007**	**08MWT010**	**08MWT010**	**08MWT011**	**08MWT011**	**08MWT013**	**08MWT014**
Sample Number	**Criterion**	**08GWT00701**	**08GWT00702**	**08GWT01001**	**08GWT01002**	**08GWT01101**	**08GWT01102**	**08GWT01301**	**08GWT01401**
Sample Code		**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Date		**6/2/2005**	**10/15/2005**	**6/3/2005**	**10/12/2005**	**6/4/2005**	**10/12/2005**	**10/16/2005**	**10/16/2005**
Volatile Organics (µg/L)									
1,1,1-TRICHLOROETHANE	200	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1.5
1,1-DICHLOROETHANE	81	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.9 J
1,1-DICHLOROETHENE	7	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.8 J
ACETONE	550	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	12 J	5 J
Semivolatile Organics (µg/L)									
1,4-DIOXANE	6.1	0.971 U	0.971 U	0.98 U	0.971 U	**44**	**32**	4.04 U	1.11 UJ
Total Metals (µg/L)									
ALUMINUM	50	**463 J**		14.4 U		**5210 J**			
ARSENIC	0.045	0.45 U		**3.8 J**		**4.5 J**			
BARIUM	260	19.5 J		38.5 J		89.1 J			
BERYLLIUM	4	0.05 U		0.02 U		0.44 J			
CADMIUM	1.8	0.08 J		0.06 J		0.13 J			
CALCIUM	NA	9640 J		93000 J		12000 J			
CHROMIUM	11	0.58 J		0.27 J		10.3			
COBALT	73	5.3 J		1.4		10.2			
COPPER	150	2.1 U		1.5 U		7.1 J			
IRON	300	**681 J**		**400**		**13400**			
LEAD	15	0.54 J		0.13 J		6			
MAGNESIUM	NA	6750 J		27900		6100			
MANGANESE	50	**93.9 J**		**110**		**533**			
MERCURY	1.1	0.03 U		0.03 U		0.07 J			
NICKEL	73	7.8 J		7.7		22.8			
POTASSIUM	NA	518 J		2690		3270			
SELENIUM	18	0.33 J		0.31 J		0.76 J			
SODIUM	NA	36500 J		43000 J		34300 J			
TIN	2200	0.1 U		0.1 U		0.4 J			
VANADIUM	3.6	1.14 U		1.14 U		**10.9**			
ZINC	1100	12.4 J		2.8 U		23.4 J			
Dissolved Metals (µg/L)									
ALUMINUM	50	8.35 U				15.1 J			
BARIUM	260	19.8 J				55.1 J			
CALCIUM	NA	9620 J				12600 J			
CHROMIUM	11	0.11 J				0.18 J			
COBALT	73	5.1 J				5.8			
IRON	300	6.15 UJ				24.3 J			
MAGNESIUM	NA	6510 J				5520			
MANGANESE	50	**91.2 J**				**370**			
NICKEL	73	7.4 J				13.1			
POTASSIUM	NA	388				2300			
SELENIUM	18	0.31 J				0.84 J			
SODIUM	NA	36300 J				36700 J			
ZINC	1100	10.1 J				2.6 J			

TABLE 3-38

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN DEEP ZONE GROUNDWATER SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Characterization		**UPGRAD**	**UPGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**	**DOWNGRAD**
Sampling Round		**02**	**03**	**02**	**03**	**02**	**03**	**03**	**03**
Location	**HHRA**	**08MWT007**	**08MWT007**	**08MWT010**	**08MWT010**	**08MWT011**	**08MWT011**	**08MWT013**	**08MWT014**
Sample Number	**Criterion**	**08GWT00701**	**08GWT00702**	**08GWT01001**	**08GWT01002**	**08GWT01101**	**08GWT01102**	**08GWT01301**	**08GWT01401**
Sample Code		**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
Sample Date		**6/2/2005**	**10/15/2005**	**6/3/2005**	**10/12/2005**	**6/4/2005**	**10/12/2005**	**10/16/2005**	**10/16/2005**
Field Parameters (mg/L)									
DISSOLVED OXYGEN	NA		2.23		0.37		1.27	0.59	2.61
OXIDATION REDUCTION POTENTIAL (mV)	NA		215.4		-29.4		143.2	85	261
PH (S.U.)	NA		6.09		6.71		5.76	11.96	9.03
SPECIFIC CONDUCTANCE (mS/cm)	NA		0.316		0.547		0.195	1.061	0.724
TEMPERATURE (°C)	NA		19.51		15.53		16.78	15.86	16.69
TURBIDITY (NTU)	NA		5.5		8.05		108	>1000	>1000

°C - Degrees Celsius.
Data qualifiers (e.g., U, J) are defined in Appendix H.
DOWNGRAD - Location is a downgradient location.
UPGRAD - Location is an upgradient location.
mg/L - Milligrams per liter.
mS/cm - MilliSiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity units.
S.U. - Standard units.
µg/L - Micrograms per liter.

TABLE 3-39

DESCRIPTIVE STATISTICS FOR SUMP SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	HHRA Criterion	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Non-Detects	Mean Concentration	Average of Positive Detects	Sample With Maximum Detection
Volatile Organics (µg/L)								
1,1,1-TRICHLOROETHANE	200	1/1	3.5	3.5	---	3.5	3.5	08SU00101
1,1-DICHLOROETHANE	81	1/1	2.7	2.7	---	2.7	2.7	08SU00101
ACETONE	550	1/1	0.8 J	0.8 J	---	0.8	0.8	08SU00101
CHLOROETHANE	4.6	1/1	1.1	1.1	---	1.1	1.1	08SU00101
CIS-1,2-DICHLOROETHENE	6.1	1/1	1.7	1.7	---	1.7	1.7	08SU00101
TRICHLOROETHENE	1.4	1/1	1.4	1.4	---	1.4	1.4	08SU00101
Semivolatile Organics (µg/L)								
1,4-DIOXANE	6.1	1/1	2 J	2 J	---	2	2	08SU00101
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	1/1	2 J	2 J	---	2	2	08SU00101
Total Metals (µg/L)								
ARSENIC	0.045	1/1	0.91 J	0.91 J	---	0.91	0.91	08SU00101
BARIUM	260	1/1	62.1 J	62.1 J	---	62.1	62.1	08SU00101
CADMIUM	1.8	1/1	0.29 J	0.29 J	---	0.29	0.29	08SU00101
CALCIUM	NA	1/1	57300 J	57300 J	---	57300	57300	08SU00101
CHROMIUM	11	1/1	0.47 J	0.47 J	---	0.47	0.47	08SU00101
COBALT	73	1/1	0.7 J	0.7 J	---	0.7	0.7	08SU00101
IRON	300	1/1	813	813	---	813	813	08SU00101
LEAD	15	1/1	0.37 J	0.37 J	---	0.37	0.37	08SU00101
MAGNESIUM	NA	1/1	7080	7080	---	7080	7080	08SU00101
MANGANESE	50	1/1	209	209	---	209	209	08SU00101
NICKEL	73	1/1	1.6	1.6	---	1.6	1.6	08SU00101
POTASSIUM	NA	1/1	3720	3720	---	3720	3720	08SU00101
SELENIUM	18	1/1	0.16 J	0.16 J	---	0.16	0.16	08SU00101
SODIUM	NA	1/1	22900 J	22900 J	---	22900	22900	08SU00101
ZINC	1100	1/1	30.9 J	30.9 J	---	30.9	30.9	08SU00101
Dissolved Metals (µg/L)								
ARSENIC	0.045	1/1	0.78 J	0.78 J	---	0.78	0.78	08SU00101-F
BARIUM	260	1/1	26 J	26 J	---	26	26	08SU00101-F
CALCIUM	NA	1/1	57300 J	57300 J	---	57300	57300	08SU00101-F
CHROMIUM	11	1/1	0.33 J	0.33 J	---	0.33	0.33	08SU00101-F
COBALT	73	1/1	0.73 J	0.73 J	---	0.73	0.73	08SU00101-F
IRON	300	1/1	560	560	---	560	560	08SU00101-F
LEAD	15	1/1	0.2 J	0.2 J	---	0.2	0.2	08SU00101-F
MAGNESIUM	NA	1/1	7130	7130	---	7130	7130	08SU00101-F
MANGANESE	50	1/1	230	230	---	230	230	08SU00101-F
NICKEL	73	1/1	1.7	1.7	---	1.7	1.7	08SU00101-F
POTASSIUM	NA	1/1	3710	3710	---	3710	3710	08SU00101-F
SELENIUM	18	1/1	0.13 J	0.13 J	---	0.13	0.13	08SU00101-F
SODIUM	NA	1/1	23100 J	23100 J	---	23100	23100	08SU00101-F
ZINC	1100	1/1	19.4 J	19.4 J	---	19.4	19.4	08SU00101-F
Miscellaneous Parameters								
TOTAL COLIFORM (CFU/100 mL)	NA	1/1	2419.2 >	2419.2 >	---	2419	2419	08SU00101

CFU/100 mL - Colony-forming units per 100 milliliters.
Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
NA - No applicable criterion.
µg/L - Micrograms per liter.

TABLE 3-40

ANALYTICAL RESULTS FOR CHEMICALS DETECTED IN SUMP SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sampling Round **Location** **Sample Number** **Sample Code** **Sample Date**	**HHRA Criterion**	**02** **08SU001** **08SU00101** **ORIG** **6/7/2005**	**02** **08SU001** **08SU00101-D** **DUP** **6/7/2005**
Volatile Organics (µg/L)			
1,1,1-TRICHLOROETHANE	200	3.5	
1,1-DICHLOROETHANE	81	2.7	
ACETONE	550	0.8 J	
CHLOROETHANE	4.6	1.1	
CIS-1,2-DICHLOROETHENE	6.1	1.7	
TRICHLOROETHENE	1.4	1.4	
Semivolatile Organics (µg/L)			
1,4-DIOXANE	6.1	2 J	
BIS(2-ETHYLHEXYL)PHTHALATE	4.8	2 J	
Total Metals (µg/L)			
ARSENIC	0.045	**0.91 J**	
BARIUM	260	62.1 J	
CADMIUM	1.8	0.29 J	
CALCIUM	NA	57300 J	
CHROMIUM	11	0.47 J	
COBALT	73	0.7 J	
IRON	300	**813**	
LEAD	15	0.37 J	
MAGNESIUM	NA	7080	
MANGANESE	50	**209**	
NICKEL	73	1.6	
POTASSIUM	NA	3720	
SELENIUM	18	0.16 J	
SODIUM	NA	22900 J	
ZINC	1100	30.9 J	
Dissolved Metals (µg/L)			
ARSENIC	0.045	**0.78 J**	
BARIUM	260	26 J	
CALCIUM	NA	57300 J	
CHROMIUM	11	0.33 J	
COBALT	73	0.73 J	
IRON	300	**560**	
LEAD	15	0.2 J	
MAGNESIUM	NA	7130	
MANGANESE	50	**230**	
NICKEL	73	1.7	
POTASSIUM	NA	3710	
SELENIUM	18	0.13 J	
SODIUM	NA	23100 J	
ZINC	1100	19.4 J	
Miscellaneous Parameters			
TOTAL COLIFORM (CFU/100 mL)	NA	>2419.2	>2419.2

CFU/100 mL - Colony-forming units per 100 milliliters.
Data qualifiers (e.g., U, J) are defined in Appendix H.
HHRA - Human health risk assessment.
NA - No applicable criterion.
µg/L - Micrograms per liter.
Black background indicates values that exceed at least one of the criteria.
Blank cells indicate no data are available.

4.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

4.1 PHYSIOGRAPHY AND TOPOGRAPHY

Buildings 106 and 107, together with other buildings in the area, are located on a promontory of land that juts southward from a primary east-west trending ridgetop (Figure 2-2). In this area, the top of the ridge was flattened to some extent in the 1940s in preparation for site development (roads, rail lines, buildings, parking lots). The areas that lie between buildings are mostly grass covered. SWMU 8 is surrounded by wooded slopes on the eastern, southern and western sides (Figure 2-2). An unnamed tributary of Boggs Creek and a primary road (Highway 45) run along the base of the wooded slope on the southern side of SWMU 8. A primary road (Highway 101) and a main rail line run along the western and northern sides of SWMU 8. Within the Building 106/107 area, a blacktop road runs in a north-south direction on both sides of the buildings and loops around the southern side. There are also three small paint and solvent storage lockers on the southern side of Building 106.

The areas in the immediate vicinity of Buildings 106 and 107 slope gently outwards toward the outer edge of the ridgetop (i.e., to the east, south, and west). From the ridgetop, surface drainage migrates down the hillslopes in small ephemeral gullies. Four gullies have been numbered for this project to facilitate identification. The gulley numbers are not part of any officially designated geographic names. Tributary 8-01 (Figure 2-2) collects all runoff from the western side of the ridgetop and discharges from several storm drains. Tributary 8-02 collects runoff from the hillslope on the southern side of Buildings 106 and 119. Tributary 8-03 runs directly past the northern and eastern sides of the Building 106 Pond and farther east collects surface runoff and storm drain discharges from the eastern side of Buildings 106 and 107. Another small ephemeral tributary gulley (8-04) is located farther east and collects runoff from another set of buildings on its northeastern side (Figure 2-2). Tributary 8-04 does not collect any surface runoff from the Building 106/107 area; however, some groundwater discharging from the Building 106/107 area might discharge to this gulley.

A large unnamed tributary of Boggs Creek is located about 500 feet south of Building 106 and flows from west to east towards Boggs Creek. Boggs Creek, in combination with Turkey Creek, is the largest watershed draining NSWC Crane.

Elevations on the SWMU 8 ridgetop range from about 670 to 700 feet above mean sea level (amsl) (Figure 2-2). The maximum elevations at SWMU 8 (about 700 feet amsl) occur around Building 2722, which is situated on a small knoll. The elevations along the small tributary 8-01 range from 660 feet amsl

near surface water sampling point 08SW/SD18 to about 610 feet amsl where it enters the unnamed main stream (Figure 2-2), a drop of approximately 50 feet in elevation. The larger eastern tributary 8-03 starts farther up on the ridgetop at an elevation of about 690 feet amsl and drops in elevation to about 590 feet amsl where tributary 8-03 enters the unnamed main stream. The total topographic relief around SWMU 8 is about 110 feet.

4.2 METEOROLOGY

NSWC Crane is located in a warm, temperate climatic zone. In general, the summers are warm and humid, and winters are mild with occasional short cold periods. The temperature ranges from an average maximum July temperature of 89 degrees Fahrenheit (°F) to an average minimum January temperature of 26°F. Precipitation is fairly evenly distributed throughout the calendar year; the maximum precipitation occurs during the spring and early summer. The average annual precipitation at the facility is 44 inches and consists of 42 inches of rain and 15 inches of snow. The average humidity ranges from 40 to 90 percent in summer and 60 to 90 percent in winter. Long-term climatological records for the area indicate that the monthly prevailing wind direction is from the southwest from April through December and from the northwest during January through March [National Oceanic and Atmospheric Administration (NOAA, 1988)]. The annual prevailing wind direction for the region is from the southwest, and the annual average wind speed for the area is about 9.6 miles per hour. Figure 4-1 is a wind rose summarizing the mean wind direction and wind speed distribution at the Indianapolis International Airport over a 5-year period (1985 to 1989).

4.3 SURFACE WATER HYDROLOGY

The topography at SWMU 8 consists of a ridge on the northern side of Highway 45 that runs in an east-west orientation. The slopes across the ridgetop are very gradual. Surface water runoff from most of the buildings, grassy areas, railroad tracks, roads, and parking lots drains to the periphery of the developed area and runs down the hillside in the gullies, as described in Section 4.1.

One storm drain used to discharge into the northwestern corner of the Building 106 Pond. However, that pipe was reportedly sealed. No storm drain pipes are known to currently discharge to the pond. In addition, no drainage ditches empty into the pond. The pond has no known surface outlet or subsurface drain outlet. The mean sea level elevation of the average pond surface is 681 feet amsl and the mean sea level elevation of the average pond bottom is 676 feet amsl. It appears that direct rainfall, a small amount of surface runoff from the banks of the pond, and perhaps a small amount of groundwater seepage are the only sources of water entering the pond. The pond is connected to a former treatment

plant (Building 2961) located on the southern side of the pond by a horizontal subsurface pipe. The depth, diameter, and type of pipe are unknown. Because the water level in the treatment plant sump and the pond are nearly identical, it is assumed that they are still in hydraulic communication and water can pass back and forth between them. The water level in the pond never appears to reach the grade of the surrounding berm; therefore, the only means of water leaving the pond is probably evapotranspiration and slow groundwater seepage to the east and southeast. Groundwater seepage will be discussed later in this section.

Three rounds of surface water sampling and surface flow estimates were conducted during the RFI. Based on visual observations and measurements, estimates of surface water flow were made at each surface water sampling station and at each staff gauge on one or more occasions during the three rounds (Table 4-1). During Round 2 sampling (June 5, 2005), there was no flow in any of the gullies or unnamed stream. During Round 1 sampling (January 9, 2005) and Round 3 sampling (October 25, 2005), there was very little or no flow at any sample location or gauging station. The highest flow rate [310 gallons per minute (gpm)] was estimated at 08SW/SD09 during Round 1 sampling. This location is on the main unnamed stream, just downstream of its confluence with Tributary 8-03 (Figure 2-2). It is likely that the gullies and the upper reaches of the unnamed tributary creeks are not flowing most of the year, especially in the summer and fall months. However, based on the boulder and gravel size found in the bed of the unnamed stream and the lack of leaves, twigs, or fine sediment in the streambed, it is apparent that much higher flows can be expected in the tributary gullies and the main stream during large storm events or periods of heavy snowmelt.

4.4 GEOLOGY

Bedrock underlying NSWC Crane consists of sedimentary rocks from the Lower Pennsylvanian-age Mansfield Formation of the Raccoon Creek Group and the underlying Upper Mississippian-age Stephensport and West Baden Groups (Figure 4-2). The Pennsylvanian-age sandstones, siltstone, shales, coal beds, and thin limestone units of the Mansfield Formation can reach thicknesses of 250 to 300 feet at NSWC Crane in the central and western portions of the facility. Because the pre-Pennsylvanian bedrock is dipping to the west-southwest toward the center of the Illinois structural basin, the Mississippian-age rocks are closer to the surface and crop out along the stream valleys and lower slopes on the eastern side of NSWC Crane (Figure 4-3). On the eastern side of NSWC Crane (e.g., near the Dye Burial Ground, Ammunition Burning Ground, and Rockeye), Pennsylvanian bedrock is confined to the uppermost portions of hills and ridges. At SWMU 9 (Pest Control Area), which lies in the central portion of NSWC Crane, the United States Army Corps of Engineers (USACE) drilled a well (09C01) through the top of the ridge to a total depth of 150 feet. This well penetrated 13 feet of

overburden soil and 132.5 feet of Pennsylvanian (Mansfield) shales, sandstones, siltstone, and coal seams. The boring also encountered 5.5 feet of Mississippian limestone at the bottom, which the USACE and Indiana Geological Survey identified as the Glen Dean Limestone (Barnhill and Hansley, 1993). The elevation of the Pennsylvanian-Mississippian unconformity at this location (SWMU 9) is approximately 575 feet amsl. Based on the Map Showing Structure on Top of the Mississippian Unconformity at NSWC Crane, Indiana (Barnhill and Hansley, 1993), the basal elevation of Pennsylvanian rock at SWMU 8 is about 520 feet amsl. Thus, the combined thickness of Pennsylvanian shales, sandstones, and coals at SWMU 8 is up to 180 feet.

Below the Pennsylvanian rocks lie Mississippian-age limestone and sandstone formations of the Stephensport Group, including the Glen Dean, Golconda, and Beech Creek Limestones, the Big Clifty Sandstone, and the Hardinsburg Formation (siltstone and shale) (Figure 4-2). The Mississippian Formations lie at or below 520 feet amsl at SWMU 8, which is at least 70 feet below the level of the unnamed creek (elevation 590 to 600 feet amsl). This fact is corroborated by the basewide geology map (Figure 4-3), which shows Raccoon Creek and Lower-Pennsylvanian sandstone units present in all of the major and minor stream valleys in the vicinity of SWMU 8. Mississippian Formations do not crop out in major stream valleys until about 1 kilometer eastward in the Turkey Creek Valley near SWMU 7.

The ridgetop containing SWMU 8 is blanketed with residual soils and reworked soils that range from 2 to 19 feet thick. As discussed above, the bulk of the ridge is composed of Pennsylvanian bedrock, which consists of discontinuous layers of siltstones, sandstones, shales, and coal seams up to 180 feet thick near the center of the ridge. These Pennsylvanian rock units extend from the ridgetop down to about 520 feet amsl.

During the RFI for SWMU 8, a total of 14 permanent monitoring wells were installed. The date of installation, total depth, ground surface elevation, screen elevations, and other physical characteristics of each of the 14 monitoring wells are listed in Table 2-2. The boring logs and well construction logs for these wells are included in Appendix B. The locations of the 14 monitoring wells are shown on Figure 2-2. The bottom of the deepest monitoring well (08MWT13) was drilled to 562.68 feet amsl, which is still about 42 feet above the base of the Pennsylvanian rock units. Therefore, all of the drilling occurred and all of the monitoring wells were installed at SWMU 8 in the unconsolidated overburden, fill materials, or Pennsylvanian bedrock. As a result, there is no further mention of geology or hydrogeology of Mississippian rocks in this document. For all practical purposes, they are far below any contaminated groundwater and do not interact hydraulically with the overlying conductive zones within the Pennsylvanian rocks.

Figure 4-4 illustrates the locations of three geological cross sections that have been prepared based on the results of drilling and well installation activities at SWMU 8. These geologic cross sections (A-A', B-B', C-C') are presented in Figure 4-5. The highest part of the SWMU 8 ridge (above 670 feet amsl) is capped by shaly sandstone, fine sandstone, and medium sandstone. The coarser, medium-grained sandstone was encountered in well 08MWT007 located on the topographically high knoll (cross section A-A', Figure 4-5). On the northwestern side of Building 106, the medium sandstone is replaced by fine sandstone and shaly sandstone. Toward the outer edges of the ridge (e.g., southeast of the Building 106 Pond), the bedrock has weathered down to 670 feet amsl, and shallow monitoring wells 08MWT002, 08MWT004, and 08MWT006 were installed in residual soil on top of the ridge (cross sections B-B' and C-C', Figure 4-5). The monitoring wells installed in the uppermost sandstone, shaly sandstone, and overburden soils were grouped together as Upper Pennsylvanian and overburden monitoring wells.

Beneath the uppermost sandstone and overburden, a black carbonaceous shale containing coal streaks was generally encountered between 660 and 672 feet amsl. This shale was finely laminated and appeared to be a marine shale. It was 5 to 8 feet thick in most locations, but was not encountered on the far southeastern side of the ridgetop near 08MWT01 (cross section C-C', Figure 4-5).

Laminated siltstone, shale, and fine sandstone were generally encountered between 445 and 460 feet amsl. These units were relatively dry when drilled. On the southern and southeastern sides of the Building 106 Pond (e.g., 08MWT001 and 08MWT003), a well-sorted, orange to pink, medium sandstone was encountered between approximately 615 and 645 feet amsl. The colors of this sandstone indicate that it is porous and well oxidized. On the southern and southwestern sides of SWMU 8 (near wells 08MWT005 and 08MWT12) (cross section C-C', Figure 4-5), the same interval is partially occupied by finer-grained sandstone and siltstone with coal streaks and a small coal seam. Monitoring wells 08MWT001, 08MWT003, 08MWT005, and 08MWT012 are all screened in the geologic strata between 611 and 648 feet amsl and are grouped together as the Middle Pennsylvanian monitoring wells.

Between 570 and 620 feet amsl, a thick sequence of laminated, gray to tan, fine-grained sandstones, siltstones, and silty shales were encountered. In most cases, this sequence of rock was well cemented, massive, and dry (these units produced significant dust during drilling). However, between 595 and 605 feet amsl, the shaly siltstone was often fractured and produced significant quantities of water when drilled, especially in borehole 08MWT014.

Between 560 and 570 feet amsl, a fine sandstone with minor shale interbeds, coal streaks, and a very thin coal seam was encountered. In this zone, the sandstone appeared to be irregularly bedded and

broken. Monitoring wells 08MWT010, 08MWT011, 08MWT013, and 08MWT014 are all screened in this elevation range and are referred to as Lower Pennsylvanian monitoring wells.

The base of the Pennsylvanian System is at approximately 520 feet amsl at SWMU 8. However, no drilling penetrated this deep, and there is no information concerning the rock units below 562 feet amsl at this location.

As stated above, the overburden soils are generally thin (i.e., generally less than 7 feet thick) and are not usually saturated at the bottom at the bedrock interface (based on numerous soil borings drilled within and around Buildings 106 and 107; see Figure 2-1). Surface soils were pushed toward the southern and southeastern sides of the ridgetop in the 1940s during site development to level the upper surface of the ridge. Thus, soil thicknesses measured in the southern and southeastern edges of the ridgetop are thicker (up to 19 feet thick). For all wells and soil borings that reached the bedrock surface, the bedrock surface elevation was recorded. Figure 4-6 presents the approximate topography on the bedrock surface. A bedrock high is present near monitoring well 08MWT07 and Building 2722, where the bedrock surface almost reaches 700 feet amsl. Around the Building 106 Pond, the bedrock elevation is approximately 670 to 675 feet amsl. From the ridgetop, the bedrock surface drops rapidly, matching the land surface. In most cases, the residual soil is no more than a few feet thick on the hillslopes. At the bottom of the slopes, the main stream is flowing on top of the bedrock surface, and bedrock is exposed on the stream bottom and banks.

4.5 SOILS

A veneer of natural soil blankets the top and the sideslopes of the SWMU 8 ridge. The soils are the result of Pennsylvanian-age rocks (mostly sandstone, shales, and siltstone) weathering in place. These residual soils derived from Pennsylvanian rock are the most prevalent soils at NSWC Crane and consist predominantly of fine materials, including varying amounts of clay, silt, and sand. The thickness of the residual soil was typically 2 to 7 feet around the buildings (Table 2-1). However, a significantly thicker layer of soil (18 to 19 feet) was encountered on the southeastern side of the SWMU 8 ridgetop around soil borings 08SB010, 08SB012, and 08SB013 (Figure 2-1). It is quite likely that this thicker layer of soil includes some reworked soils that were pushed into the area when the ridgetop was being leveled and developed in the 1940s.

4.6 HYDROGEOLOGY

As discussed above, the maximum thickness of soil encountered on the ridgetop or sideslopes of SWMU 8 was 19 feet. Elsewhere, the residual soil was generally less than 7 feet thick. While drilling through the overburden on top of the ridge, saturated conditions were encountered in the overburden soil at several locations (e.g., 08MWT002, 08MWT004, and 08MWT006). The uppermost sandstone in the ridgetop (encountered in monitoring wells 08MWT007 and 08MWT008) were also saturated in the lower portions. These five wells have been grouped together and represent the Upper Pennsylvanian and overburden water-bearing zone (Puz). This zone is recharged by downward infiltration through surface soil. A higher rate of recharge may occur beneath the Building 106 Pond, but there is no quantitative evidence to support this conjecture. The sandstone and overburden residual soil belonging to the Puz rest on top of a fairly continuous, black, finely laminated, clay shale. By its appearance, this shale should be very impervious and should act as an effective aquitard that minimizes the downward migration of water to deeper strata and this in fact is the case. The rocks immediately below the black shale were dry. It was not until about 635 feet amsl that saturated rock was once more encountered in the boreholes. This deeper groundwater resides in a porous, highly oxidized, medium-grained sandstone that is referred to as the Middle Pennsylvanian water-bearing zone (Pmz). The sandstone was present in boreholes 08MWT01 and 08MWT03 just south of the Building 106 Pond. Farther southwest, in the vicinity of wells 08MWT005 and 08MWT012, groundwater was also encountered at this elevation; however, the sandstone in this area becomes finer grained and contains coal streaks and a thin coal seam. These four wells were grouped together and used to represent the Pmz.

The deepest monitoring wells at SWMU 8 are screened in laminated siltstones, sandstone, and silty shale. This rock type is not normally very permeable. However, broken rock was encountered in this lithology between 595 and 605 feet amsl in wells 08MWT013 and 08MWT014, and fine sandstone with minor coal streaks was encountered between 562 to 570 feet amsl in 08MWT014. Four wells screened between 562 and 585 feet amsl are included in a group the represents the Lower Pennsylvanian water-bearing zone (Plz).

Depth to groundwater and groundwater elevations were measured on three different occasions, and data are listed in Table 2-2. Water levels were first measured in June 2005 before all of the 14 RFI monitoring wells were installed, and water levels were again measured in December 2005 after all 14 permanent monitoring wells were installed. However, two of the Plz wells (08MWT013 and 08MWT014) were very slow to recover, and the water levels were measured prematurely after well development and sampling. Therefore, a third set of groundwater levels was measured in March 2006. The third data set (i.e.,

March 1, 2006) was used to prepare potentiometric surface maps that are discussed below. All water level measurements are listed in Table 2-2.

Figure 4-7 presents the potentiometric surface for the uppermost sandstone unit and overburden wells (i.e., the Puz) measured in March 2006. The highest groundwater elevations (686 to 688 feet amsl) were measured in the two monitoring wells located farthest north and northwest (i.e., wells 08MWT007 and 09MWT008) toward the center of the ridgetop. The Puz groundwater elevations decrease to about 680 feet amsl on the eastern and southern sides of the Building 106 Pond. The water surface elevation in the pond on March 1, 2006 was 681.91 feet amsl (Figure 4-6, Table 2-2); hence, groundwater is probably seeping slowly into the pond on the northern and western sides and seeping out on the eastern and southern sides. The primary groundwater flow direction in the area around the pond is to the east and southeast.

All shallow groundwater in the Puz is presumably flowing toward the crop line and discharging to the gullies on the eastern and southern sides of the ridge (primarily tributary 8-03) or discharging to surface soils and gradually evaporating. The hydraulic gradients in the Puz steepen as the sideslopes of the ridge are approached. The base elevation of the Puz is approximately 660 to 670 feet amsl, so groundwater is confined to the uppermost portion of the ridgetop. Figure 4-7 includes arrows that depict the approximate lateral flow directions in the Puz.

Figure 4-8 shows groundwater elevations measured in the five monitoring wells screened in the second major sandstone unit (i.e., the Pmz) on March 1, 2006. The highest groundwater elevations in the Pmz were measured in the two wells located near the pond (634.39 ft amsl in well 08MWT003 and 634.36 feet amsl in well 08MWT001). Groundwater elevations measured in wells 08MWT005 and 08MWT012 were only slightly lower (633 to 634 feet amsl). Groundwater elevations mimic the surface topography (which is typical) and decrease toward the southeast and toward the south from the ridgetop. Arrows on Figure 4-8 show the approximate flow direction for groundwater in the Pmz. The lowest groundwater elevation measured in the Pmz was in well 08MWT009 (619.57 feet amsl) on the southern side of SWMU 8. This groundwater elevation is approaching the base of the second sandstone unit (i.e., Pmz), which occurs at approximately 610 to 615 feet amsl. Groundwater in the Pmz, like the Puz, is expected to discharge to the hillside, but at a lower elevation. Groundwater discharge around the hillsides has been observed at seeps 08SP002, 08SP003, and 08SP004 and along the roadside ditch southeast of well 08MWT009. Groundwater in the Pmz is also presumably discharging slowly to tributary 8-03.

Water levels measured in the four wells screened in the Plz on March 1, 2006 are presented on Figure 4-9. The highest Plz groundwater level was measured in well 08MWT011. On March 1, 2006, the

level in this well was 595.65 feet amsl, which is about 6 to 9 feet higher than the other three Plz wells. The higher water level in this well might be caused by the fact that the permeability of the rock around the well screen is very low (as discussed below). Also, the well is likely receiving extra recharge from the adjacent gully (tributary 8-03) when the gully is flowing. Potentiometric contours were not drawn on this figure because they would have portrayed an east-west potentiometric ridge between wells 08MWT014 and 08MWT011, with groundwater flow to the north (toward well 08MWT013) and toward the south (toward well 08MWT010). This is not a likely situation. A possible explanation for the erratic water levels in these Plz wells is that the Ks of the fine sandstones and clayey siltstones in this interval are relatively low. Thus, the water levels do not react quickly to changes in hydraulic potentials around them and behave erratically.

During the RFI, slug tests were performed at seven monitoring wells. In many cases, both a rising head and falling head test were performed on the same well. In three of the wells, only a rising head test was performed because the water levels in the wells were below the top of the screens (which introduces error in evaluating a falling head test). The raw data, data analysis procedures, graphs of the data, and analytical results for each test are presented in Appendix E.1. A summary of the results of slug tests performed on select monitoring wells are presented in Table 4-2. The K values calculated for one Puz and one overburden monitoring well (08MWT007 and 08MWT004) were the highest and ranged from 4.41 to 8.75 feet per day [1.6E-03 to 3.1E-03 centimeters per second (cm/s)]. The median K for the shallow bedrock and overburden was approximately 6.6 feet per day.

The K values calculated for five Pmz monitoring wells (Table 4-2) ranged from 0.68 to 1.75 feet per day (2.4E-04 to 6.2E-04 cm/s). The median K value for the Pmz (1.07 foot per day) was less than the median for the Puz.

A K value calculated for one Plz monitoring well (08MWT11) was only 0.061 foot per day (Table 4-2). This low K value, in addition to the very slow recovery rates observed in the four Plz wells, suggests that the hydraulic conductivity of this zone is very low, and as a result, groundwater flow through this zone is very slow or nonexistent.

Horizontal hydraulic gradients were calculated graphically at several locations for the Puz and Pmz (see Appendix E.2). The gradients were relatively steep in the Puz, ranging from 0.086 to 0.114. Using the median hydraulic conductivity value for the Puz of 6.6 feet per day and an estimated porosity of 0.25 for the weathered sandstone and overburden, values of linear groundwater velocity were estimated for the Puz (Appendix E.2). These values ranged from 2.27 to 3.01 feet per day (829 to 1100 feet per year). These flow velocities are relatively high because the K for the Puz and overburden was higher than for

the other two zones. In addition, the gradients are steep near the outer edges of the ridge where the Puz approaches its crop line. The groundwater velocities therefore increase as the groundwater approaches the outer edge of the ridge (i.e., its discharge zone). All assumptions, data, and calculations for linear groundwater velocities are presented in Appendix E.2.

Horizontal hydraulic gradients were calculated graphically at several locations for the Pmz (see Appendix E.2). The gradients are less steep than found in the Puz, but still somewhat steep (0.065 to 0.074). The gradients become steepest near the outer edges of the ridge where the Pmz approaches its crop line. Using the median hydraulic conductivity value for the Pmz of 1.07 foot per day and an estimated porosity of 0.05 for the sandstone, values of linear groundwater velocity were estimated for the Pmz. These values ranged from 1.39 to 1.58 feet per day (508 to 578 feet per year). These velocities are roughly 50 percent of the velocities calculated for the Puz. All assumptions, data, and calculations for linear groundwater velocities are presented in Appendix E.2.

Horizontal hydraulic gradients and groundwater velocities were not calculated for the Plz because the groundwater elevations were very erratic, and determining hydraulic gradients would be prone to severe error. Regardless, the gradients in the Plz (excluding the 8MWT011 water level) appear to be almost flat, and the K of this zone is very low (0.061 foot per day). Thus, linear groundwater velocities in the Plz should be one to two orders of magnitude lower than in the upper two zones.

Most of the groundwater within the ridge is flowing laterally eastward, southward, and westward from the center of the ridge. Some groundwater is likely flowing from the upper sandstone unit (i.e., the Puz) downward to the second sandstone unit (i.e., the Pmz) and subsequently down to the lowermost Pennsylvanian strata (i.e., the Plz). The hydraulic heads measured in monitoring wells at SWMU 8 consistently decrease in elevation as the elevations of the well screens decrease (Figure 4-10). This indicates that recharge occurs along the upper slopes of the ridge; groundwater flow is mostly lateral with a small vertical component downward. The flow rates downward through the ridge are very low based on the following evidence:

- Much of the upper portion of the Pmz is dry; hence, the groundwater in the Puz is perched and cannot move down to the Pmz very quickly. The black silty shale and siltstone between the Puz and Pmz is an effective barrier to downward groundwater flow.

- The fact that groundwater elevations decrease dramatically from top to bottom in the ridge (see Figure 4-10) indicates a large vertical hydraulic gradient exists, which reflects the low permeabilities of aquitard materials (i.e., shales and siltstones) between the Puz, Pmz, and Plz.

- Three different nests of wells also indicate a very large hydraulic head difference between the Puz, Pmz, and Plz (see Figure 4-11). The average head difference between the wells in the Puz and the wells in the Pmz in March 2005 was about 40 feet. The same approximate decrease in hydraulic head occurs between the Pmz and the Plz.

The results of groundwater sampling will be presented in Section 5.0. Most contaminants detected in groundwater in the Puz were detected in the Pmz at higher concentrations. This suggests that the aquitard separating the Puz and the Pmz is not continuous and is breached in one or more locations. One of these locations appears to occur near Building 106 and west of Building 106 near monitoring well 08MWT008 (see cross section B-B', Figure 4-5). The black shale appears to be absent, although it should have been present in the interval that was drilled. Another possible "window" through the aquitards could occur at the Building 106 Pond itself. When the pond was constructed in the 1940s, a dozer might have gouged down into uppermost bedrock to create the depression, and this could have cut into the black shale aquitards. Contamination has definitely seeped down into the Pmz, but it is virtually absent in the Plz. Thus, migration of groundwater contaminants is limited to south and southeastward lateral movement in the Puz and Pmz zones.

4.7 DEMOGRAPHY AND LAND USE

The economic base of communities surrounding NSWC Crane is in transition from agriculture, mining, and quarrying to manufacturing and service industries. The patterns of settlement, population statistics, and median income are similar throughout the region. Because most of the region is covered by vegetation, the area is classified as rural.

There is no State or local planning within the vicinity of NSWC Crane. The only zoning and land use regulations are in the municipalities in the region. None of the municipalities are close enough to impact NSWC Crane. None of the areas adjacent to NSWC Crane are zoned, and zoning is not anticipated in the near future. No known land use or community actions are being considered or proposed at this time.

4.8 ECOLOGY

NSWC Crane is a heavily forested facility situated within the Western Mesophytic Forest Region, Hill Section, and Beech-Maple Forest Region (Braun, 1950). Lindsey et al. (1970) further subdivided the area of the installation into the South-Central Oak and Mixed Woods Division, including the Beech-Maple and the Beech-Oak-Maple-Hickory sub-elements. Deam (1940) classified the portion of Martin County in

which the facility is located as consisting of the Chestnut Oak Upland based on the dominant floral components at that time. More recently, Kuchler (1964) mapped this portion of Indiana and classified it as belonging to two distinct vegetation classes, the Oak-Hickory and the Beech-Maple forest components of the Broadleaf Forest Classification. This latter classification most closely resembles the current floristic components observed at the facility.

NSWC Crane contains old agricultural fields in various stages of biological succession. Openings on dry upland sites contain almost pure stands of grasses, with some clumps of woody plants such as persimmon, sassafras, and sumac. Areas that tend to be wetter have river birch, willow, sycamore, and cottonwood. Hillside communities include hickory, white and black oak, red maple, sugar maple, tulip poplar, ash, and beech (NEESA, 1983). Cleared areas at the facility have various stages of grassland, old field, and scrub/shrub vegetational forms present. Dominant tree species include black oak, white oak, pignut hickory, and yellow poplar. These stands are relatively young, with the average tree diameter ranging from 6 to 12 inches. Shrubs are present in these areas, and leaf litter, limbs, and saplings cover the understory.

The wildlife habitats and vegetation types present at NSWC Crane (including many stages of forest succession, streams, ponds, Greenwood Lake, and grassy open spaces) support a diverse terrestrial and aquatic fauna. The abundance of wildlife is mainly due to the mixture of landforms and vegetation types that occur over the installation. In addition, the lack of agricultural pressures has enhanced wildlife abundance and served to provide an installation-wide "wildlife enclosure" condition. There is an adequate amount of forage materials, concealment opportunities, and shelter locations to support a highly diverse wildlife community at the site.

Terrestrial habitats (i.e., wooded and grassy areas) near the site may provide shelter and food sources for various species of mammals such as white-tailed deer, coyote, red fox, rabbits, raccoons, and mice and for birds such as ducks, geese, wild turkey, bobwhite quail, red-tailed hawks, and American robins.

The white-tailed deer is the most conspicuous large, wild mammal at the installation. Other mammals include opossum, raccoon, rabbits, mice, bats, chipmunks, squirrels, beaver, groundhogs, gray fox, coyotes, and long-tailed weasel. Fox, coyotes, and hawks are carnivores whose presence indicates a healthy ecosystem with smaller mammals present to provide a food source (NEESA, 1983).

The birds at NSWC Crane are diverse. Previous studies identified over 100 species present at the facility during breeding seasons (Hengeveld, 1987). Because the facility is largely forested, the species found consist predominantly of those that frequent wooded habitat types. Species of waterfowl also use the

facility, especially in the vicinity of Greenwood Lake (Figure 1-2). A large number of bird species frequent the non-forested grassland, old field, and scrub/shrub vegetation present over portions of NSWC Crane. The bird population includes a number of threatened, endangered, or species of special concern that use NSWC Crane as their home range. These species include the bald eagle, osprey, sharp-shinned hawk, red-shouldered hawk, broad-winged hawk, black and white warbler, hooded warbler, and worm-eating warbler (Brown & Root Environmental, 1997).

Previous studies conducted at NSWC Crane (Nelson et al., 1987) identified 21 amphibian species and 22 reptilian species including skinks, lizards, snakes, and turtles.

A total of 46 distinct fish species were collected from the installation during a 1987 inventory of fish fauna at NSWC Crane. Other than Greenwood Lake, the 1987 study observed that the greatest number of individual fish species were recorded from the largest stream, Boggs Creek, and that the smallest number of species were recorded from Turkey Creek. Boggs Creek contained 29 species, including eight species of fish characteristic of large river-type systems. This included long-nose gar, paddlefish, bowfin, gizzard shad, ribbon shiner, big mouth buffalo, channel catfish, and flathead catfish. By contrast, the Turkey Creek survey yielded 16 species of fish, none of which were unusual to the area.

TABLE 4-1

ESTIMATED FLOW RATES AT SURFACE WATER SAMPLING LOCATIONS AND STAFF GAUGES
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Surface Water Sampling Station[1]	Round 1		Round 2		Round 3	
	1/9/2005		6/05/05		10/25/05	
	Estimated Flow Rate (gpm)	Notes	Estimated Flow Rate (gpm)	Notes	Estimated Flow Rate (gpm)	Notes
08SW/SD01	0	stagnant pool	0	dry	0	
08SW/SD02	0	dry	0	dry	0	
08SW/SD03	0	stagnant pool, 4 in. deep	0	stagnant pool, 3 in. deep	0	
08SW/SD04	0	Bldg. 106 Pond		NS	0	Bldg. 106 Pond
08SW/SD05	0	Bldg. 106 Pond		NS		Not Sampled
08SW/SD06	2 - 5	very shallow flowing water	0	dry	0	dry
08SW/SD07	10 - 15	water depth = 1 to 4 inches	0	dry	0	dry
08SW/SD08	140		0	stagnant pool, 10 in. deep	< 1	
08SW/SD09	310		0	stagnant pool	1	
08SW/SD10			0	stagnant pool	0	stagnant pool
08SW/SD11			0	dry, no sample	0	stagnant pool
08SW/SD12			0	Bldg. 106 Pond	0	Bldg. 106 Pond
08SW/SD13			0	dry	0	stagnant pool
08SW/SD14			0	stagnant pool		NE
08SW/SD15			0	stagnant pool	1 - 3	
08SW/SD16					0	dry
08SW/SD17					< 1	
08SW/SD18					1	
08SW/SD19					0	dry
08SW/SD20					0	stagnant pool, water depth = 8 in.
08SW/SD21					0	stagnant pool, water depth = 6 in.
Staff Gauge						
08SG01		NE		NE	9	
08SG02		NE		NE	3 - 5	
08SG03		NE		NE	1 - 3	
08SG04		NE		NE	1 - 3	
08SG05		NE		NE	0	dry
08SG06		NE		NE	148	
08SG07		NE		NE	0	Bldg. 106 Pond

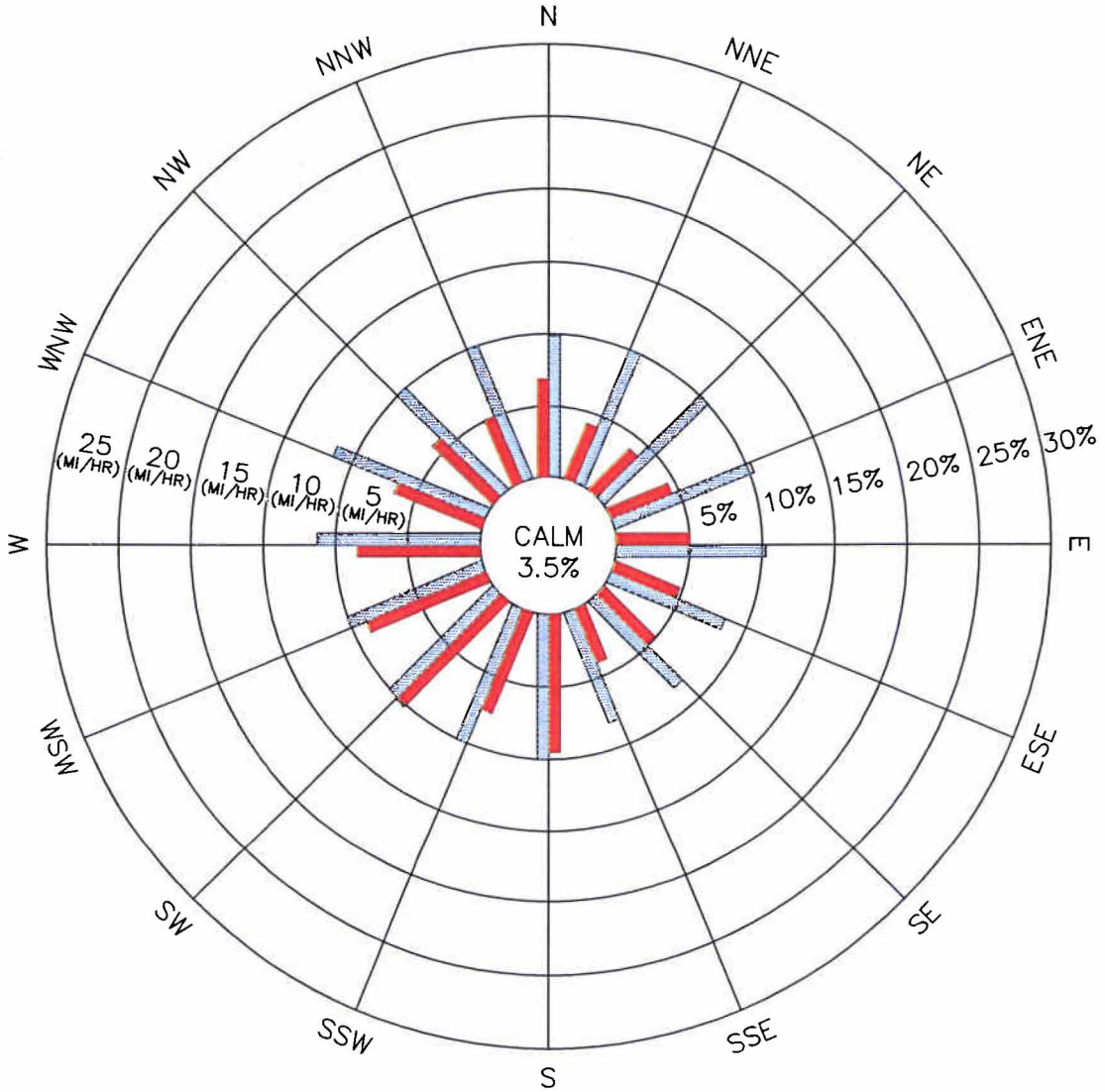
1 - See surface water sample log sheets for flow calculations or estimates; locations shown on Figure 2-2.
NE = flow rate not estimated or recorded.
NA = not applicable
gpm = gallons per minute.

TABLE 4-2

HYDRAULIC CONDUCTIVITIES OF GEOLOGIC MATERIALS BASED ON SLUG TESTS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Monitoring Zone / Well No.	Screened Material	Horizontal Hydraulic Conductivity (K_h)		Average Horizontal Hydraulic Conductivity (K_h)	
		(rising head, ft/day)	(falling head, ft/day)	(ft/day)	(cm/s)
Unconsolidated Overburden					
08MWT004	silty and sandy clay	6.40	11.1	8.75	3.1E-03
Upper Pennsylvanian Water-Bearing Zone (Puz)					
08MWT007	medium sandstone and thin, shaly, fractured coal	4.39	4.43	4.41	1.6E-03
Middle Pennsylvanian Water-Bearing Zone (Pmz)					
08MWT001	fine to medium sandstone	1.12		1.12	4.0E-04
08MWT003	medium sandstone	0.680		0.680	2.4E-04
08MWT005	medium sandstone and thin, shaly, fractured coal	0.907	1.14	1.02	3.6E-04
08MWT009	fine sandstone (broken and iron-stained) with thin streaks of coal	1.75		1.75	6.2E-04
			Median Value	1.07	3.8E-04
Lower Pennsylvanian Water-Bearing Zone (Plz)					
08MWT011	siltstone and silty shale	0.045	0.08	0.061	2.2E-05

ACAD:1245GP01.dwg 01/31/06 MF PIT



LEGEND:

WIND DIRECTION FREQUENCY (PERCENT)
(DIRECTION FROM WHICH THE WIND IS BLOWING)

MEAN WIND SPEED (MI/HR)

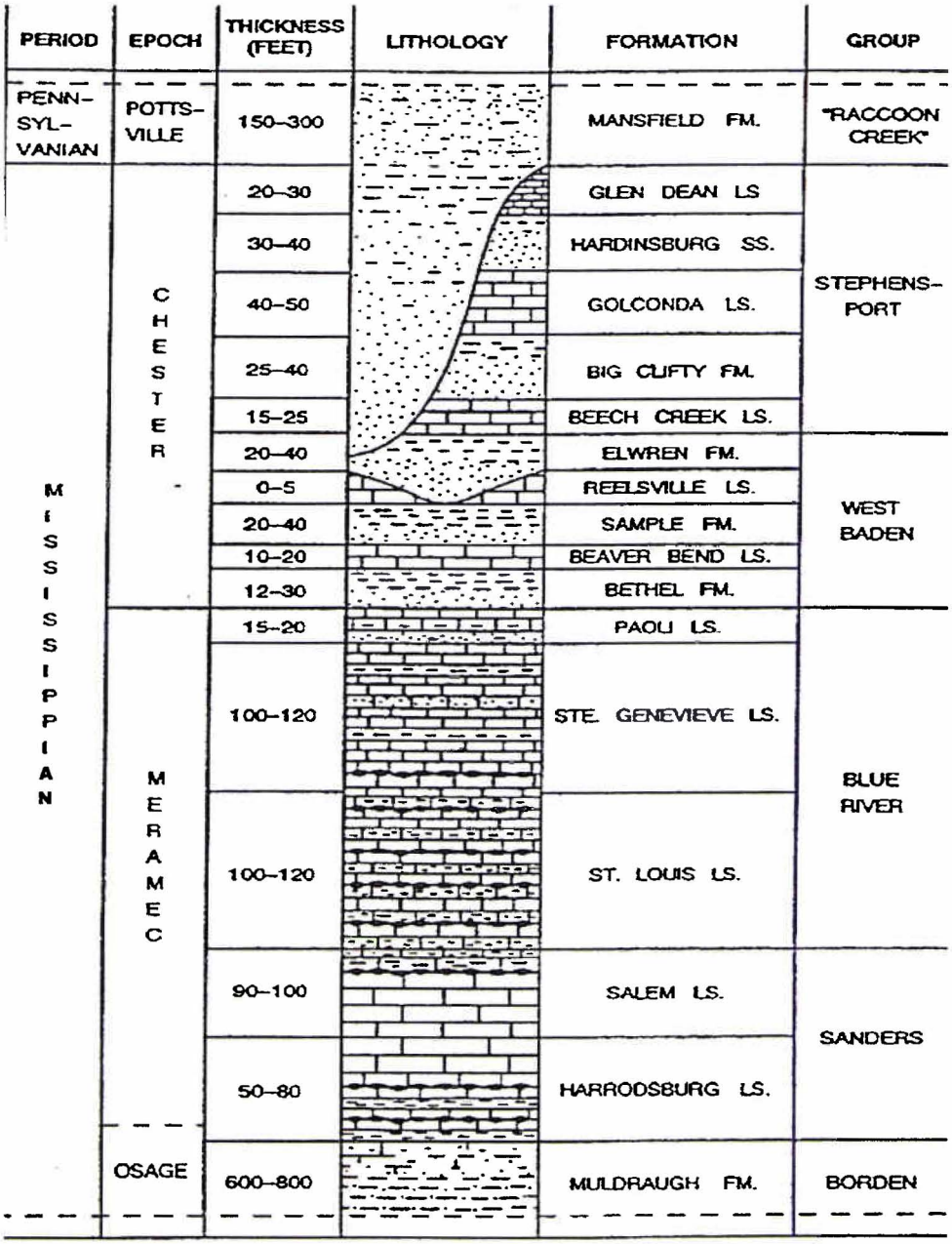
DATA SOURCE: INDIANAPOLIS, INDIANA AIRPORT

PERIOD OF RECORD: 1985–1989
43,824 OBSERVATIONS

DRAWN BY MF	DATE 1/31/06	FIVE-YEAR WIND ROSE SUMMARY FOR INDIANAPOLIS, INDIANA SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NO. 1245
CHECKED BY	DATE		OWNER NO. 0000
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-1 / REV. 0

NAVFAC

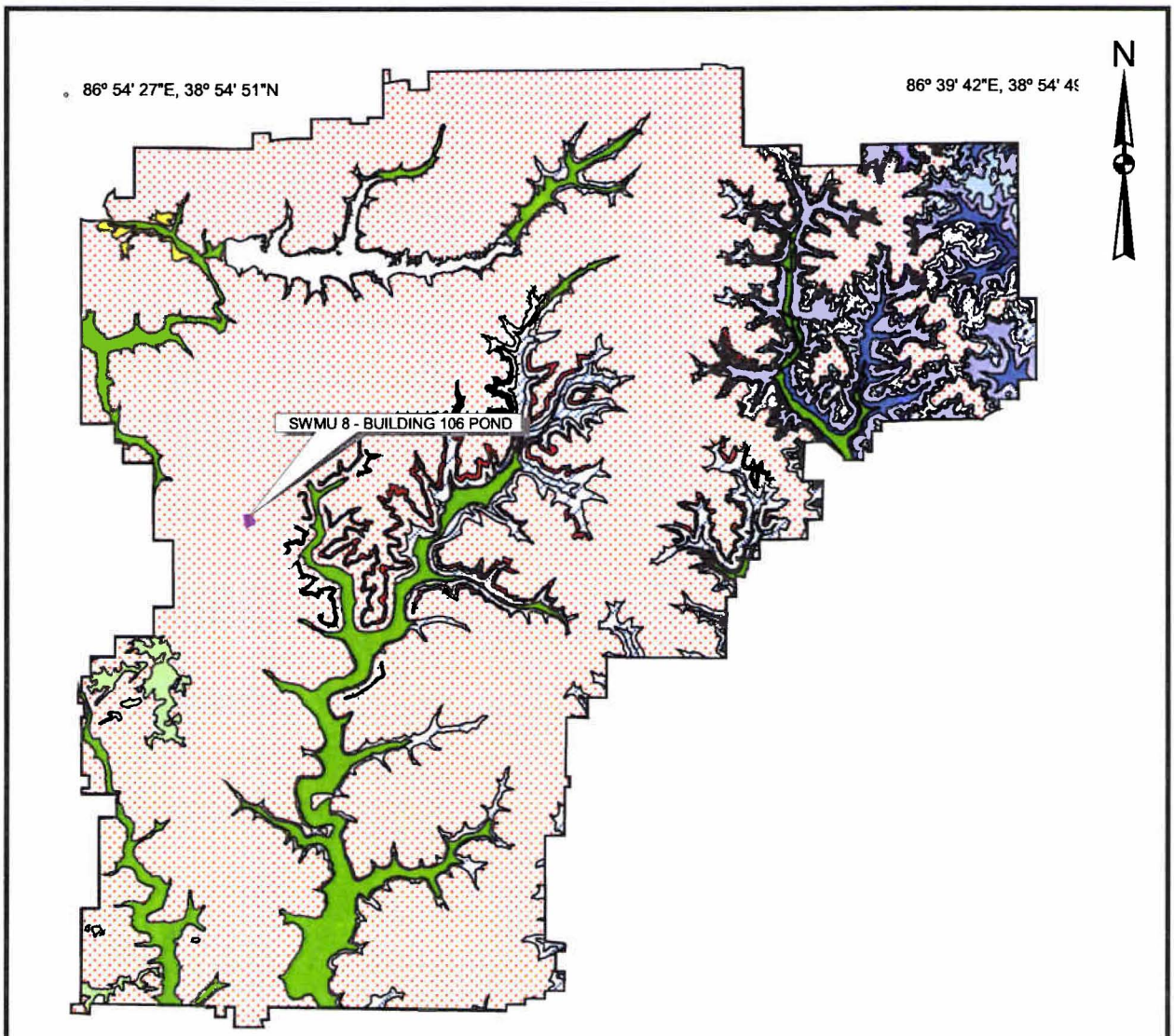
FORM CADD NO. SDIV-AV.DWG - REV 1 - 9/10/98



Source: Draft Report, RCRA Facility Investigation
Phase II Groundwater Release Assessment, SWMU 06/09
Demolition Area and Phase III Release
Characterization SWMU 07/09 Old Rifle Range
November 1995 - Figure 13
by William L. Murphy and Roy Wade

DRAWN BY K. PEILA	DATE 9/23/05	GENERALIZED STRATIGRAPHIC COLUMN SWMU 8 - BUILDING 106 POND NAVAL SURFACE WARFARE CENTER CRANE, INDIANA	CONTRACT NUMBER 1245	OWNER NO. CTO 0331
CHECKED BY J. SCHUBERT	DATE 9/23/05		APPROVED BY —	DATE —
COST/SCHEDULE-AREA			APPROVED BY —	DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 2	REV 0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\CRANE_REPORTFIGURES.APR STRATAGRAPHIC COLUMN 1245_SWMU08 2/20/06 KMP



Explanation of Geology

- Qal — *Alluvium*
- Ql — *Loess*
- Qo — *Glacial Outwash*
- P — *Raccoon Creek Group and undifferentiated*
- Ps — *Sandstone-dominated horizon of Lower Pennsylvanian*
- M6 — *Glenn Dean Ls, Hardinsburg Fm, Haney Ls, Indian Springs Shale Mbr, and undifferentiated*
- M5 — *Sandstone member of the Big Clifty Fm*
- M4 — *Beech Creek Ls*
- M3 — *Elwren Fm, Reelsville Ls, upper Sample Fm, and undifferentiated*
- M2 — *Lower part of Sample Fm, Beaver Bend Ls, Bethel Fm, and undifferentiated*
- M1 — *Paoli Ls, Ste Genevieve Ls, and undifferentiated*
- Select Solid Waste Management Units (SWMUs)

12000 0 12000 Feet

(Modified from Blunck, 1995)

DRAWN BY K. PEILA	DATE 2/23/06	SURFICIAL GEOLOGY MAP SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY J. SCHUBERT	DATE 2/23/06		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 3 / REV 0

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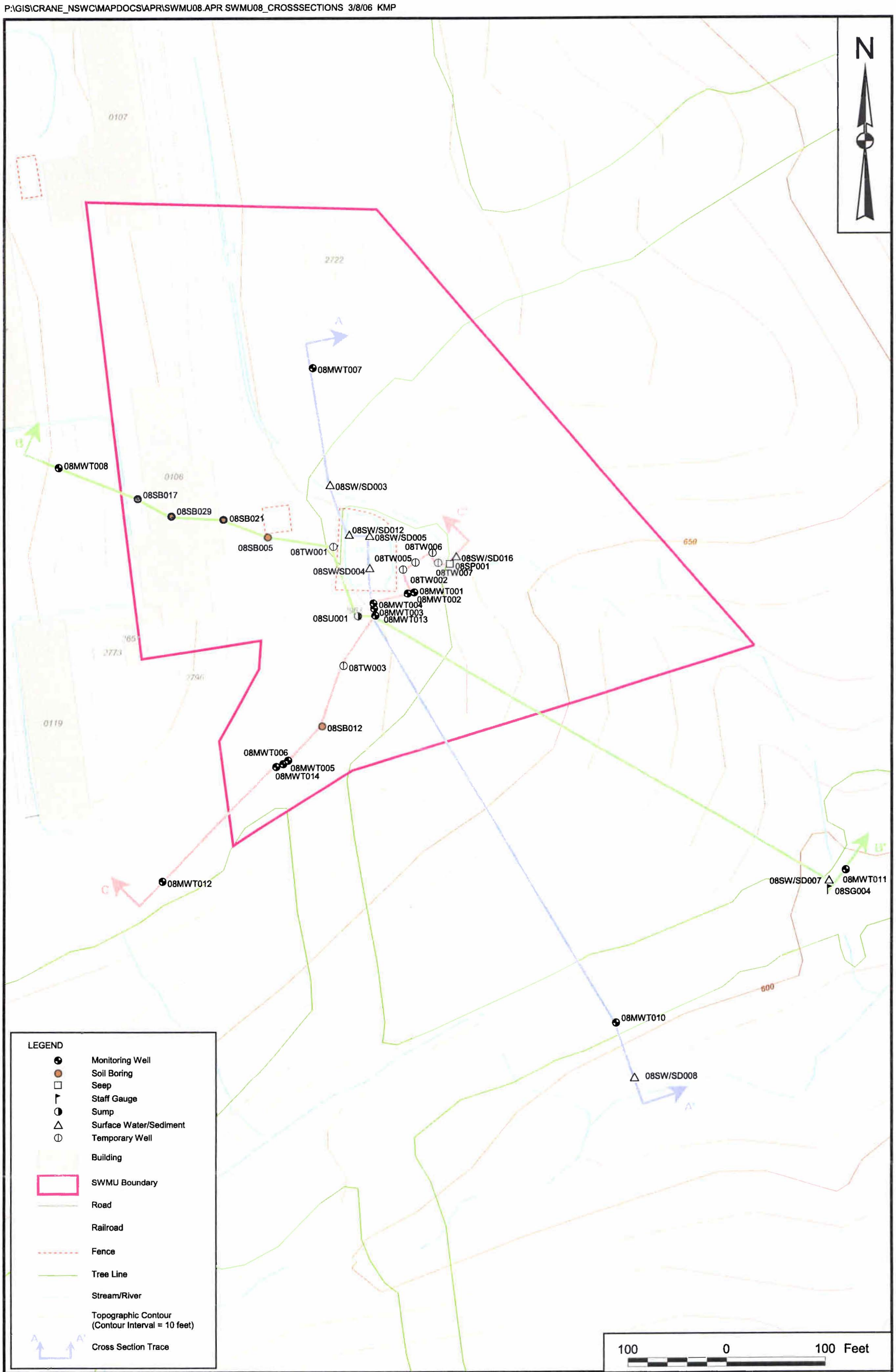
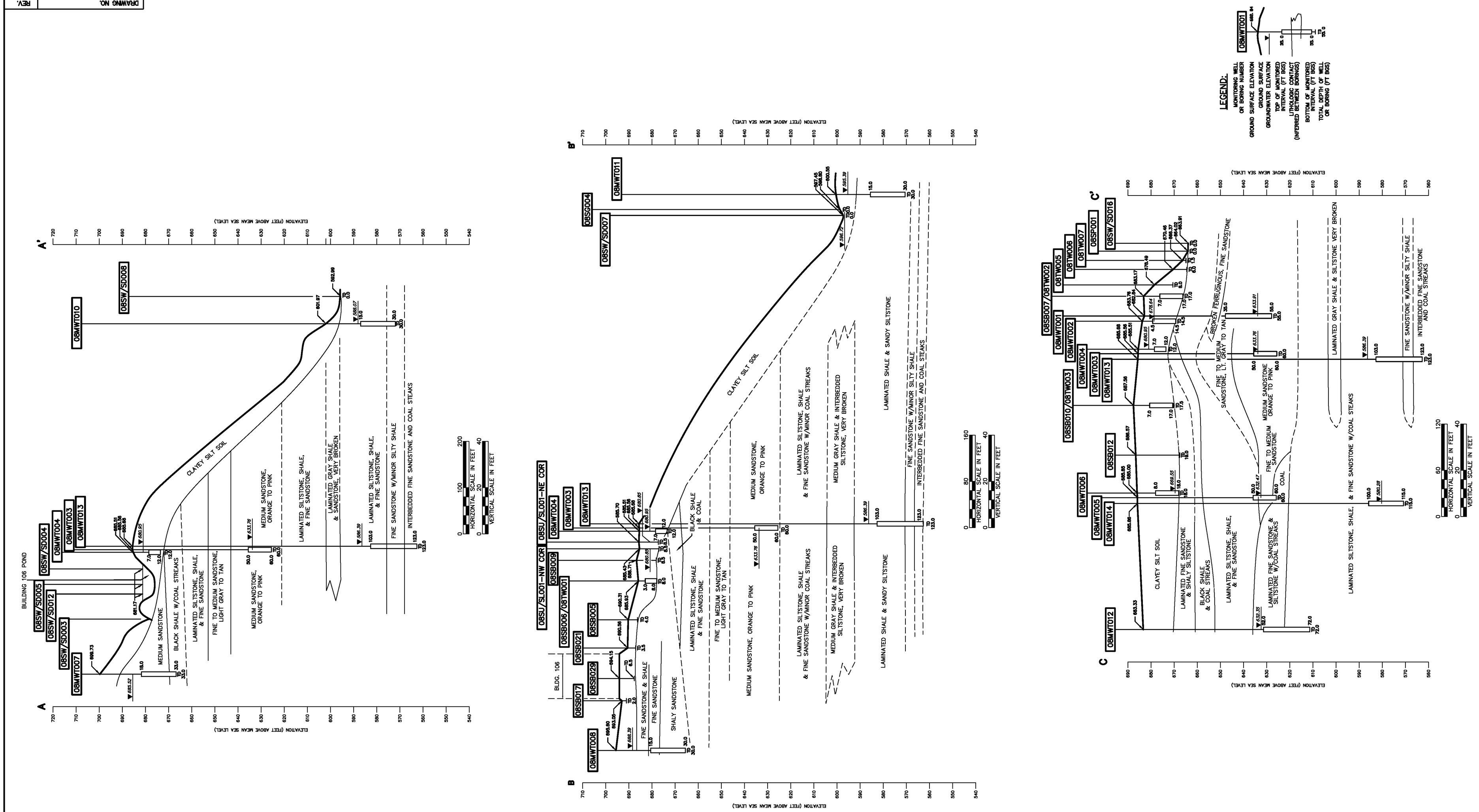


DRAWN BY	DATE			CONTRACT NUMBER
K. PEILA	3/7/06		LOCATION OF GEOLOGIC CROSS SECTIONS SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CTO 0331
CHECKED BY	DATE			APPROVED BY / DATE
J. SCHUBERT	3/7/06			— / —
COST/SCHEDULE-AREA				APPROVED BY / DATE
				— / —
SCALE		NAVFAC		DRAWING NO. FIGURE 4 - 4 / REV 0
AS NOTED				



DRAWN BY	DATE
MF	2/3/06
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	

Tetra Tech NUS, Inc.

GEOLOGIC CROSS SECTIONS A-A', B-B', & C-C'
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

CONTRACT NO. 1245
OWNER NO. 0000
APPROVED BY | DATE
DRAWING NO. FIGURE 4-5
REV. 0

FORM CADD NO. TTNUS-D-STD.DWG - REV 1 - 9/11/98

ACAD:1245GX01.dwg 07/28/06 MF PIT

DRAWING NO. FIGURE 4-5 REV. 0

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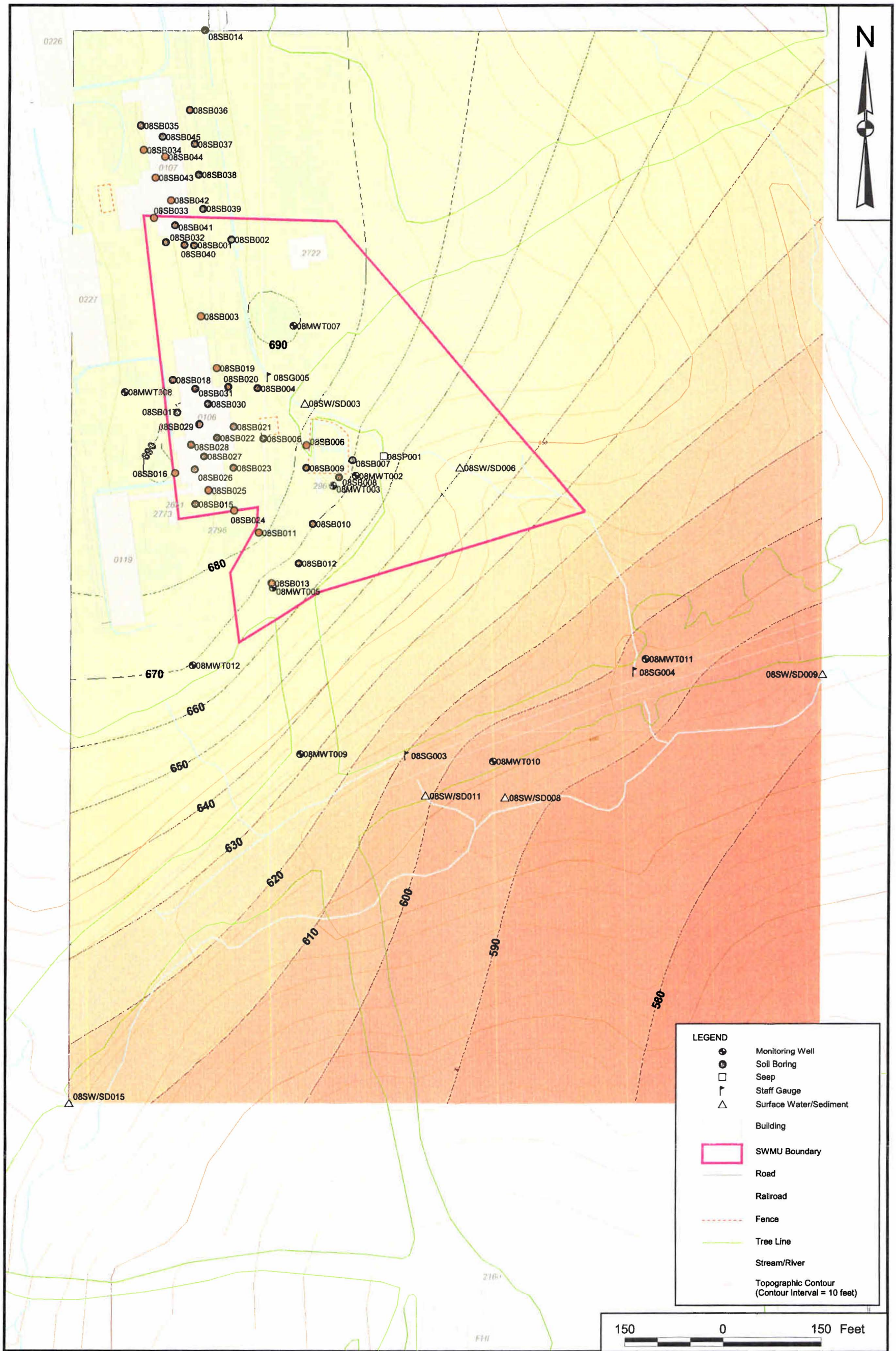

DRAWN BY K. PEILA	DATE 2/23/06	BEDROCK SURFACE ELEVATION MAP SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY J. SCHUBERT	DATE 2/23/06		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 6 REV 0

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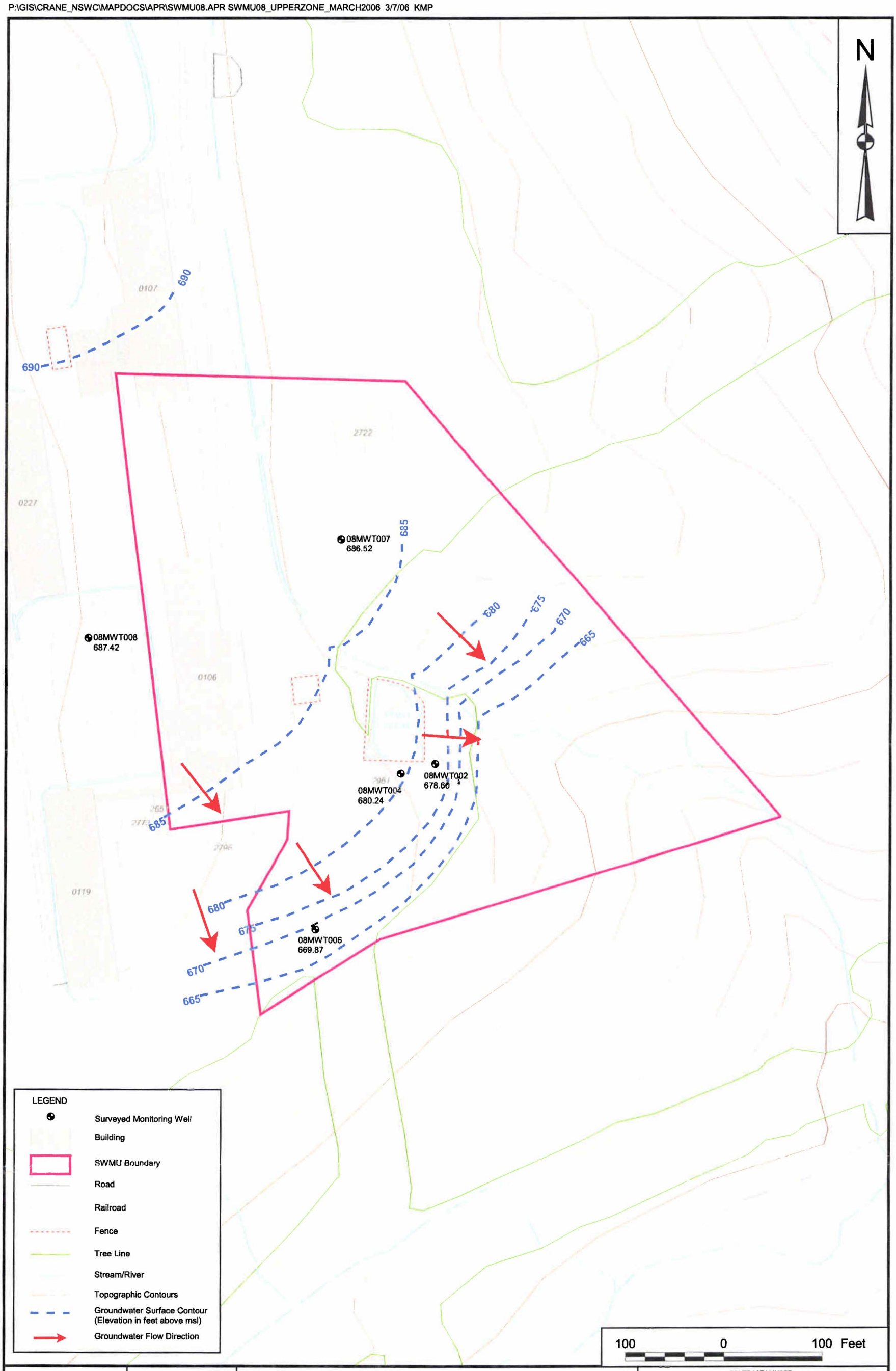

DRAWN BY K. PEILA	DATE 2/23/06	POTENTIOMETRIC SURFACE MAP FOR THE OVERBURDEN/UPPER PENNSYLVANIAN WATER-BEARING ZONE - MARCH 1, 2006 SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY J. SCHUBERT	DATE 2/23/06		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 7 REV 0

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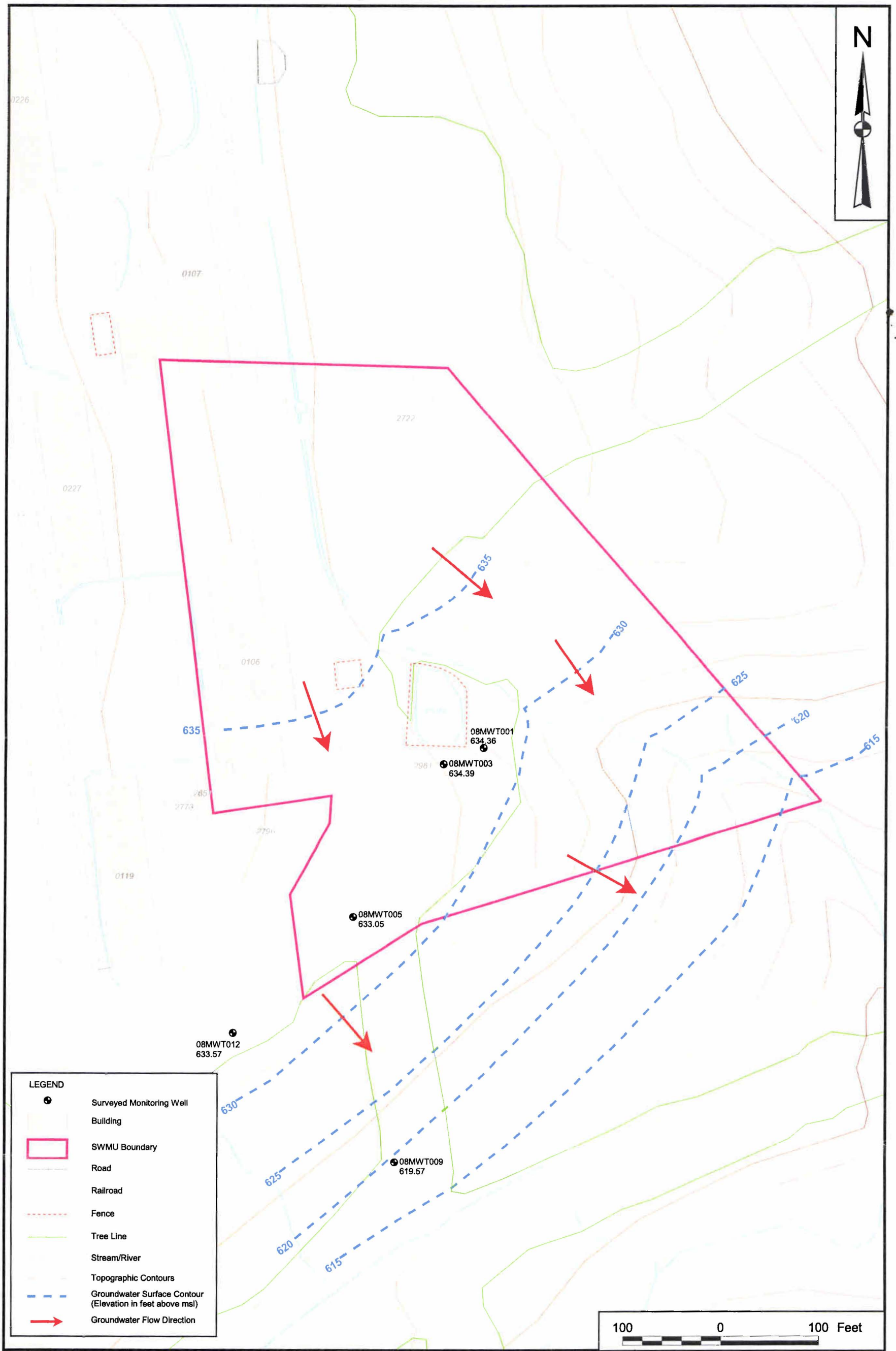

DRAWN BY K. PEILA	DATE 2/23/06	POTENTIOMETRIC SURFACE MAP FOR THE INTERMEDIATE PENNSYLVANIAN WATER-BEARING ZONE - MARCH 1, 2006 SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY J. SCHUBERT	DATE 2/23/06		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 4 - 8 / REV 0

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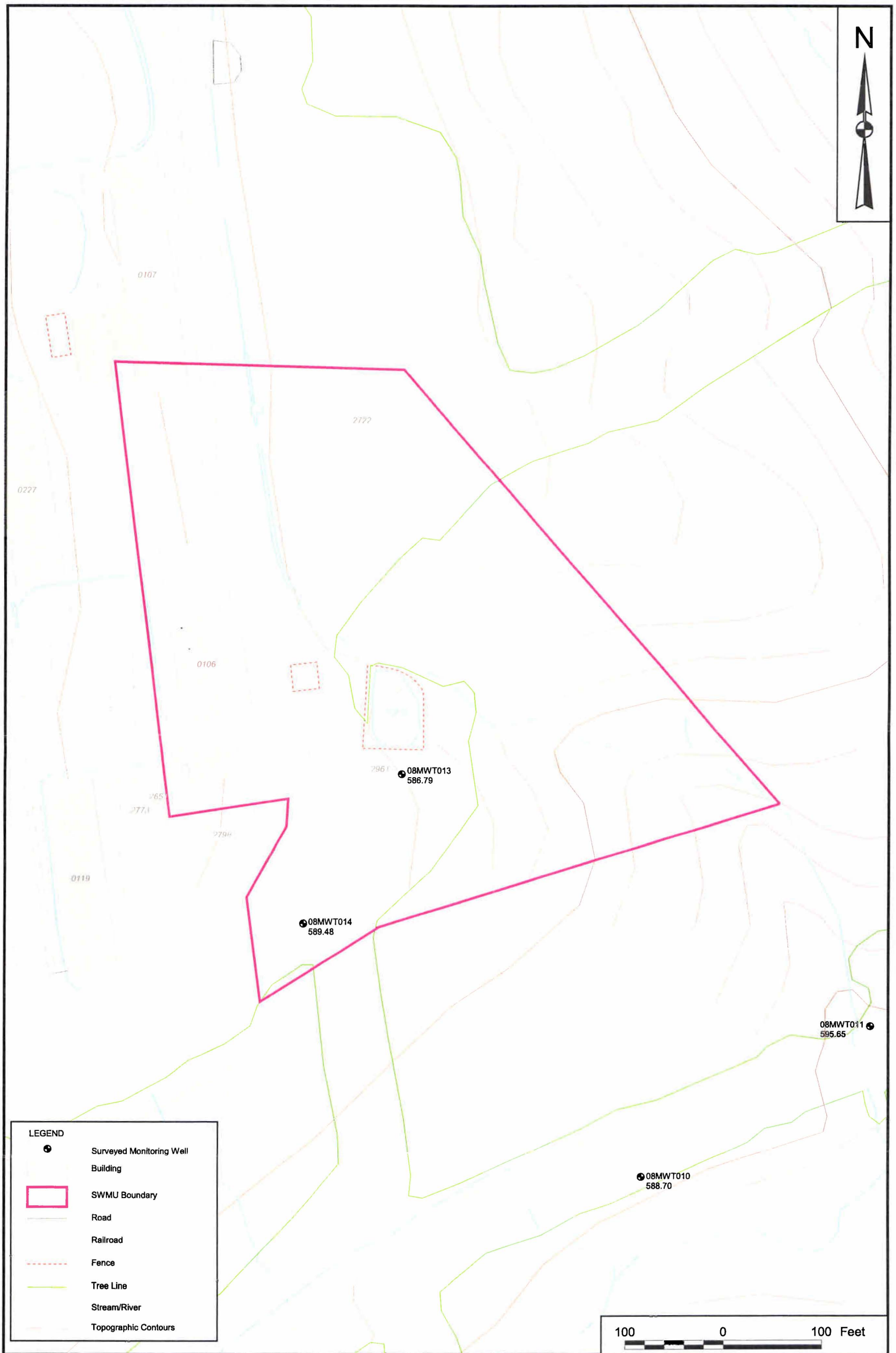


DRAWN BY K. PEILA	DATE 2/23/06	POTENTIOMETRIC SURFACE MAP FOR THE LOWER PENNSYLVANIAN WATER-BEARING ZONE - MARCH 1, 2006 SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY J. SCHUBERT	DATE 2/23/06		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 9 REV 0

FIGURE 4-10. GROUNDWATER ELEVATIONS IN MONITORING WELLS VERSUS WELL SCREEN ELEVATION

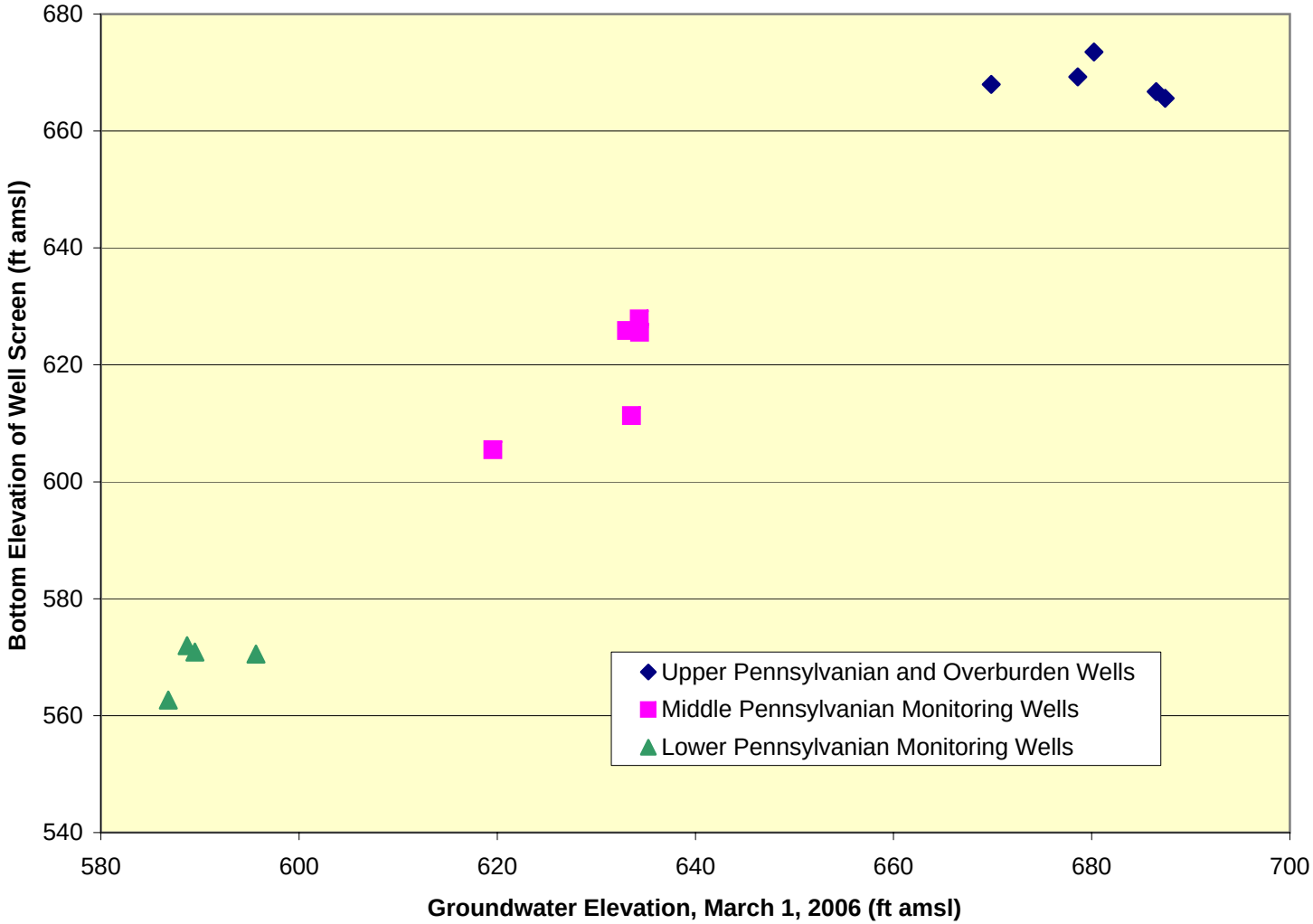
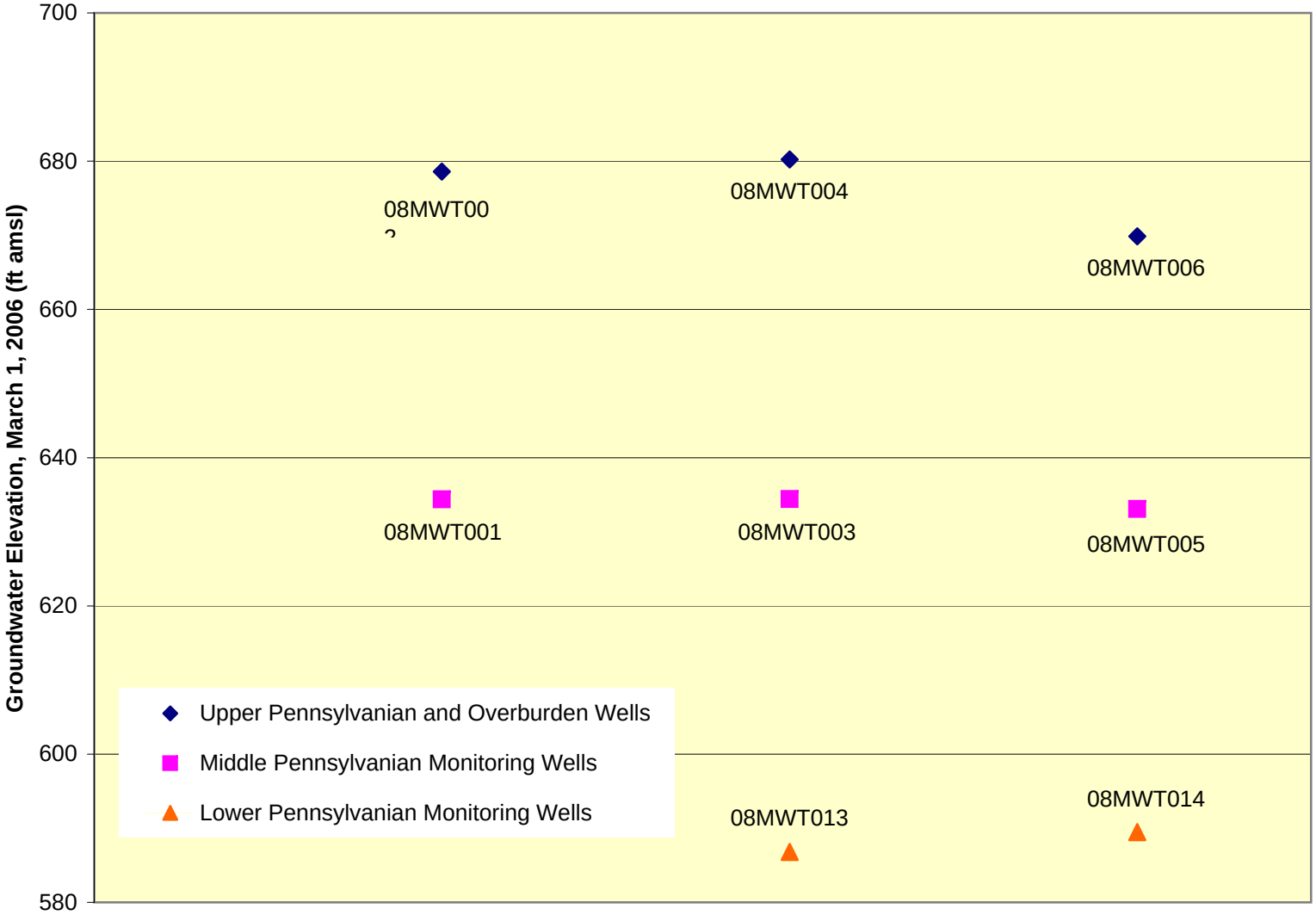


FIGURE 4-11. COMPARISON OF GROUNDWATER ELEVATIONS IN NESTED WELLS



5.0 NATURE AND EXTENT OF CONTAMINATION

This section describes the locations, spatial patterns, chemical forms, and concentrations of organic and inorganic chemical contaminants at SWMU 8. Where feasible, attempts were made to identify which chemicals appear to be site-related contaminants and which do not.

The range of analyses conducted during this RFI is documented in Section 2.0 and summarized in Table 2-3. Data summary tables are presented in Section 3.0 of this report. Tables 3-1 through 3-4 present NSWC base-wide background data for metals in soils similar to those found at SWMU 8. Tables 3-5 through 3-40 present data summaries for RFI samples collected at SWMU 8. A complete data set for the RFI is presented in Appendix G (Tables G-1 through G-4). Some surface water and sediment locations could not be sampled during all rounds. These locations are marked as “DRY” on Figure 5-1, and the reasons for not collecting samples at these locations are described in Section 2.0. On Figures 5-2 “NS” is used to identify planned sampling locations were sediment was not available to be sampled. On Figure 5-3 and 5-4, “REF” is used to identify soil sampling intervals where bedrock was shallower than the planned sampling interval, thus preventing sample collection.

SWMU 8 RFI data sets were subdivided into groups that reflect areas or similar environmental media with similar characteristics. These groups are described below and are identified in data tables, where appropriate.

Organic chemical contamination is defined for this RFI as chemicals whose concentrations exceed human health or ecological screening values (SVs) and therefore are considered to potentially result in unacceptable human health or ecological risks. Exceedances of SVs are highlighted in the data tables (Tables 3-5 through 3-40, as applicable). Because organic chemicals were assumed not to occur naturally, detections of organic compounds at SWMU 8 were generally considered to be site related unless the site history and observed concentrations or concentration patterns indicated that the contaminants are from non-site-related sources. For example, chemicals such as methylene chloride or acetone were often detectable and attributable to laboratory contamination. Other lesser used chemicals such as freons (chlorofluorocarbons), chloroform, and xylenes may also fit this description, depending on the laboratory and time period in which samples were analyzed. Laboratory contamination is often indicated by low concentrations of a chemical in field blanks or laboratory blanks and in multiple samples, regardless of the origin of the samples. When present as a laboratory contaminant, the concentrations of the contaminating chemical appear to be relatively uniform in magnitude regardless of the location of the sample in which the contamination was reported. All organic target analyte concentrations were

measured using routine methods, except for pentachlorophenol and hexachlorophene. These two compounds were analyzed by an herbicide analytical method even though they are not herbicides, and they are discussed as herbicides in the text below because of this. The herbicide method was used to obtain lower detections limits than are achievable using the routine SVOC analytical method (SW-846 Method 8270C) for these compounds.

Metals contamination was also defined as an exceedance of SVs; however, consideration was given to the natural occurrence of metals in environmental media. Concentrations of metals that are within normal background or upgradient levels were not considered to represent site-related contamination, although they may be discussed for the sake of completeness. Background and upgradient data sets that are used for these evaluations are described in Section 5.1.

Multiple chemicals of environmental interest were detected in multiple areas of SWMU 8 at concentrations greater than SVs. The extent of contamination, however, is best described using representative chemicals whose extent encompasses that of other chemicals. This reduces the complications associated with trying to track multiple chemicals when all chemicals have similar distribution patterns. Therefore, emphasis was given to chemicals that:

- Exceed chemical of potential concern (COPC) SVs (described and evaluated further in Sections 7.0 and 8.0).
- Represent, based on chemical and physical properties, a particular group of chemicals (e.g., VOCs).
- Were detected multiple times and were generally pervasive, thus representing the greatest extent of contamination for similar chemicals.
- Were detected infrequently but at environmentally significant concentrations. This may occur, for example, when multiple analytes of similar behavior or origin are detected at a small number of locations but at elevated concentrations that are indicative of a chemical release or contamination pattern.
- May be used to show a connection or no connection among various environmental media.
- May be significant degradation (i.e., daughter) products that demonstrate changes in contaminant concentrations over time due to chemical or biochemical degradation.

- Ultimately were judged to adequately represent the nature and extent of similar contaminants at SWMU 8.

If the nature and extent of contamination could be easily described, figures were not generated and the contamination was described in text only.

5.1 BACKGROUND AND UPGRADIENT LOCATIONS

Each the background data set and how it was established is described below.

5.1.1 NSWC Crane Soil Background Data Set

Tables 3-1 through 3-4 present summary statistics for metal concentrations in the following soil categories:

- All Crane soils (a composite of nine different Soil Groups)
- Soil Group 3 - Alluvial, Mississippian, and Pennsylvanian surface soil
- Soil Group 8 - Pennsylvanian Subsurface Clay and Silt
- Soil Group 9 - Pennsylvanian Subsurface Sand

The background data for these soil groups were generated during the NSWC Crane basewide background soil investigation. Derivation of the Soil Groups is described in detail in the report for that investigation (TtNUS, 2001). Soil Groups 3, 8, and 9 represent all soil samples collected at SWMU 8. All SWMU 8 surface soil samples belong to Soil Group 3, and most of the subsurface soil samples belong to Soil Group 8. The SWMU 8 samples that belong to Soil Group 9 contain enough clay or silt that they are more appropriately characterized as a hybrid between Soil Groups 8 and 9. The background Soil Group 9 has just one value for each metal, even though multiple attempts were made during the background investigation to collect more than one soil sample from this group. Therefore, it is most appropriate to compare SWMU 8 subsurface soil samples to the Soil Group 8 background soil concentration data when evaluating whether the soils from SWMU 8 represent background concentrations.

Statistical comparisons were not made between background and SWMU 8 RFI metals concentrations for this investigation. However, NSWC Crane background soil data extracted from TtNUS (2001) were used to estimate whether the concentrations of chemicals observed in SWMU 8 soils represented site-related contamination or not. UTLs were used as points of comparison to demonstrate that one soil data set was

similar to another. The UTLs represent a numerical limit below which 95 percent of the reported concentrations would fall with 95 percent confidence if the soil data represent background concentrations.

5.1.2 SWMU 8 Surface Water and Sediment Upgradient Concentrations

Surface water and sediment samples were grouped into three categories: Pond, Tributaries, and Main Stream. These three groups represent surface water and sediments of significantly different character. The Pond group contains water that has collected in the Building 106 Pond from process effluent, overland runoff, and precipitation. This pond has the potential to influence the chemical composition of downgradient groundwater and subsurface soil. The Tributary group, consisting of four channels, represents the drainage channels least likely to contain water at any given time and that drain into the Main Stream, located east and south of SWMU 8. These channels are labeled as Tributaries 8-01, 8-02, 8-03, and 8-04 on Figures 5-1 through 5-4. Tributaries 8-02 and 8-03 are expected to exhibit the greatest influence from SWMU 8 operations because they are most immediately downgradient of the SWMU. Tributary 8-01 also could represent influence from the area west of SWMU 8; Tributary 8-04 could represent influence from the area north of SWMU 8. The Main Stream group represents the unnamed main stream channel located east and south of SWMU 8, and contains water more often than the tributaries. This group also represents potential influences from areas upgradient (southeast) of SWMU 8.

Within two of these groups, some locations identified on Figures 5-1 and 5-2 were designated as upgradient locations. Sample location 08SW/SD013 was chosen to represent upgradient surface water conditions for the tributaries; location 08SW/SD010 was chosen to represent upgradient conditions for the main stream. Two surface water samples (08SW01001 and 08SW01002) and one sediment sample (08SD010010006) were collected at location 08SW/SD010. One surface water sample (08SD01301) and one sediment sample (08SD013010006) were collected at location 08SW/SD013. The surface water sample was only of sufficient volume to support VOC analyses. No upgradient locations are available for the pond because it is a process effluent retention pond.

In addition to drainage channel surface water and sediment sampling, an attempt was made to collect water samples from four seeps and to collect water and sediment samples from select sumps. Two unfiltered water samples (08SP00201 and 08SP00202) and one filtered water sample (08SP00201-F) were collected during sampling rounds 1 and 2 from seep sampling location 08SP002. Other seeps could not be sampled for lack of water. One unfiltered (08SU00101) and one filtered (08SU00101-F) sump water sample were collected in sampling round 2 at sump sampling location 08SU001. The other sumps

were dry at the times of sampling. There was not enough sediment in the sumps to be collected for analysis during any sampling round.

Comparisons of site data to data from upgradient locations are discussed in the surface water and sediment sections, as applicable (Sections 5.3 and 5.4, respectively). The seep and sump data are generally discussed with the drainage channel data because of the few samples that could be collected from the seeps and sumps.

5.1.3 Groundwater Upgradient Locations

Groundwater for this project was collected as perched groundwater at the interface between the soil overburden and the bedrock interface and from bedrock geologic units. The perched water was collected from open soil borings. Groundwater samples were divided into three groups (groundwater overburden and shallow bedrock zone (OVERBURDEN or Puz); groundwater intermediate zone (INTERMEDIATE or Pmz); and groundwater deep zone (DEEP or Plz). These three groups represent site conditions. A fourth group (UPGRADIENT) represents upgradient conditions for all groundwater. The sole upgradient sample for comparison with all SWMU 8 groundwater samples was 08GWT00701 (refer to Figure 5-1).

5.2 SOIL CONTAMINATION

Explosives and Perchlorate – No perchlorate or explosive compounds were detected in soil samples. The analytical performance was within expectations; therefore, explosives and perchlorate are not discussed further for soils.

Fecal and Total Coliform Bacteria – No soil samples were analyzed for coliform bacteria.

Herbicides – A few surface and subsurface soil samples were analyzed for herbicides. No herbicides were detected; therefore, herbicides are not discussed further for soils.

Metals – Several metals concentrations exceeded human health and ecological SVs in surface soil samples across SWMU 8 (Tables 3-9 through 3-11). Subsurface soil metals concentrations also exceeded SVs, although only human health SVs apply in the case of subsurface soil. Building 107 surface and subsurface soils were not analyzed for metals because the primary interest in this area was VOCs.

Even though the metals concentrations in individual samples may have exceeded SVs, the concentrations generally were less than Soil Group 3 (surface soil) or Soil Group 8 (subsurface soil) background UTLs. This is an indication that, although greater than SVs, most of the reported concentrations are within normal background levels. Three metals exhibited significant exceptions to this general pattern and are discussed below.

Aluminum concentrations in SWMU 8 surface and subsurface soil samples were often on the high end or greater than the background range of aluminum concentrations. The greatest observed surface soil aluminum concentration was 28,200 milligrams per kilogram (mg/kg) and the greatest observed subsurface soil aluminum concentration was 31,500 mg/kg. The soil background UTLs for aluminum are 19,900 and 20,600 mg/kg, respectively. The high SWMU 8 values could be an indication of site-related contamination, or they could represent a local soil population with slightly greater aluminum concentrations than are seen across NSWC Crane. However, because the elevated concentrations were within approximately 50 percent of the UTL, they do not appear to be significant. Furthermore, the highest aluminum concentration (31,500 mg/kg in sample 08SB0050610) was associated with a sample that is not associated with the SWMU 8 process effluent. Aluminum concentrations also appear to be randomly distributed in a spatial sense whereby the area(s) of highest concentrations are not co-located.

The antimony concentration of 13.3 mg/kg in sample 08SB0070610 did not exceed its SV, but antimony concentrations this high are not common (Dragun, 1988). Sample 08SB0070610 was collected just south of the southwestern corner of the Building 106 Pond. The origin of the elevated antimony concentration could not be determined.

Surface samples 08SS0010002 and 08SS0090002 had lead concentrations of 31.1 and 28.8 mg/kg, respectively. These values are greater than the 27.0 mg/kg surface soil UTL and the 11.0 mg/kg ecological SV but not the 400 mg/kg human health SV. Some subsurface samples also had comparable ranges of lead concentrations, but the ecological SV does not apply to subsurface samples; therefore, there were no SV exceedances for lead in subsurface soils.

Because of the general conformance of SWMU 8 surface and subsurface soil metals concentrations to typical background levels, metals are not discussed further and do not appear to be significant site-related contaminants for soils.

Pesticides and PCBs – A few surface and subsurface soil samples were analyzed for pesticides and/or PCBs. No pesticides or PCBs were detected; therefore, these parameters are not discussed further for soils.

SVOCs – Thirteen of 14 surface soil samples were analyzed for SVOCs prior to October 2006, and select subsurface soil samples were analyzed for SVOCs, depending on the surface soil concentrations (see Table 2-3). In Round 4 (October 2006), seventeen subsurface soil samples and a field duplicate were analyzed for SVOCs but no SVOCs were detected. The detectable surface soil concentrations prior to 2006 were generally low, with a few exceedances of human health risk-based SVs. The exceedances of SVs were limited to select PAHs, with benzo(a)pyrene (BaP) being the most frequent chemical to exceed its SV. The greatest exceedance was observed in surface soil sample 08SS0050002 [site concentration of 560 micrograms per kilogram (µg/kg) versus SV of 62 µg/kg]. All other exceedances were within two times the human health SV. Sample 08SS0050002 was collected at the edge of asphalt pavement between Building 106 and the pond. Its proximity to asphalt may explain the elevated PAH concentrations because asphalt is rich in PAHs. The other exceedances were generally within 50 percent of the applicable human health SVs and less than ecological SVs. No samples were analyzed during Rounds 2 or 3 for SVOCs because of the generally low concentrations observed in Round 1. Because of the generally low concentrations and few SV exceedances, SVOCs are not considered to be significant site-related contaminants and are not discussed further for soils.

VOCs – 1,1,2-Trichlorethane (TCA) (in one sample), methylene chloride (in 20 samples), TCE (in 14 samples), 1,1-dichloroethene (in three samples), 1,2-dichloroethane (in one sample), vinyl chloride (in two samples), and benzene (in one sample) were the only VOCs that exceeded SVs at any surface or subsurface soil sampling location. Most of the SV exceedances occurred in subsurface soils near the pond or in samples collected from Buildings 106 and 107. The exceedances in these areas were also the greatest in magnitude. Figure 5-3 shows 1,1,1-TCA and TCE concentrations in SWMU 8 soil samples. Although acetone and methylene chloride are common laboratory contaminants, the concentrations of these chemicals exhibit a fairly consistent pattern of being greatest in the deepest interval sampled, to a maximum sampled depth of 13 feet bgs. This pattern of increasing concentration with depth is mirrored in other contaminant concentrations. The additional sampling conducted in Round 4 (October 2006) exhibited the same pattern of increasing acetone concentration with depth. The acetone data are presented in Figure 5-4. For sampling locations that had detectable levels of VOCs and were not associated with Building 107, the predominant vertical concentration pattern is an increase in VOC concentrations with depth or no trend or at all. At about 10 feet bgs, the VOC concentrations tend to increase most significantly to a multiple of two, three, or more of the 6- to 10-feet bgs interval. This modest VOC concentration increase occurs close to the depth of the bedrock-overburden interface. It may reflect migration of contaminants along the weathered bedrock-overburden interface, or it could reflect a contribution from soil moisture contaminated by groundwater flowing above the interface. For the Building 107 locations, the greater VOC concentrations tend to be in the shallow soils rather than in

deeper soils. Prior to Round 4, the greatest observed VOC concentration was 430 µg/kg TCE in sample 08SB0410002, located inside the southern end of Building 107. The highest observed contamination in the October 2006 sampling period was 3,900 µg/kg of total xylenes. This occurred at soil boring 08SB051, which was located about 70 feet south of Building 106. This same boring had detectable levels of acetone (55 µg/kg), benzene (1.5 µg/kg) cis-1,2-dichloroethene (1.9 µg/kg), ethylbenzene (440 µg/kg), and toluene (23 µg/kg). All other VOC concentrations were less than detection limits. Of the detected VOCs, all except the acetone and cis-1,2-dichloroethene are indicators of a gasoline release. October 2006 sampling results for total xylenes, ethylbenzene, and toluene are presented on Figure 5-4. All values are less than SVs. Individual bias indicators for these three compounds were as much as 51 percent low and each had a mean low bias of about 30 percent. If the results were to be adjusted for this percentage bias, the maximum observed total xylene concentration would be approximately equal to the 7,200 total xylene human health SV. There concentrations of ethylbenzene and toluene would be less than half of the SV in the worst case. Hence, the biases do not appear to affect decision making significantly.

Lateral concentration trends suggest Building 107 and the pond are the primary VOC contaminant sources for SWMU 8 soils. Concentrations are greatest in those areas and are generally lower in areas separating those VOC sources. Soil VOC contamination also was observed in the drum storage area, near sampling locations 08SB010 through 08SB013 prior to October 2006. Methylene chloride was the most frequently detected VOC in exceedance of SVs at those locations. The methylene chloride concentrations, however, are consistent with the concentrations sometimes observed for laboratory contamination, so it was not clear that the methylene chloride detections were site related. October 2006 sampling south of Building 106 did not yield detectable concentrations of methylene chloride. This is evidence that the methylene chloride observed earlier was laboratory contamination or at least that it did not originate from a source located near Building 106. Except for methylene chloride, 1,1-dichloroethene, 1,1,2-trichloroethane, benzene, and vinyl chloride were the only VOCs detected in excess of their SVs south or southeast of Building 106. These exceedances (see Table 3-18 and Figures 5-3 and 5-4) appear to be minor and the concentrations of these compounds did not exceed the SVs in Round 4. Acetone and 2-butanone concentrations increase with depth in the drum storage area and the presence of the ketones were interpreted to be an indication that a source of these compounds may exist immediately south of Building 106. The October sampling did not reveal any source of 2-butanone between Building 106 and the previous 2-butanone detections. Acetone was detected in this area. When viewed in total, the entire sampling pattern for pre-October 2006 to October 2006 sampling indicates that acetone concentrations increase from north to the south. The southeastern edge of the pattern (from 08SB057/TW013 to 08SB007/TW002 on Figure 5-3) has the highest acetone concentrations, in general. This pattern suggests a connection between the SWMU and the elevated acetone concentrations but no

source of acetone has been found. Because acetone concentrations are much less than the acetone human health and ecological SVs, the presence of acetone is not a significant concern.

VOC concentrations in solid matrices exhibited a slight to moderate low bias. Therefore, the exceedances of SVs described above are probably slightly greater than reported (refer to Section 3.0 and Appendix H). With this considered, a few more exceedances of criteria might be expected if no low bias were present, but the additional exceedances would be minor.

In summary, the only significant contaminants in soil are VOCs. Surface and subsurface soils are generally free of VOC concentrations that exceed SVs, except for methylene chloride and except for soils under Buildings 106 and 107 and near the pond. This type of spatial VOC distribution is consistent with site history. Soil boring 08SB041, located under Building 107, had the highest TCE concentration (430 µg/kg). BTEX compounds (benzene, ethylbenzene, toluene, and xylenes) were detected southeast of Building 106 but the release associated with those compounds is not connected with Building 106. Although the contamination in these areas is not bounded in all directions by samples with concentrations less than SVs, it is apparent that the major sources of soil contamination are known. Sample locations 08SB004, 08SB005, 08SB009, 08SB011, 08SB015, and 08SB025 are situated between the areas cited above as areas of contamination, and these five locations are almost free of VOCs in excess of SVs. Location 08SB009 is on the upgradient (west) side of the pond. Soil samples (08SB006, 08SB007, and 08SB008) on the downgradient side of the pond are more contaminated. Building 106 and the area south of this building are eliminated as sources of 2-butanone contamination observed in the pre-2006 sampling. Acetone cannot be ruled out as having been released at SWMU 8, but the observed concentrations of this compound are well below the acetone human health and ecological screening values. The pond is the primary source of soil VOC contamination. A source of the elevated 1,1,1-TCA in groundwater toward the southeast of this most recently sample area south of Building 106 was not found. Given the limited extent of 1,1,1-TCA contamination in excess of SVs, continued searching is warranted.

5.3 SURFACE WATER CONTAMINATION

Seep and sump water samples were grouped with the Tributary sample group and are discussed in this section because there were not enough of these types of samples to warrant separate discussions.

Explosives and Perchlorate – Eight surface water samples were analyzed for 14 nitroaromatic/nitramine explosives and perchlorate ion. None of these chemicals were detected and analytical performance was acceptable; therefore, these chemicals are not discussed further for surface water.

Fecal and Total Coliform Bacteria – No fecal coliform analyses were conducted for surface water samples, including the seep and sump samples. A seep water sample (08SP00201), a sump water sample (08SU00201), and a duplicate of the sump sample (08SU00201-D) were collected during Round 2 and analyzed for total coliform. The total coliform counts were very high [greater than 2419.2 colony-forming units (CFU) per 100 mL]. The number of fecal CFUs included in those total coliform counts cannot be estimated; however, based on groundwater contamination results, it is likely that fecal coliform bacteria have migrated to the stream channels, either via groundwater or overland runoff. Because the sewer break that caused the release of fecal coliform bacteria has been repaired, this is not viewed to be a significant problem.

Herbicides and Pesticides – No surface water samples were analyzed for herbicides or pesticides.

Metals – Several metals concentrations in Tributary surface water samples exceeded the single upgradient concentration and SVs. A comparison of the total and dissolved metals concentrations at those locations indicates that the majority of the metals concentrations are associated with suspended matter (see Table 3-25). The greatest number of SV exceedances and the exceedances of greatest magnitude occurred in the seep sample. Except for this sample, the metals concentrations were comparable throughout the tributary system for the locations that had enough water to be sampled. For the Main Stream system, metals concentrations are also consistent, and downgradient concentrations are generally less than or comparable to upgradient concentrations. Therefore, metals in Tributary and Main Stream samples appear to reflect natural conditions, and metals do not appear to be significant site-related contaminants for SWMU 8 Tributaries and Main Streams samples.

Many metals concentrations in the Building 106 Pond were elevated relative to SVs, and the observed concentrations appear to reflect contamination from SWMU 8-related processes. Location 08SW/SD012 was generally the most contaminated (see Table 3-24). This location is at the outfall pipe that discharges into the pond; hence, it represents building effluent prior to dilution in the pond. It is not known whether some of the metals concentrations reflect process effluent alone or a combination of process effluent and, for example, corrosion products from the plumbing.

The majority of metals contamination within the pond is associated with suspended solids for the following metals: aluminum, arsenic, chromium, cobalt, copper, iron, lead, tin, vanadium, and zinc. This is evident because, when the total metals concentration is at least four times the detection limit, the total metals concentrations are typically more than two times the dissolved metals concentration (see Tables 3-24 through 3-26). Manganese is a borderline case for which about half of the samples have a total

manganese concentration greater than the dissolved manganese concentration. For surface water samples outside of the pond, many more metals concentrations are near the detection limits and this pattern is not so clear.

In summary, the only significant site-related metals contamination in surface water is associated with, and confined to, the Building 106 Pond.

PCBs – Four surface water samples were analyzed for PCBs. No PCBs were detected, and analytical performance was acceptable; therefore they are concluded not to be site-related surface water contaminants and are not discussed further.

SVOCs – Twenty-two surface water samples (and two field duplicates), the seep water at 08SP02, and the sump water sample (08SU00101) were analyzed for SVOCs including PAHs and 1,4-dioxane. Several SVOC results were rejected because of poor analytical performance, but the rejected values were generally for parameters that are not significant based on the observed contamination patterns. The rejected parameters are listed in Table H-3. The reported SVOC results are generally biased low. SVOCs that were present at two to three times detection limits, however, should have been generally detectable. Perhaps in some cases, the contaminant would have to have been present at concentrations as high as 10 times the detection limit to have been detected. None of the detected concentrations exceeded human health SVs, and very few SVOC concentrations exceeded ecological SVs (see Tables 3-24, 3-25, and 3-26). This is also true of surface water PAHs in the Building 106 Pond, where sediment PAH concentrations, described in Section 5.4, were high. The few exceedances only slightly exceeded ecological SVs. The high organic carbon content of the pond sediments appears to adsorb the PAHs and prevents significant exchange with the surface water. Therefore, with one exception, SVOC contamination (including PAHs) is generally limited in extent and magnitude and is not discussed further for surface water. The exception is 1,4-dioxane (see Figure 5-1). This chemical was detected in groundwater as described in Section 5.5. Although there were few detections of 1,4-dioxane in surface water, it was detected inside the pond and in drainage channels. The highest concentrations were observed east of the Building 106 Pond, and some of the reported concentrations exceeded human health SVs (indicated by "[H]" on Figure 5-1). The origin of this chemical at SWMU 8 is unknown. It is known to be a stabilizer for 1,1,1-TCA formulations and 1,1,1-TCA was detected at this site, but its presence cannot be definitively linked to use of 1,1,1-TCA.

VOCs – Ketones, chlorinated ethanes, and chlorinated ethenes were the predominant VOC contaminants detected in surface water. The majority of contaminant mass is associated with the Building 106 Pond (see Figure 5-1, ketone data not plotted). None of the ketone detections exceeded SVs. Concentrations

of TCE and degradation products in the pond are in large excess of applicable SVs. Outside the pond, detections of VOCs in surface water were relatively sparse. TCE is the only VOC with concentrations outside the pond that exceeded human health SVs [1.4 microgram per Liter (µg/L)], and there were no exceedances of ecological SVs outside the pond. The human health SV exceedances were generally slight and infrequent, but there was one result of 34 µg/L in Tributary surface water sample 08SW00601. This location is directly east and downgradient of the Building 106 Pond and is likely influenced by groundwater discharge to the tributary. Although several surface water samples were not collected in one or more rounds because of dry drainage channels, the contamination pattern is not likely to have been altered if those samples could have been collected.

Seep 08SP002 was sampled two times (4.9 µg/L and 2 µg/L), and each time the TCE concentration exceeded the 1.4 µg/L human health SV. This seep is located approximately 300 feet south of the pond, and the reported concentrations appear to represent discharge of contaminated groundwater at the seep. In contrast, location 08SW/SD006, at which the maximum TCE concentration was detected, is located approximately 260 feet east of the pond. This tributary sampling location is at approximately the same topographical elevation as 08SP002. Based on these observations, contamination observed in drainage channels downgradient of the Building 106 Pond is a result of contaminated groundwater discharge to the channels. Groundwater contamination is described in more detail in Section 5.5.

The most downgradient Main Stream surface water sampling locations (08SW/SD014 and 08SW/SD021) were VOC free except for low-level detections of acetone in Round 3 (1.1 µg/L at 008SW/SD014 and 2.3 µg/L at 08SW/SD021). In Round 2, 08SW/SD14 was sampled and yielded no detectable acetone. The detected acetone concentrations did not exceed human health or ecological SVs; therefore, the surface water VOC contamination of significance is considered to be well bounded, with most contaminant mass associated with water from the Building 106 Pond.

As TCE degrades in a relatively reducing environment it forms cis-dichloroethene which, in turn, degrades into vinyl chloride. The presence of vinyl chloride in soil boring 08SB10 (2 µg/kg from 6 to 13 feet bgs), and in groundwater (21 µg/L) in the collocated temporary well 08TW003, is an indication that such degradation is likely to be occurring. Based on known site operations and the behavior of chemicals in the environment it is not likely that the vinyl chloride originated from any other source. The observed vinyl chloride concentration was approximately three times the screening value (0.67 µg/kg) for protection of groundwater from contaminants leaching out of soil. The total mass of vinyl chloride in soil, however, is evidently low because the observed concentrations are low and vinyl chloride was not detected in surrounding soil borings 08SB008, 08SB009, 08SB011 and 08SB013. Additional discussions concerning the fate and transport of chemicals in the environment can be found in Section 6.0.

5.4 SEDIMENT CONTAMINATION

Explosives and Perchlorate – Eleven samples were analyzed for 14 nitroaraomatic/nitramine explosives and perchlorate ion, but these chemicals were not detected. Analytical performance was acceptable; therefore, these chemicals are not discussed further for sediments.

Herbicides and Pesticides – No surface water samples were analyzed for herbicides or pesticides.

Metals – Metals concentrations in Tributary sediment samples were generally greater in the sample collected from Tributary 8-01 (refer to Figure 5-2) than from other samples. Exceedances of SVs were limited to the following metals in the Tributary 8-01 sample (08SD015010006): aluminum, arsenic, chromium, iron, manganese, nickel, and vanadium. The exceedances are highlighted in Table 3-31. The vanadium concentration (53.1 mg/kg) was comparable to and slightly less than the upgradient vanadium concentration (56.4 mg/kg); therefore, vanadium concentrations appear to reflect natural conditions. The aluminum concentration was also comparable to but about 50 percent greater than the upgradient concentration, and it falls within the normal range of surface soil aluminum concentrations (UTL = 19,900 mg/kg). Therefore, the aluminum concentrations are also concluded to reflect natural conditions. Arsenic and chromium concentrations (18.7 and 60.4, respectively) exceeded the UTLs for surface soils (11.83 and 28.7 mg/kg, respectively) and the upgradient concentrations (4.4 and 22.7 mg/kg, respectively in sample 08SD013010006). The chromium concentration exceeded the ecological SV (43.4 mg/kg) but not the human health SV (210 mg/kg); the arsenic concentration exceed the human health SV (0.39 mg/kg) and the ecological SV (9.79 mg/kg). Iron (71,900 mg/kg) and manganese (3,100 mg/kg) concentrations were high compared to the upgradient concentrations: 11,800 mg/kg and 290 mg/kg for iron and manganese, respectively. The iron concentrations also exceeded the surface soil UTL (37,400 mg/kg), but the manganese concentrations did not (UTL = 5,700 mg/kg); therefore, manganese concentrations appear to reflect natural conditions, and the iron appears to be elevated for an unknown reason. The samples from Tributary 8-02 had considerably lower concentrations of these and other metals, and the metals concentrations are more consistent with natural conditions as represented by surface soil UTLs and upgradient concentrations (refer to Tables 3-2 and 3-31). In conclusion, tributary samples generally reflect natural conditions, but concentrations of three metals (arsenic, chromium, and iron) in the Tributary 8-01 sample (08SD015010006) indicate a possible source of contamination west of SWMU 8 and probably not related to SWMU 8. The degree of contamination, however, is slight at the sampled location. Although metals concentrations were not measured in all tributaries, these limited results indicate that tributary channels are not likely to have received any significant contamination from SWMU 8 operations.

Several metals concentrations in the Main Stream channel exceeded human health and/or ecological SVs. However, except for the downgradient zinc concentration (59.3 mg/kg), all downgradient metals concentrations were less than upgradient concentrations. The upgradient zinc concentration was 56.7 mg/kg, which is comparable to the downgradient concentration. The downgradient and upgradient concentrations were also comparable to the surface soil UTLs for all metals except:

- Arsenic
- Beryllium
- Chromium
- Cobalt , iron, lead, manganese, nickel and vanadium in the upgradient sample only

Because the upgradient sample metals concentrations exceeded surface soil UTLs, its validity as a representative upgradient sample was questioned. However, the sampling location is well removed from SWMU 8 and it does appear to represent SWMU 8 upgradient Main Stream conditions. Therefore, SWMU 8 is concluded not to be contributing significant metals contamination to the main stream channel.

Metals concentrations were measured at Building 106 Pond location 08SW/SD012, the discharge point of the outfall pipe that transferred process effluent to the pond. This location represents chemical concentrations immediately prior to their dilution in the pond; therefore, it is considered to represent worst-case conditions. Although organic chemical contamination is high in the pond, this sediment location did not exhibit significant metals contamination. Because of this, metals contamination in the pond is not considered significant.

After considering the metals concentration distributions as described above and the relative magnitudes of upgradient/downgradient concentrations as well as surface soil UTLs, metals are concluded not to be significant site-related sediment contaminants.

PCBs – Four sediment samples were analyzed for PCBs. No PCBs were detected and analytical performance was acceptable; therefore, they are concluded not to be site-related sediment contaminants and are not discussed further for sediments.

SVOCs – Twenty-six sediment samples including two field duplicates were analyzed for SVOCs including PAHs. Table 5-1 shows detections of SVOCs in sediment. Sampling locations in the Building 106 Pond (08SW/SD004, 08SW/SD005, and 08SW/SD012) exhibited the greatest SVOC concentrations. PAHs,

3&4-methylphenol, and phthalates were the dominant SVOC contaminants in the sediments. If the pond samples are excluded from consideration, the remaining sediment samples exhibit sparsely distributed, low-level exceedances of ecological SVs (in samples 08SD009010006, 08SD001010006, 08SD001020006, 08SD002020006, and 08SD003020006), and an exceedance of the 62 µg/kg BaP human health SV in sample 08SD001010006 (69 µg/kg). Figure 5-2 presents concentrations of the representative SVOCs, BaP equivalent concentrations, and total PAH concentrations. The total BaP equivalent concentrations summarize the total PAH concentrations in terms of the equivalent toxicity of BaP. That is, the displayed BaP equivalent concentrations are the sum of all PAH concentrations after multiplying each PAH concentration by a factor that represents its toxicity relative to BaP. The result is a concentration that represents the same toxicity as the displayed concentration of BaP. The Total PAH concentrations (TPAH) shown on the figure represent the sum of all PAH concentrations, without computing the BaP equivalent. Total PAH concentrations less than detection limits are shown as ‘0 µg/L.

Figure 5-2 shows that the SVOC contamination of significance in sediments is limited to Building 106 Pond sediments. It also shows that the Tributary upgradient drainage channel sample (collected from location 08SW/SD001) is the only drainage channel sample with a BaP equivalent concentration that exceeds the human health SV of 62 µg/kg for BaP. The actual site concentrations of PAHs are likely to be as much as 50 percent greater than the reported concentrations because of the general slight to moderate low bias described in Section 3.0. If PAH concentrations are adjusted based on these biases, PAHs would still not be expected to be of significant concern for sediments.

VOCs –Nine sediment samples including two field duplicates were analyzed for VOCs. Table 5-2 shows detections of VOCs in sediments. Two samples (08SD006010006 and 08SD070010006) were Tributary samples and two samples (08SD008010006 and 08SD0090010006) were Main Stream samples. Five samples (08SD004010012, 08SD004011224, 08SD005010012, 08SD005011224, and 08SD012010006) were Pond samples. No VOCs were detected in any Tributary and/or Main Stream sediment samples. However, there were very high concentrations of VOCs in the Building 106 Pond sediments. For example, TCE concentrations were as high as 28,700,000 µg/kg, and 1,1,1-TCA concentrations were as high as 17,300,000 µg/kg, both at location 08SW/SD004. These concentrations are indicative of the presence of dense non-aqueous phase liquids (DNAPLs), especially when one considers that the greatest concentrations present in the pond are probably below the depths sampled. Consistent with the tendency of DNAPLs to migrate vertically downward, the greater concentrations were in the 1- to 2-foot sediment depth interval within the pond. It is not clear how much of the pond bottom contains DNAPLs. Based on these observations, the sediment VOC contamination at SWMU 8 is limited to Building 106 Pond sediments. The northern sediment samples may very well be contaminated from the February 7, 1994 release of 13,590 gallons (estimated) of fuel oil from the B115, 30,000 gallon above ground storage

tank. However, most of the F.O. escaped through a crack in the concrete in the bottom of the containment and found its way to a VCT which discharged to the hillside probably 100' away.

5.5 GROUNDWATER CONTAMINATION

Explosives and Perchlorate – Five groundwater samples including one field duplicate were analyzed for 14 nitroaromatic/nitramine parameters and perchlorate ion. There was a single detection of 4-amino-2,6-dinitrotouene and a single detection of octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazoline (HMX) in sample number 08GWTW002. Otherwise, explosives and perchlorate ion were not detected in groundwater. The groundwater sampling was biased to locations at which contamination was expected. The detected concentrations did not exceed human health or ecological SVs. Because of the lack of SV exceedances, the infrequent detections, and the low observed concentrations, the detected groundwater explosives contamination is concluded to be insignificant and is not discussed further.

Fecal and Total Coliform Bacteria – Six groundwater samples, including two field duplicates, were collected from temporary wells (08TW001, 08TW002, 08TW003, and 08TW004) during Round 1. These samples were analyzed for fecal coliform bacteria. No groundwater samples were analyzed for either fecal or total coliform bacteria in subsequent sampling rounds. The well containing the most fecal coliform (5 CFU per 100 mL) was 08TW001. This temporary well was closest to the sewer line break that occurred near the road running north to south along the sides of Buildings 106 and 107. The other temporary well samples had fecal coliform counts of 1 CFU/100 mL or less, and the counts decrease with distance from well 08TW001. It appears that the sewer line break infiltrated shallow groundwater across the sampled soil area of SWMU 8. Although surface water samples were not analyzed for fecal coliform bacteria, it is expected that fecal coliform bacteria have migrated into nearby stream channels via groundwater (see Section 5.3).

Herbicides – No groundwater samples were analyzed for herbicides.

Metals (Total and Dissolved) – Tables 3-36 (shallow bedrock and overburden or Puz), 3-37 (intermediate zone or Pmz), and 3-38 (deep zone or Plz) display total and dissolved concentrations for metals detected at least once in groundwater samples from the respective aquifers. There were several exceedances of SVs across SWMU 8, as indicated in the tables.

In general, metals concentrations in groundwater were similar to or less than upgradient metals concentrations except for the following metals and locations, which exceeded both the upgradient concentrations and the respective SVs.

- Aluminum in Puz permanent well 08MWT006 (68,200 µg/L); in Puz temporary wells 08TW001 (8,220 µg/L), 08TW002 (8,470 µg/L) and 08TW004 (3,370 µg/L); and in Plz well 08MWT011 (5,210 µg/L).

- Antimony in Puz temporary well 08TW002 (1.9 µg/L).

- Arsenic in Puz permanent wells 08MWT004 (10.3 µg/L) and 08MWT006 (26.4 µg/L) and Puz temporary wells 08TW001 (3.8 µg/L), 08TW002 (17.1 µg/L), 08TW003 (10.4 µg/L), and 08TW004 (3.7 µg/L).

- Barium in Puz permanent well 08MWT006 (589 µg/L).

- Beryllium in Puz permanent well 08MWT006 (6.1 µg/L).

- Cadmium in Puz permanent wells 08MWT002 (4.4 µg/L), 08MWT006 (2.8 µg/L) and in Puz temporary well 08TW004 (4.9 µg/L).

- Chromium in Puz permanent well 08MWT006 (34.9 µg/L) and Puz temporary wells 08TW001 (12.6 µg/L) and 08TW002 (31.6 µg/L).

- Cobalt in Puz temporary well 08TW004 (80 µg/L) and in Pmz permanent well 08MWT09 (306 µg/L).

- Iron in Puz permanent wells 08MWT004 (12,500 µg/L), and 08MWT006 (45,600 µg/L); in Puz temporary wells 08TW001 (12,400 µg/L) through 08TW004 (20,000 µg/L); in Pmz wells 08MWT005 (756 µg/L) and 08MWT009 (9,510 µg/L); and in Plz well 08MWT010 (13,400 µg/L).

- Lead in Puz permanent well 08MWT006 and in Puz temporary wells 08TW002 (112 µg/L) and 08TW004 (16.9 µg/L).

- Manganese in all groundwater samples (concentrations ranged from 73.6 µg/L in 08TW001 to 10,700 in 08MWT009).

- Nickel in Pmz wells 08MWT005 (223 µg/L) and 08MWT009 (820 µg/L).

- Thallium in Puz permanent well 08MWT006 (0.58 µg/L).

- Vanadium in Puz permanent well 08MWT006 (38.3 µg/L); in Puz temporary wells 08TW001 (22.2 µg/L), 08TW002 (27.2 µg/L), and 08TW004 (11.2 µg/L); and in Plz well 08MWT011 (10.9 µg/L).

Although not in excess of its SV, the zinc concentration appeared to be elevated in Puz permanent well 08MWT006 (871 µg/L), in Puz temporary well 08TW004 (819 µg/L), and in Pmz wells 08MWT005 (134 µg/L) and 08MWT009 (310 µg/L).

Aluminum, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, mercury, tin, vanadium, and zinc groundwater concentrations appear to be predominantly associated with the suspended matter. This is evident because, when detected at concentrations more than four times detection limits, total metals concentration is generally more than two times dissolved metals concentration, or the metal is detectable in the unfiltered sample (total metals) but not in the filtered sample (dissolved metals). When the detections are close to detection limits, the increased analytical uncertainty renders these comparisons less valid and less conclusive. In some cases, the increased uncertainty causes the dissolved metals concentrations to appear to be greater than the total metals concentrations. This is a theoretical and practical impossibility and is considered to be an indication that the detection limits are not as low as were reported. The only metal affected this way in more than two samples was nickel, and all such occurrences were at concentrations near detection limits.

The metals contamination in groundwater is not bounded relative to SVs or upgradient concentrations.

Pesticides/PCBs – No groundwater samples were analyzed for pesticides or PCBs.

SVOCs – Thirty-two groundwater samples, including two field duplicates, were collected from temporary and permanent wells during the first three sampling events and the samples were analyzed for SVOCs, including 1,4-dioxane. The first four temporary wells installed were sampled only during the first sampling event (in December 2004/January 2005). Temporary wells 08TW005 and 08TW007, installed in the second sampling event in June 2005, did not produce enough water for sampling. Temporary well 08TW006, also installed and sampled during the second sampling event (in June 2005), went dry during sampling; but enough water was collected for SVOC and VOC analyses. Five overburden groundwater samples were collected from temporary wells installed in Round 4 (October 2006). The most frequently detected SVOC during Rounds 1 through 3 was 1,4-dioxane. Table 5-3 shows SVOC detections as a function of well and seep location by sampling round. Exceedances of human health SVs are highlighted in the table; ecological SVs do not apply to groundwater. Figure 5-1 shows the 1,4-dioxane

concentrations in groundwater and surface water. No 1,4-dioxane was detected in any of the five groundwater samples collected in Round 4.

In Rounds 1 through 3, the concentrations of 1,4-dioxane ranged from not detected to 150 µg/L. The greatest 1,4-dioxane concentrations (130 µg/L to 150 µg/L) were consistently observed in permanent well 08MWT003 in June and October 2005 (Rounds 2 and 3). The next highest concentrations were observed in permanent wells 08MWT001 (approximately 25 feet east-southeast and downgradient of the pond), 08MWT005 (approximately 250 feet south-southwest and downgradient of the pond), and 08MWT011 (approximately 550 feet southeast and downgradient of the pond). Three (08MWT001, 08MWT003, and 08MWT0005) of these four wells are screened in the Puz, with tops of screens between 635 and 648 feet amsl. The top of screen in the fourth well (08MWT011) is approximately 586 feet amsl. In general, the most contaminated zone is the Pmz, with some indication of limited communication and transfer of contamination between this zone and the Plz. No 1,4-dioxane contamination was observed in Plz wells 08MWT10, 08MWT13, and 08MWT14, all of which have tops of screens between approximately 583 and 586 feet amsl. Several of the observed 1,4-dioxane detections are greater than the 6.1 µg/L human health SV.

Among the few other detected SVOCs, there was one exceedance of a human health SV. This slight exceedance was 22 µg/L of 3&4-methylphenol in sample 08GWTW002, which is 33 percent greater than the 18 µg/L human health SV. Therefore, 1,4-dioxane is concluded to be the only significant SVOC contamination associated with SWMU 8 groundwater.

The 1,4-dioxane contamination was detected in select Puz wells east and south of the pond. The greatest degree of 1,4-dioxane contamination, however, was detected east and immediately south of the Building 106 Pond in the Pmz wells. The 1,4-dioxane contamination extends into the deep water-bearing unit east of the pond and is therefore not bounded in the vertical direction. South of Building 106, no 1,4-dioxane was detected in the Plz well (08MWT014). The concentrations in the Puz well 08MWT11 were approximately seven times the 6.1 µg/L human health SV. Some 1,4-dioxane contamination was also evident south of Building 106, although the concentrations there were considerably less than in the area east of the pond.

The presence of 1,4,-dioxane south of Building 106 is an indication that there could be another contaminant source closer to Building 106 than the pond because the detected 1,4-dioxane in well 08MWT05 is sidegradient of the pond.

In summary, the only significant SVOC contaminant in groundwater is 1,4-dioxane. One source of this groundwater contamination is evidently the Building 106 Pond. Another source could be upgradient from well 08MWT05, which is sidegradient of the pond.

VOCs – Thirty-two groundwater samples, including two field duplicates, were collected from temporary and permanent wells in the pre-October 2006 sampling. These samples were analyzed for VOCs over the course of three field sampling events. In October 2006, five additional groundwater samples were collected from temporary wells at locations 08SB056/TW012, 08SB057/TW013, 08SB059/TW014, 08SB060/TW015, and 08SB062/TW017. Table 5-4 presents VOC detections (excluding field duplicates) arranged according to wells in which the detections were observed but also showing the results as a function of sampling round. Plz wells either had no detections or no exceedances of VOC SVs. In contrast, the temporary Puz wells and Pmz depth wells exhibited the greatest degree of VOC contamination. The most highly contaminated Puz wells are close to the Building 106 Pond. Chlorinated VOCs were the most frequently detected VOCs (see Figure 5-1). Several chlorinated VOCs, and petroleum-related compounds benzene and toluene were the only VOCs that exceeded SVs. However, benzene and toluene exceeded their respective SVs very slightly and are therefore not discussed further for groundwater.

There are multiple lines of evidence connecting the observed groundwater contamination to the pond as the primary contaminant source. The first line of evidence is that the dominant groundwater contaminants are chlorinated VOCs that are also found in the pond sediments in very high concentrations. Elevated concentrations of the ketones (2-butanone, acetone, and hexanone) were also detected near the pond in well 08TW002, but the concentrations were less than SVs. The second line of evidence is that there is a hydraulic connection between the groundwater upgradient of the pond, which flows through and underneath the pond, and the groundwater where chlorinated VOCs were detected. There were no VOC detections in the upgradient well, 08MWT007, although it is acknowledged that this well is screened in the Puz rather than the Pmz. The third line of evidence is that the wells close to the pond are the most contaminated with chlorinated VOCs. However, the permanent wells exhibit an increase in concentrations of 1,1,1-TCA (and related compounds) from the pond area to more downgradient locations. For example, 1,1,1-TCA concentrations increase from an average across sampling events of about 800 µg/L in wells 08MWT001 and 08MWT003 to about 3,000 µg/L in well 08MWT005 (about 200 feet south of the pond). The TCE concentration gradient decreases over this same distance from an average of about 4,600 µg/L (for wells 08MWT001 and 08MWT003) to about 2 µg/L at well 08MWT005. The TCE decrease is very pronounced over this distance, whereas the 1,1,1-TCA increase is less pronounced. The pond sediments (described in Section 5.4) exhibited very high concentrations of both

TCE and 1,1,1-TCA. Degradation products of 1,1,1-TCA (chlorinated ethanes) and TCE (chlorinated ethenes) were detected in groundwater and pond sediments.

Wells 08MWT006, 08MWT005, and 08MWT014 (about 200 feet south of the Building 106 Pond) have different relative concentrations of contaminants than wells east of the pond and wells immediately south of the pond. The relative concentrations of 1,1,1-TCA and TCE, in particular, are reversed relative to the eastern wells, especially in well 08MWT005 where the 1,1,1-TCA concentration is a thousand times greater than the TCE concentration. These three western wells are sidegradient of the Building 106 Pond, which means that the influence from the pond is physically limited. In addition, the ketone concentrations in the western wells were at detection limit levels or less. These observations suggested that a source of groundwater contamination other than the pond is present upgradient (i.e., northwest) of these three wells. The overburden groundwater samples collected in Round 4 (October 2006), however, exhibited few VOC detections (See Table 5-4) and the same is true of the soil samples (See Section 5.2). Chlorinated VOCs were detected in the temporary overburden wells located at the southeastern edge of the Round 4 sampling pattern south of Building 106, but not in wells to the west. No 1,4-dioxane (analyzed as an SVOC) was detected in any of these groundwater samples. Based on these observations, a source of the contamination in the southernmost sampled areas has not been found in the soil overburden. This means that the observed groundwater contamination may be associated with a subsurface released that is as yet unidentified or an old surface release that migrated to deeper depths. The SV exceedances are essentially limited to the eastern side of the site, where influence from pond-related contamination is known to have occurred.

A trace (0.6 µg/L) of benzene was detected in temporary well 08TW013 in Round 4. The distance between this location and the detection of benzene in soil boring 08SB051 is relatively large (over 150 feet) so it is not likely that the benzene detections are connected. The benzene concentrations were less than soil and groundwater SVs.

Based on these observations, the Building 106 pond is a major groundwater contaminant source of chlorinated VOCs, especially 1,1,1-TCA, 1,1,1-TCA degradation products, TCE, and TCE degradation products. A source of 1,1,1-TCA, 1,1,1-TCA degradation products, and ketones in the area south of Building 106 was not found. Soil sample contamination indicates a release of BTEX compounds at or near soil boring 08SB054 but no BTEX compounds were detected in the temporary well groundwater samples. This indicates that the BTEX release was a small release and is insignificant, especially when compared to the magnitude of the contamination associated with the Building 106 pond. Some groundwater samples could not be collected because there was no water available at the time of

sampling. This leaves some holes in the data set, but it also indicates that migration of contamination along the overburden-bedrock interface is sporadic in those areas.

5.6 EXTENT OF CONTAMINATION SUMMARY

The degree and extent of contamination at SWMU 8 is rather limited and reasonably well bounded. The primary contaminants are select chlorinated VOCs in pond sediments, pond water, and groundwater and 1,4-dioxane in groundwater. Groundwater contaminant concentrations suggest that a source of VOC and 1,4-dioxane contamination other than the Building 106 Pond may exist in the area immediately south of Building 106 but such a source was not found in soils. Based upon the extent of contamination observed in soils and groundwater, this contaminant source is smaller in magnitude than the Building 106 Pond contamination.

Several groundwater metals concentrations (listed in Section 5.5) exceeded SVs and upgradient concentrations, yet no link to SMWU 8 for the elevated metals concentrations was found. Slightly elevated concentrations of some metals were detected in the Building 106 Pond, but the elevated concentrations were not nearly as extreme as the chlorinated VOC concentrations. Metals in Tributary and Main Stream samples appear to reflect natural conditions, and metals do not appear to be significant site-related contaminants for SWMU 8 Tributaries and Main Stream. Surface water and sediment contamination are limited and well bounded. Location 08SW/SD006 had the overall greatest degree of surface water and sediment contamination. Some surface water and sediment locations were not sampled because of lack of water at the times of sampling or because it was not part of the sampling design. Nevertheless, the available data indicate that the surface water and sediment in drainage channels is relatively contaminant free and that the surface water and sediment in the Building 106 Pond are by far the most contaminated media at SWMU 8.

The greatest number of surface water SV exceedances for metals occurred in the seep sample (location 08SP002) located southwest of the Building 106 Pond. At the seep, groundwater is expressed as surface water. Except for this sample, metals concentrations were comparable throughout the tributary system for the locations that had enough water to be sampled. Counts of CFU for total coliform bacteria exceeded 2,400 units per 100 mL in surface water. Fecal coliform counts exceeded 5 CFU per 100 mL in groundwater. This was evidence of a sewer line break that was identified and repaired at about the same time as the RFI. Thus, the source of the fecal coliforms has been eliminated.

A comparison of metals concentrations from filtered and unfiltered surface water samples reveals that the majority of the following metals results are associated with the solid portion of the surface water:

aluminum, arsenic, chromium, cobalt, copper, iron, lead, tin, vanadium, and zinc. A similar comparison for groundwater reveals that the majority of the following metals results are associated with the solid portion of groundwater: aluminum, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, mercury, tin, vanadium, and zinc.

TABLE 5-1

SEMIVOLATILE ORGANIC CHEMICAL DETECTIONS IN SEDIMENT[1]
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	Round	Top Depth	HHSV	ESV	Location									
					08SW/SD001	08SW/SD002	08SW/SD003	08SW/SD004	08SW/SD005	08SW/SD007	08SW/SD008	08SW/SD009	08SW/SD012	08SW/SD013
2-METHYLNAPHTHALENE	1	0	5600	20.2	6.0			230	14.0			13.0		
		1	5600	20.2				230						
3&4-METHYLPHENOL	1	0	31000	52.4				1100						
		1	31000	52.4				1200						
	2	0	31000	52.4									280	
ACENAPHTHENE	1	0	370000	6.71					24.0					
		1	370000	6.71				120	6.0					
ACENAPHTHYLENE	1	0	370000	5.87	11.0				25.0					
ANTHRACENE	1	0	2200000	57.2	10.0									
BENZO(A)ANTHRACENE	1	0	620	108	51.0				74.0		9.0	12.0		
		1	620	108					21.0					
BENZO(A)PYRENE	1	0	62	150	69.0				94.0		10.0	10.0		
		1	62	150					18.0					
BENZO(B)FLUORANTHENE	1	0	620	10400	140				100		11.0	13.0		
BENZO(G,H,I)PERYLENE	1	0	50000	170	120				160		14.0	13.0		
		1	50000	170					28.0					
BENZO(K)FLUORANTHENE	1	0	6200	240	67.0				46.0		10.0	9.0		
BIS(2-ETHYLHEXYL)PHTHALATE	1	0	35000	182	680			6000	950			210		
		1	35000	182				35000	170					
	2	0	35000	182	250	630	240						1300	180
BUTYL BENZYL PHTHALATE	1	1	1200000	1970					210					
CHRYSENE	1	0	62000	166	100				140		11.0	12.0		
		1	62000	166					27.0					
DIBENZO(A,H)ANTHRACENE	1	0	62	33	20.0									
DI-N-BUTYL PHTHALATE	1	1	610000	1114				590						
	2	0	610000	1114		130							180	
FLUORANTHENE	1	0	230000	423	85.0				110		13.0	10.0		
		1	230000	423					26.0					
FLUORENE	1	0	270000	77.4					33.0					
		1	270000	77.4				130	5.0					
INDENO(1,2,3-CD)PYRENE	1	0	620	200	81.0				110		10.0	11.0		
		1	620	200					18.0					
ISOSAFROLE	1	0	NA	NA					250					
NAPHTHALENE	1	0	5600	176	8.0			240	20.0			6.0		
		1	5600	176				360	5.0					
PHENANTHRENE	1	0	230000	204	36.0	10.0		470	370		14.0			
		1	230000	204				2000	33.0					
PHENOL	1	1	1800000	49.1				650						
PYRENE	1	0	230000	195	210	8.0	6.0		180	7.0	25.0	18.0		
		1	230000	195					35.0					

1 - All concentrations are in µg/kg.
HHSV = Human health screening value.
ESV = Ecological screening value.

Shading indicates an exceedance of the HHSV or ESV.
NA - Not available.
Blank Spaces - Not detected or not analyzed.

TABLE 5-2

VOLATILE ORGANIC COMPOUND DETECTIONS IN SEDIMENT[1]
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	Round	Top Depth	HHSV	ESV	Location						
					08SW/SD004	08SW/SD005	08SW/SD006	08SW/SD007	08SW/SD008	08SW/SD009	08SW/SD012
1,1,1-TRICHLOROETHANE	1	0	1200000	213	6600000	178		2		2	
		1	1200000	213	17300000						
1,1-DICHLOROETHANE	1	0	51000	0.575	440000	200					
		1	51000	0.575	1100000	75					
	2	0	51000	0.575							5
1,1-DICHLOROETHENE	1	0	12000	19.4	320000	178					
		1	12000	19.4	1500000	14					
2-BUTANONE	2	0	2200000	42.4							870
4-METHYL-2-PENTANONE	2	0	530000	25.1							40
ACETONE	2	0	1400000	9.9							210
CARBON DISULFIDE	1	1	36000	23.9		14					
CHLOROETHANE	1	0	3000	NA	59880						
		1	3000	NA	45045						
	2	0	3000	NA							220
CIS-1,2-DICHLOROETHENE	1	0	4300	654	290000	9000					
		1	4300	654	390000	2300					
ETHYLBENZENE	2	0	400000	175							6
TOLUENE	1	0	520000	1220	59880	178					
		1	520000	1220	95000	15					
	2	0	520000	1220							27
TOTAL XYLENES	1	0	27000	433		550					
		1	27000	433		15					
	2	0	27000	433							35
TRANS-1,2-DICHLOROETHE	1	1	6900	654	51000	25					
TRICHLOROETHENE	1	0	710	112	5300000	24000	4	2	3		
		1	710	112	27800000	2100					
VINYL CHLORIDE	1	1	79	202		54					

1 - All concentrtion are in µg/kg.
HHSV = Human health screening value.
ESV = Ecological screening value.

Shading indicates an exceedance of the HHSV or ESV.
Blank spaces - Not detected or not analyzed.
NA - Not available.

TABLE 5-3

SEMIVOLATILE ORGANIC CHEMICAL DETECTIONS (EXCLUDING DUPLICATE FIELD SAMPLES) IN GROUNDWATER AND SEEP WATER, ARRANGED BY WELL AND SEEP LOCATION[1]
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Matrix	Parameter	Round	HHSV	Location and Water-Bearing Zone												
				08MWT001	08MWT002	08MWT003	08MWT004	08MWT005	08MWT006	08MWT009	08MWT011	08SP002	08TW002	08TW003	08TW004	08TW006
				Pmz	Puz	Pmz	Puz	Pmz	Puz	Pmz	Plz	Puz	Puz	Puz	Puz	Puz
GW	1,4-DIOXANE	1	6.1										64.0	3.0	8.0	
		2	6.1	110	35.0	150	4.0	21.0	3.0		44.0					6.0
		3	6.1	46.0	5.0	130	5.0	19.0	21.0	3.0	32.0					
	2,4-DIMETHYLPHENOL	1	73										2.0			
	2-METHYLNAPHTHALENE	1	0.62										0.1			
	3&4-METHYLPHENOL	1	18										22.0			
	FLUORANTHENE	1	150												0.1	
	FLUORENE	1	24										0.1			
	PHENANTHRENE	1	18										0.2		0.1	
	PHENOL	1	1100										2.0			
	PYRENE	1	18												0.1	
SP	1,4-DIOXANE	2	6.1									5.0				

All concentrations are in µg/L.

HHSV = Human health screening value.
Plz = Lower Pennsylvanian water-bearing zone.
Pmz = Middle Pennsylvanian water-bearing zone.
Puz = Upper Pennsylvanian or overburden water-bearing zone

Shading indicates an exceedance of the HHSV.
Blank spaces - Not detected or not analyzed.

TABLE 5-4

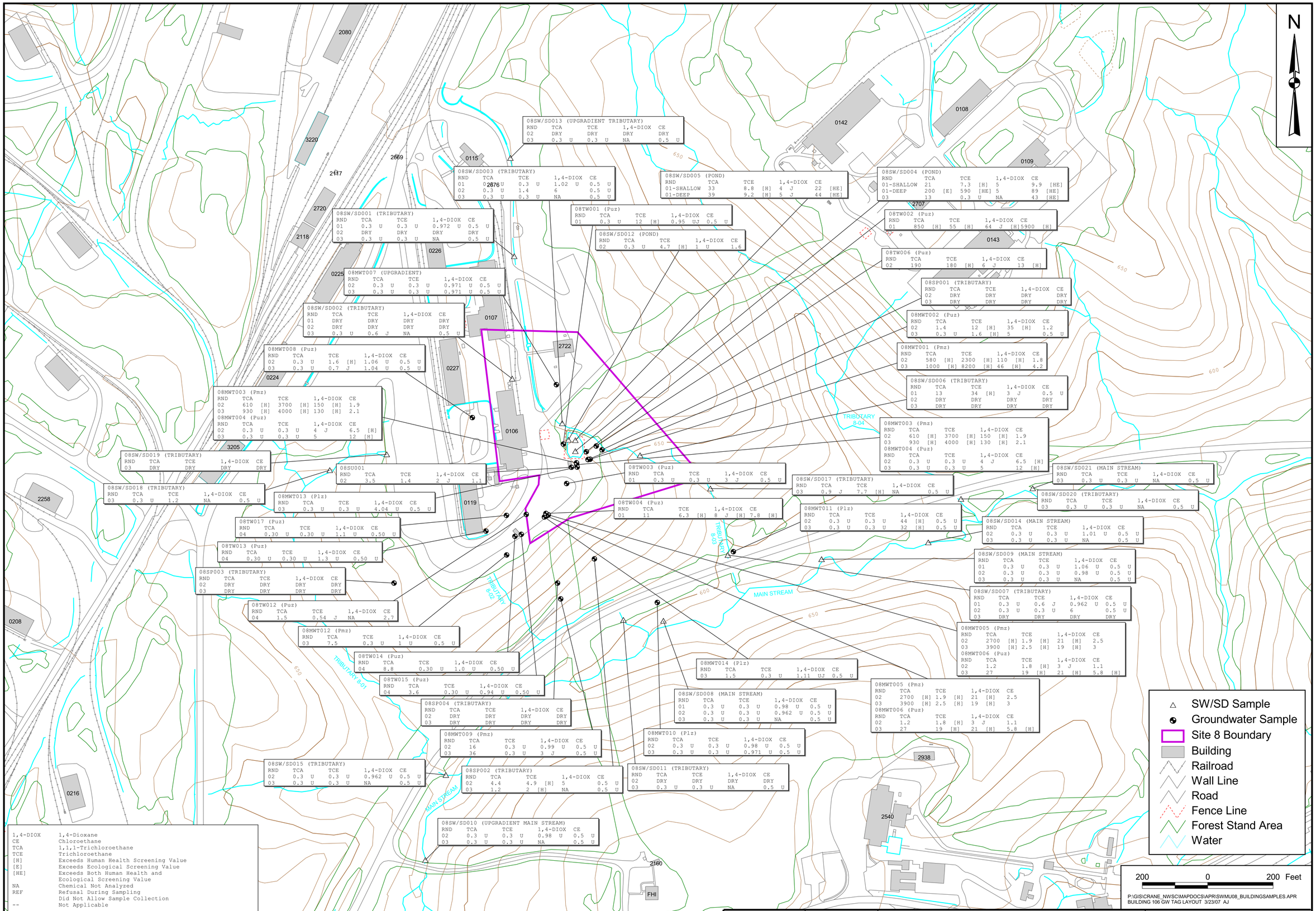
VOLATILE ORGANIC CHEMICAL DETECTIONS IN GROUNDWATER[1]
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Parameter	Round	HHSV	Location and Water-Bearing Zone																		
			08MWT001	08MWT002	08MWT003	08MWT004	08MWT005	08MWT006	08MWT008	08MWT009	08MWT012	08MWT013	08MWT014	08TW001	08TW002	08TW003	08TW004	08TW006	08TW012	08TW013	08TW014	08TW015
			Pmz	Puz	Pmz	Puz	Pmz	Puz	Puz	Pmz	Pmz	Plz	Plz	Puz	Puz	Puz	Puz	Puz	Puz	Puz	Puz	Puz
1,1,1-TRICHLOROETHANE	1	200													850		11.0					
	2	200	580	1.4	610		2700	1.2		16.0								190.0				
	3	200	1000		930		3900	27.0		36.0	7.5		1.5									
	4	200																	1.5		8.8	3.6
1,1,2-TRICHLOROETHANE	1	0.2													4.1							
	2	0.2	5.4		2.4		9.9															
	3	0.2	3.7		3.2		9.2															
1,1-DICHLOROETHANE	1	81													2500	1.3	89.0					
	2	81	260	27.0	200	30.0	240	11.0		4.0								97.0				
	3	81	450	2.9	330	7.2	340	89.0		8.8			0.9									
	4	81																	18		2.2	4.9
1,1-DICHLOROETHENE	1	7													200		18.0					
	2	7	370	4.2	550		1700	3.8		3.1								26.0				
	3	7	630		800		2600	29.0		5.5	1.6		0.8									
	4	7																	6.3			
1,2-DICHLOROETHANE	1	0.12													7.8							
	2	0.12	1.9		0.9		2.8															
	3	0.12	2.1		1.6		3.3															
2-BUTANONE	1	700													81.0							
2-HEXANONE	1	NA													1.8							
ACETONE	1	550													69.0							
	3	550					2.9		2.3			12.0	5.0									
	4	550																	7.1	12		
BENZENE	1	0.35													1.3		0.6					
	3	0.35						0.8														
CHLOROETHANE	1	4.6													5900		7.8					
	2	4.6	1.8	1.2	1.9	6.5	2.5	1.1										13.0				
	3	4.6	4.2		2.1	12.0	3.0	5.8														
	4	4.6																	2.7			
CHLOROFORM	2	0.17	2.0		1.2		0.8															
	3	0.17	1.8		1.1		0.9															
CIS-1,2-DICHLOROETHENE	1	6.1												1.1	380	5.5	1.1					
	2	6.1	120	20.0	120	5.8	8.1											250				
	3	6.1	300	1.8	110	0.9	9.0	1.8														
ETHYLBENZENE	1	130													0.8							
TETRACHLOROETHENE	2	0.1					0.8															
	3	0.1					1.4															
TOLUENE	1	72													87.0							
	2	72			0.5																	
TOTAL XYLENES	1	21													4.4							
TRANS-1,2-DICHLOROETHENE	1	12													15.0							
	2	12	1.7		1.4		11.0											0.9				
	3	12	1.8		1.9		14.0															
TRICHLOROETHENE	1	1.4												12.0	55.0		6.3					
	2	1.4	2300	12.0	3700		1.9	1.8	1.6									180				
	3	1.4	8200	1.6	4000		2.5	19.0	0.7													
	4	1.4																	0.54			
VINYL CHLORIDE	1	0.02													120	21.0	3.0					
	2	0.02	2.4	6.8	5.0	1.5	2.0															
	3	0.02	3.4		4.6		3.3	1.4														
	4	0.02																	0.72			

1 All concentrations are in µg/L. Validation qualifiers not shown.

HHSV = Human health risk-based screening value.
Plz = Lower Pennsylvanian water-bearing zone.
Pmz = Middle Pennsylvanian water-bearing zone.
Puz = Upper Pennsylvanian or overburden water-bearing zone.

Shading indicates an exceedance of the HHSV.



1,4-DIOX	1,4-Dioxane
CE	Chloroethane
TCA	1,1,1-Trichloroethane
TCE	Trichloroethane
[H]	Exceeds Human Health Screening Value
[E]	Exceeds Ecological Screening Value
[HE]	Exceeds Both Human Health and Ecological Screening Value
NA	Chemical Not Analyzed
REF	Refusal During Sampling
	Did Not Allow Sample Collection
--	Not Applicable

Screening Values

Chemical	Human Health	Ecological (1)
CE	4.6	--
TCA	97	29800
TCE	2.8	12400

Concentrations and screening values are reported in ug/kg.
1 Subsurface samples were not screened against ecological criteria

DRAWN BY	DATE
K. MOORE	3/19/07
CHECKED BY	DATE
J. GOERDT	3/23/07
COST/SCHEDULE-AREA	
SCALE	AS NOTED

NAVFAC

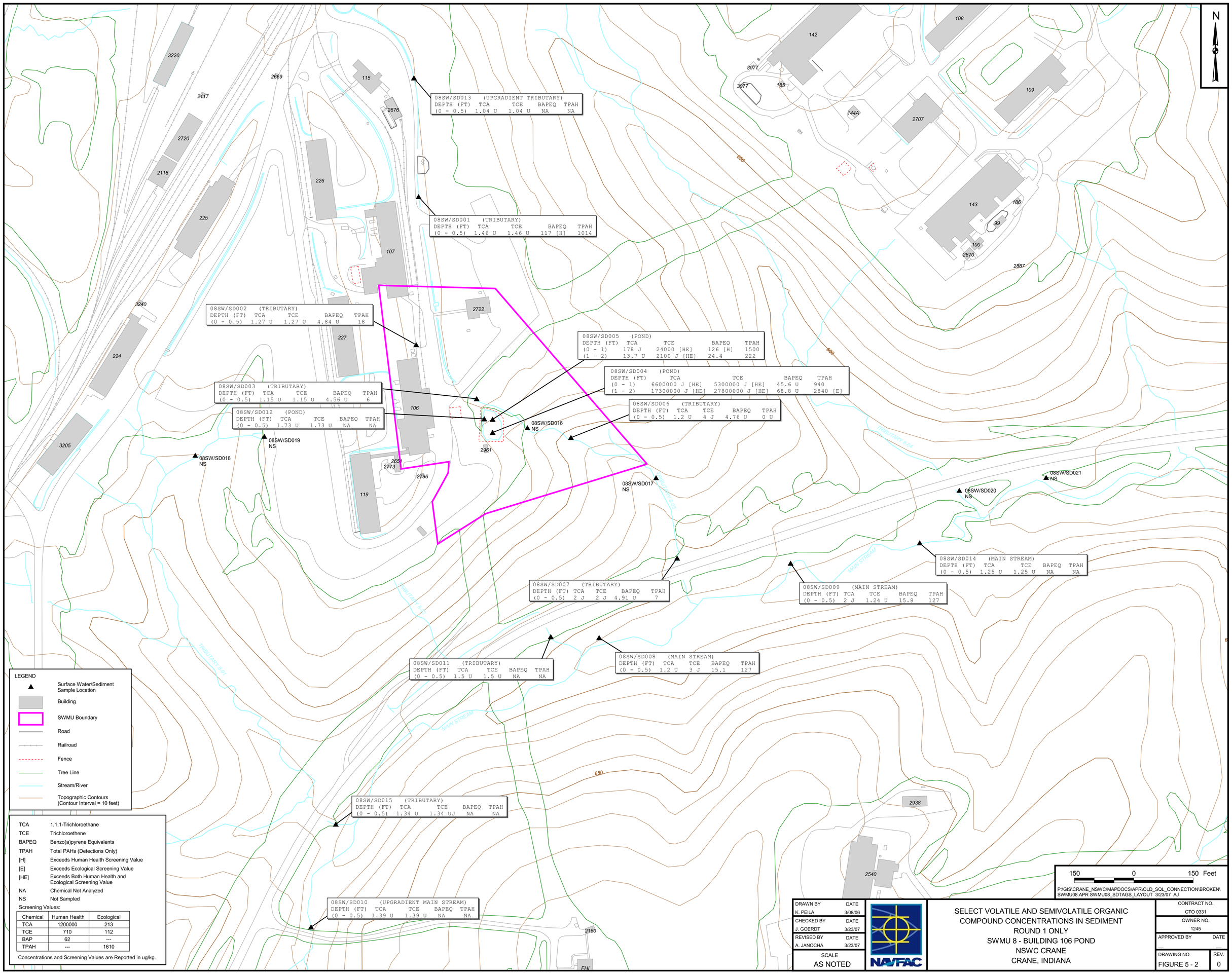
SELECT VOLATILE AND SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS (ug/L) IN GROUNDWATER AND SURFACE WATER
SWMU 8 - BUILDING 106 POND
NWSC CRANE
CRANE, INDIANA

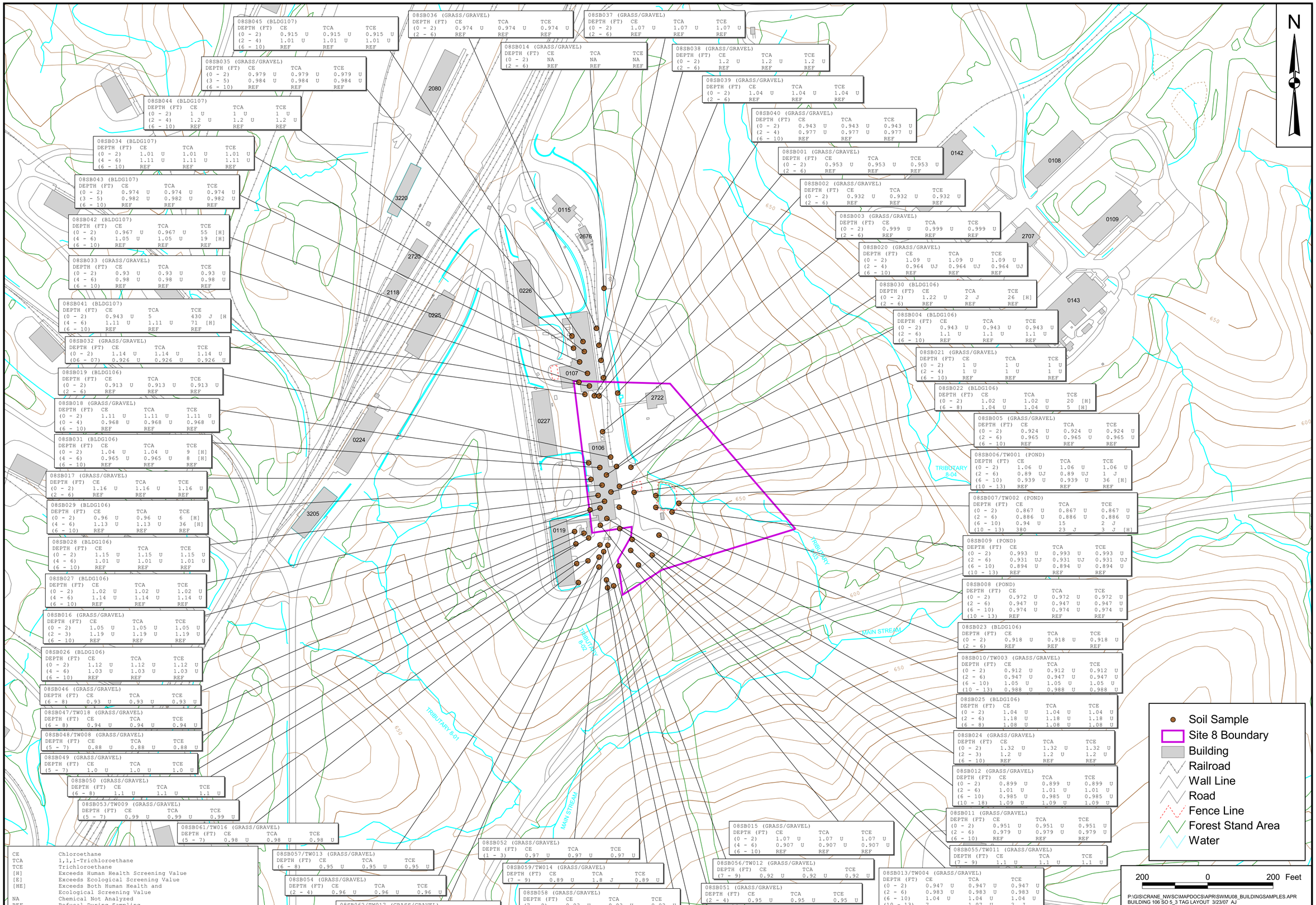
CONTRACT NUMBER CTO 331

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO. FIGURE 5-1 REV 0


N
08SW/SD013 (UPGRADIENT TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.04 U 1.04 U NA NA
08SW/SD001 (TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.46 U 1.46 U 117 [H] 1014
08SW/SD002 (TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.27 U 1.27 U 4.84 U 18
08SW/SD005 (POND)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 1) 178 J 24000 [HE] 126 [H] 1500
(1 - 2) 13.7 U 2100 J [HE] 24.4 222
08SW/SD004 (POND)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 1) 6600000 J [HE] 5300000 J [HE] 45.6 U 940
(1 - 2) 17300000 J [HE] 27800000 J [HE] 68.8 U 2840 [E]
08SW/SD003 (TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.15 U 1.15 U 4.56 U 6
08SW/SD012 (POND)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.73 U 1.73 U NA NA
08SW/SD006 (TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.2 U 4 J 4.76 U 0 U
08SW/SD016 NS
08SW/SD019 NS
08SW/SD018 NS
08SW/SD017 NS
08SW/SD020 NS
08SW/SD021 NS
08SW/SD014 (MAIN STREAM)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.25 U 1.25 U NA NA
08SW/SD009 (MAIN STREAM)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 2 J 1.24 U 15.8 127
08SW/SD007 (TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 2 J 2 J 4.91 U 7
08SW/SD011 (TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.5 U 1.5 U NA NA
08SW/SD008 (MAIN STREAM)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.2 U 3 J 15.1 127
08SW/SD015 (TRIBUTARY)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.34 U 1.34 UJ NA NA
08SW/SD010 (UPGRADIENT MAIN STREAM)
DEPTH (FT) TCA TCE BAPEQ TPAH
(0 - 0.5) 1.39 U 1.39 U NA NA
TRIBUTARY 6-1
TRIBUTARY 6-2
TRIBUTARY 6-3
TRIBUTARY 6-4
MAIN STREAM
650
660
3220
2669
115
2676
2117
2720
2118
226
225
107
3240
224
227
2722
106
2961
3205
2651
2773
2796
119
3077
142
108
185
144A
2707
109
143
186
99
100
2870
2887
2938
2540
2160
FHI
LEGEND
Surface Water/Sediment Sample Location
Building
SWMU Boundary
Road
Railroad
Fence
Tree Line
Stream/River
Topographic Contours (Contour Interval = 10 feet)
TCA 1,1,1-Trichloroethane
TCE Trichloroethene
BAPEQ Benzo(a)pyrene Equivalents
TPAH Total PAHs (Detections Only)
[H] Exceeds Human Health Screening Value
[E] Exceeds Ecological Screening Value
[HE] Exceeds Both Human Health and Ecological Screening Value
NA Chemical Not Analyzed
NS Not Sampled
Screening Values:
Chemical | Human Health | Ecological
TCA | 1200000 | 213
TCE | 710 | 112
BAP | 62 | ---
TPAH | --- | 1610
Concentrations and Screening Values are Reported in ug/kg.
150 0 150 Feet
P:\GIS\CRANE_NSWC\MAPDOCS\APR\OLD_SQL_CONNECTION\BROKEN\
SWMU08.APR SWMU08_SDTAGS_LAYOUT 3/23/07 AJ
DRAWN BY K. PEILA DATE 3/08/06
CHECKED BY J. GOERDT DATE 3/23/07
REVISED BY A. JANOCHA DATE 3/23/07
SCALE AS NOTED
NAVFAC
SELECT VOLATILE AND SEMIVOLATILE ORGANIC COMPOUND CONCENTRATIONS IN SEDIMENT
ROUND 1 ONLY
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA
CONTRACT NO. CTO 0331
OWNER NO. 1245
APPROVED BY DATE
DRAWING NO. FIGURE 5 - 2
REV. 0



CE	Chloroethane
TCA	1,1,1-Trichloroethane
TCE	Trichloroethane
[H]	Exceeds Human Health Screening Value
[E]	Exceeds Ecological Screening Value
[HE]	Exceeds Both Human Health and Ecological Screening Value
NA	Chemical Not Analyzed
REF	Refusal During Sampling
	Did Not Allow Sample Collection
--	Not Applicable

Screening Values

Chemical	Human Health	Ecological (1)
CE	3000	--
TCA	97	29800
TCE	2.8	12400

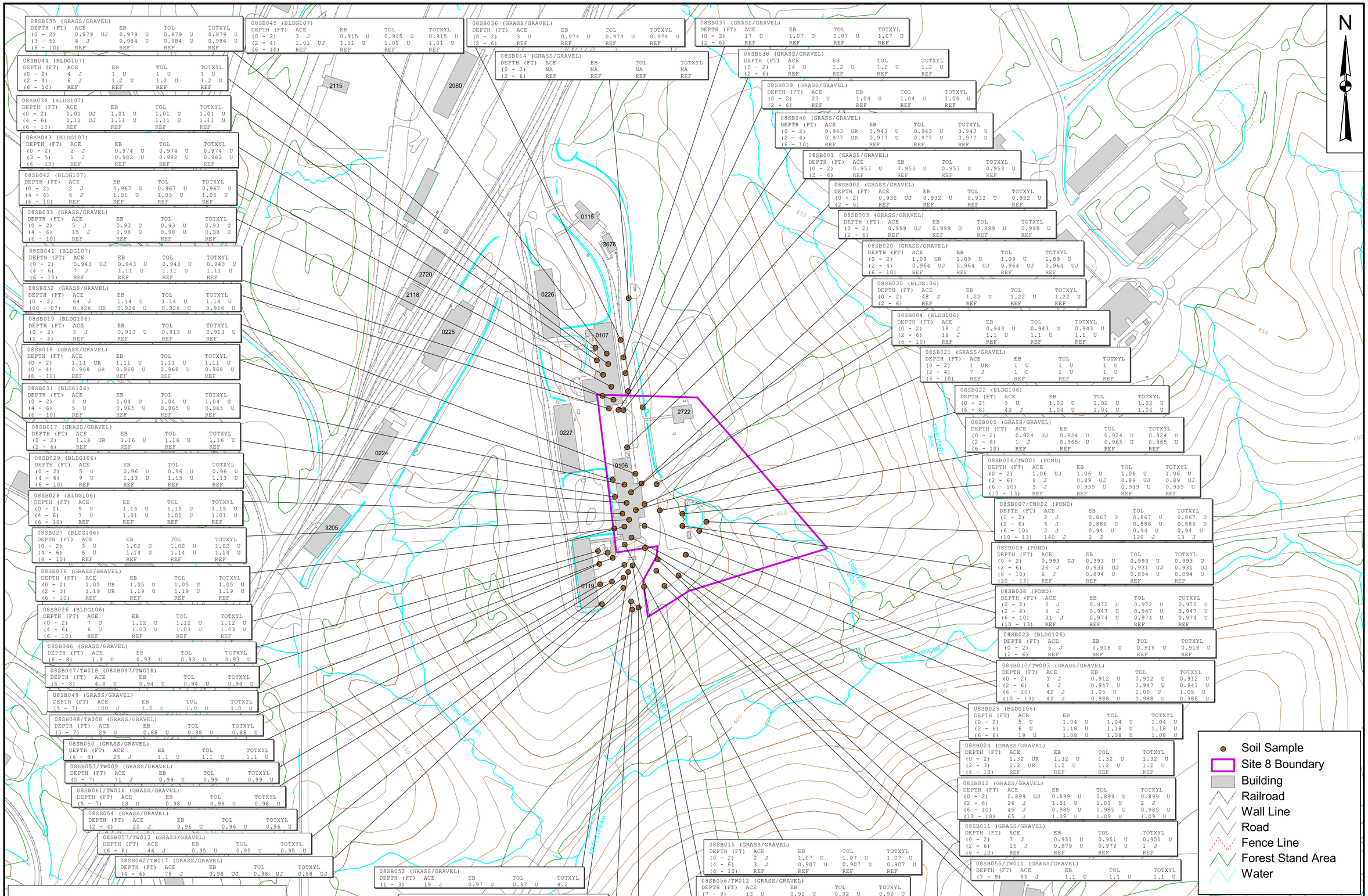
Concentrations and screening values are reported in ug/kg.
1 Subsurface samples were not screened against ecological criteria

DRAWN BY	DATE
K. MOORE	3/19/07
CHECKED BY	DATE
J. GOERDT	3/23/07
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SELECT CHLORINATED VOLATILE ORGANIC COMPOUND CONCENTRATIONS (ug/kg) IN SOIL
SWMU 8 - BUILDING 106 POND
NWSC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
CTO 331	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 5-3	REV 0



08SB035 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.979 UJ	0.979 U	0.979 U	0.979 U
(3 - 5)	4 J	0.984 U	0.984 U	0.984 U
(6 - 10)	REF	REF	REF	REF

08SB045 (BLDG107)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	3 J	0.915 U	0.915 U	0.915 U
(2 - 4)	1.01 UJ	1.01 U	1.01 U	1.01 U
(6 - 10)	REF	REF	REF	REF

08SB036 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	3 U	0.974 U	0.974 U	0.974 U
(2 - 6)	REF	REF	REF	REF

08SB037 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	17 U	1.07 U	1.07 U	1.07 U
(2 - 6)	REF	REF	REF	REF

08SB044 (BLDG107)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	4 J	1 U	1 U	1 U
(2 - 4)	6 J	1.2 U	1.2 U	1.2 U
(6 - 10)	REF	REF	REF	REF

08SB014 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	NA	NA	NA	NA
(2 - 6)	REF	REF	REF	REF

08SB038 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	14 U	1.2 U	1.2 U	1.2 U
(2 - 6)	REF	REF	REF	REF

08SB034 (BLDG107)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1.01 UJ	1.01 U	1.01 U	1.01 U
(4 - 6)	1.11 UJ	1.11 U	1.11 U	1.11 U
(6 - 10)	REF	REF	REF	REF

08SB039 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	27 U	1.04 U	1.04 U	1.04 U
(2 - 6)	REF	REF	REF	REF

08SB043 (BLDG107)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	2 J	0.974 U	0.974 U	0.974 U
(3 - 5)	1 J	0.982 U	0.982 U	0.982 U
(6 - 10)	REF	REF	REF	REF

08SB040 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.943 UR	0.943 U	0.943 U	0.943 U
(2 - 4)	0.977 UR	0.977 U	0.977 U	0.977 U
(6 - 10)	REF	REF	REF	REF

08SB001 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.953 U	0.953 U	0.953 U	0.953 U
(2 - 6)	REF	REF	REF	REF

08SB042 (BLDG107)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	2 J	0.967 U	0.967 U	0.967 U
(4 - 6)	6 J	1.05 U	1.05 U	1.05 U
(6 - 10)	REF	REF	REF	REF

08SB002 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.932 UJ	0.932 U	0.932 U	0.932 U
(2 - 6)	REF	REF	REF	REF

08SB033 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 J	0.93 U	0.93 U	0.93 U
(4 - 6)	15 J	0.98 U	0.98 U	0.98 U
(6 - 10)	REF	REF	REF	REF

08SB003 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.999 UJ	0.999 U	0.999 U	0.999 U
(2 - 6)	REF	REF	REF	REF

08SB041 (BLDG107)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.943 UJ	0.943 U	0.943 U	0.943 U
(4 - 6)	7 J	1.11 U	1.11 U	1.11 U
(6 - 10)	REF	REF	REF	REF

08SB020 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1.09 UR	1.09 U	1.09 U	1.09 U
(2 - 4)	0.964 UJ	0.964 UJ	0.964 UJ	0.964 UJ
(6 - 10)	REF	REF	REF	REF

08SB032 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	64 J	1.14 U	1.14 U	1.14 U
(06 - 07)	0.926 UR	0.926 U	0.926 U	0.926 U

08SB030 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	48 J	1.22 U	1.22 U	1.22 U
(2 - 6)	REF	REF	REF	REF

08SB019 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 J	0.913 U	0.913 U	0.913 U
(2 - 6)	REF	REF	REF	REF

08SB004 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	18 J	0.943 U	0.943 U	0.943 U
(2 - 6)	19 J	1.1 U	1.1 U	1.1 U
(6 - 10)	REF	REF	REF	REF

08SB018 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1.11 UR	1.11 U	1.11 U	1.11 U
(0 - 4)	0.968 UR	0.968 U	0.968 U	0.968 U
(6 - 10)	REF	REF	REF	REF

08SB021 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1 UR	1 U	1 U	1 U
(2 - 4)	7 J	1 U	1 U	1 U
(6 - 10)	REF	REF	REF	REF

08SB022 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 U	1.02 U	1.02 U	1.02 U
(6 - 8)	43 J	1.04 U	1.04 U	1.04 U

08SB031 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	4 U	1.04 U	1.04 U	1.04 U
(4 - 6)	5 U	0.965 U	0.965 U	0.965 U
(6 - 10)	REF	REF	REF	REF

08SB005 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.924 UJ	0.924 U	0.924 U	0.924 U
(2 - 6)	1 J	0.965 U	0.965 U	0.965 U
(6 - 10)	REF	REF	REF	REF

08SB017 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1.16 UR	1.16 U	1.16 U	1.16 U
(2 - 6)	REF	REF	REF	REF

08SB006/TW001 (POND)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1.06 UJ	1.06 U	1.06 U	1.06 U
(2 - 6)	9 J	0.89 UJ	0.89 UJ	0.89 UJ
(6 - 10)	3 J	0.939 U	0.939 U	0.939 U
(10 - 13)	REF	REF	REF	REF

08SB029 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 U	0.96 U	0.96 U	0.96 U
(4 - 6)	9 U	1.13 U	1.13 U	1.13 U
(6 - 10)	REF	REF	REF	REF

08SB007/TW002 (POND)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	2 J	0.867 U	0.867 U	0.867 U
(2 - 6)	5 J	0.886 U	0.886 U	0.886 U
(6 - 10)	2 J	0.94 U	0.94 U	0.94 U
(10 - 13)	140 J	2 J	120 J	13 J

08SB028 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 U	1.15 U	1.15 U	1.15 U
(4 - 6)	7 U	1.01 U	1.01 U	1.01 U
(6 - 10)	REF	REF	REF	REF

08SB027 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	3 U	1.02 U	1.02 U	1.02 U
(4 - 6)	6 U	1.14 U	1.14 U	1.14 U
(6 - 10)	REF	REF	REF	REF

08SB009 (POND)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.993 UJ	0.993 U	0.993 U	0.993 U
(2 - 6)	26 J	0.931 UJ	0.931 UJ	0.931 UJ
(6 - 10)	6 J	0.894 U	0.894 U	0.894 U
(10 - 13)	REF	REF	REF	REF

08SB016 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1.05 UR	1.05 U	1.05 U	1.05 U
(2 - 3)	1.19 UR	1.19 U	1.19 U	1.19 U
(6 - 10)	REF	REF	REF	REF

08SB008 (POND)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 J	0.972 U	0.972 U	0.972 U
(2 - 6)	4 J	0.947 U	0.947 U	0.947 U
(6 - 10)	31 J	0.974 U	0.974 U	0.974 U
(10 - 13)	REF	REF	REF	REF

08SB026 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	7 U	1.12 U	1.12 U	1.12 U
(4 - 6)	6 U	1.03 U	1.03 U	1.03 U
(6 - 10)	REF	REF	REF	REF

08SB023 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 J	0.918 U	0.918 U	0.918 U
(2 - 6)	REF	REF	REF	REF

08SB046 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(6 - 8)	1.9 U	0.93 U	0.93 U	0.93 U

08SB010/TW003 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1 J	0.912 U	0.912 U	0.912 U
(2 - 6)	6 J	0.947 U	0.947 U	0.947 U
(6 - 10)	42 J	1.05 U	1.05 U	1.05 U
(10 - 13)	42 J	0.988 U	0.988 U	0.988 U

08SB047/TW018 (08SB047/TW018)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(6 - 8)	4.8 U	0.94 U	0.94 U	0.94 U

08SB049 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(5 - 7)	100 J	1.0 U	1.0 U	1.0 U

08SB025 (BLDG106)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	5 U	1.04 U	1.04 U	1.04 U
(2 - 6)	6 U	1.18 U	1.18 U	1.18 U
(6 - 8)	19 U	1.08 U	1.08 U	1.08 U

08SB048/TW008 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(5 - 7)	29 U	0.88 U	0.88 U	0.88 U

08SB050 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(6 - 8)	25 J	1.1 U	1.1 U	1.1 U

08SB024 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	1.32 UR	1.32 U	1.32 U	1.32 U
(2 - 3)	1.2 UR	1.2 U	1.2 U	1.2 U
(6 - 10)	REF	REF	REF	REF

08SB053/TW009 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(5 - 7)	71 J	0.99 U	0.99 U	0.99 U

08SB061/TW016 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(5 - 7)	13 U	0.98 U	0.98 U	0.98 U

08SB012 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.899 UJ	0.899 U	0.899 U	0.899 U
(2 - 6)	26 J	1.01 U	1.01 U	2 J
(6 - 10)	45 J	0.985 U	0.985 U	0.985 U
(10 - 18)	65 J	1.09 U	1.09 U	1.09 U

08SB054 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(2 - 4)	20 J	0.96 U	0.96 U	0.96 U

08SB011 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	7 J	0.951 U	0.951 U	0.951 U
(2 - 6)	15 J	0.979 U	0.979 U	1 J
(6 - 10)	REF	REF	REF	REF

08SB057/TW013 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(6 - 8)	46 J	0.95 U	0.95 U	0.95 U

08SB015 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	2 J	1.07 U	1.07 U	1.07 U
(4 - 6)	3 J	0.907 U	0.907 U	0.907 U
(6 - 10)	REF	REF	REF	REF

08SB055/TW011 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(7 - 9)	55 J	1.1 U	1.1 U	1.1 U

08SB062/TW017 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(4 - 6)	78 J	0.98 UJ	0.98 UJ	0.98 UJ

08SB052 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(1 - 3)	19 J	0.97 U	0.97 U	4.2

08SB056/TW012 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(7 - 9)	13 U	0.92 U	0.92 U	0.92 U

08SB058 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(7 - 9)	18 J	0.93 U	0.93 U	1.2 J

08SB013/TW004 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(0 - 2)	0.947 UJ	0.947 U	0.947 U	0.947 U
(2 - 6)	6 J	0.983 U	0.983 U	0.983 U
(6 - 10)	51 J	1.04 U	1.04 U	1.04 U
(10 - 13)	130 J	3 J	19	1.07 U

08SB059/TW014 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(7 - 9)	80 J	0.89 U	0.89 U	0.89 U

08SB051 ()

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(2 - 4)	55 J	440 J	23 J	3900 J

08SB060/TW015 (GRASS/GRAVEL)

DEPTH (FT)	ACE	EB	TOL	TOTXYL
(7 - 9)	89 J	0.92 U	0.92 U	0.92 U

ACE	Acetone	[H]	Exceeds Human Health Screening Value
EB	Ethyl Benzene	[E]	Exceeds Ecological Screening Value
TOL	Toluene	[HE]	Exceeds Both Human Health and Ecological Screening Value
TOTXYL	Total Xylenes	NA	Chemical Not Analyzed
		REF	Refusal During Sampling Did Not Allow Sample Collection

Screening Values

Chemical	Human Health	Ecological (1)
ACE	6,600	2,500
EB	670	--
TOL	590	--
TOTXYL	7,100	--

Concentrations and screening values are reported in ug/kg.
1 Subsurface samples were not screened against ecological criteria

DRAWN BY	DATE
K. MOORE	3/19/07
CHECKED BY	DATE
J. GOERDT	3/23/07
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

SELECT NON-CHLORINATED VOLATILE ORGANIC COMPOUND CONCENTRATIONS (ug/kg) IN SOIL
SWMU 8 - BUILDING 106 POND
NWSC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
CTO 331	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 5-4	REV 0

6.0 CONCEPTUAL SITE MODEL, CONTAMINANT TRANSPORT, AND ATTENUATION

This section presents an overview of the movement of contaminants at SWMU 8 among the environmental media. The focus is placed on three major contaminant groups (VOCs, SVOCs, and metals) that can be attributed to historical site operations and that have been detected in environmental media at SWMU 8. The information presented in this section is to be used to:

- Provide information on the chemical and physical properties, which affect the mobility, migration, biodegradation, and persistence, of the principal COPCs at SWMU 8.
- Assist in human health and ecological risks presented in Sections 7.0 and 8.0.
- Assist in risk management decisions.
- Assess whether movement of contaminants among environmental media will result in significant future changes to exposure point concentrations (EPCs) to receptors or significant exposure to receptors not currently exposed or at locations not currently exposed.
- Assess whether the potential exists for contaminant concentrations to decrease over time in various media.
- Present a conceptual site model, which identifies contamination sources, contaminant migration pathways, and potential receptors.

6.1 PROPERTIES AFFECTING MOBILITY, ATTENUATION, AND PERSISTENCE

COPCs present at SWMU 8 belong to three primary groups: VOCs, SVOCs, and metals. Not all of the COPCs are discussed in this section, but the primary contaminants that were detected at the highest concentrations and frequencies and that have the highest potentials to cause human health or ecological risk are evaluated in this section. These primary contaminants are representative of all other site-related contaminants that are not explicitly discussed in this section. The primary chemical and biological factors that affect the mobility, migration, biodegradation, and persistence of COPCs at SWMU 8 are solubility, adsorption/desorption, volatility, biodegradation, and plant uptake.

6.1.1 Solubilities and Adsorption/Desorption Properties

Literature values and regulatory guidance values for solubilities, organic matter-water partition coefficients (K_{oc}s), soil-water partition coefficients (K_ds), and biodegradation rates are summarized in Table 6-1. These values are based on field investigations, laboratory experiments, and theoretical calculations that are described in scientific literature and U.S. EPA guidance documents. In most instances, the values found for each parameter for each chemical has a wide range. Thus, the parameter values listed in Table 6-1 may not be accurate or entirely applicable to the SWMU 8 setting, but they are useful for comparative purposes to rank COPCs against each other in terms of their relative mobilities and biodegradation potential.

As shown in Table 6-1, most of the COPCs have moderate to high solubilities and generally have low to moderate affinities for sorbing to organic carbon and soil. However, some of the metals do have high affinities for sorbing to soil (i.e., aluminum and arsenic). For these COPCs, the concentrations dissolved in groundwater are low, and the rates of migration through surface water, soil, and groundwater systems in the dissolved phase should be very slow or insignificant.

The remaining metals (i.e., iron and manganese) and the VOCs have moderate affinities for sorption to soil and can therefore move through the environment more quickly than the COPCs listed above. However, their mobility and migration rates are still impeded by sorption and in some cases solubility constraints. The sole SVOC COPC is 1,4-dioxane. This compound is completely miscible in water and has extremely low sorption potential. Of all the compounds listed in Table 6-1, this contaminant is the most mobile, least likely to sorb, and should migrate quickly through soil, groundwater, and surface water systems. As discussed in Section 5.0, TCE, 1,1,1-TCA, and 1,4-dioxane have migrated into more media and have been detected in more samples than any other organic COPC.

The K_ds of the metals are intermediate to high in value and indicate that the metals should be relatively immobile. However, the natural soils and groundwater associated with the Pennsylvanian-age rocks in southern Indiana are slightly too strongly acidic. For example, the pH of five groundwater samples collected from the Pmz ranged from 4.22 to 5.62 (Table 3-34). The relatively low pH values are due to the following:

- The Pennsylvanian shales, coals, and sandstone units typically contain pyrite, which forms sulfuric acid when oxidized.

- The near-surface rocks have undergone chemical and physical weathering through a very long period of geologic time, which has allowed the oxidation of pyrite and the leaching and removal of any carbonate minerals that may have once been present in the rocks.

- The residual soils and near-surface rock units have been subjected to acid rain in recent decades.

Because of low pH values in soils, bedrock, and groundwater, the solubilities of most metals are generally higher than would be expected at near-neutral pH values. In addition, the K_d values for most of the metals are depressed. Therefore, the higher concentrations of metals causing SV exceedances, as described in Section 5.0, may be due in large part to naturally occurring low pH values.

Another factor that greatly affects the solubilities and mobilities of iron, manganese, and arsenic are their valence states. Each of these metals has more than one valence state that is stable in nature. The oxidation-reduction conditions of the soil, bedrock, groundwater, or surface water systems where these metals reside will control the valence states of the metals in each specific environment and location. Iron and manganese are much more soluble and mobile under reducing conditions, where the reduced forms of these metals (Fe^{+2}, Mn^{+2}) are most prevalent.

Even though many of the VOCs and the metals have moderate affinities for adsorption to soil and sediment, they can still move through the environment away from a source area via erosion and sediment transport (i.e., surface water pathway) or via wind erosion and transport.

6.1.2 Biodegradation

As shown in Table 6-1, the VOCs and 1,4-dioxane biodegrade, with half-lives in groundwater ranging from about 0.02 to 7.0 years. Hence, it is probable that the total mass of the VOCs and 1,4-dioxane at SWMU 8 will decrease over time as a result of degradation (chemical and biological). Metals do not degrade at all.

TCE is a chlorinated ethene compound with three chlorine atoms. At sites contaminated with chlorinated solvents, most of the solvent degradation occurs by reductive (anaerobic) dechlorination (RD) (U.S. EPA, 1998), although aerobic processes can also biodegrade the less-chlorinated ethenes. RD is a microbially mediated reaction whereby a chlorine atom on a chlorinated solvent is replaced by a hydrogen atom (Vogel and McCarty, 1987). In aerobic bioremediation processes, an organic contaminant such as benzene acts as an electron donor, and another compound (e.g., oxygen, nitrate, or sulfate) acts as the electron acceptor. However, during RD, hydrogen acts as the electron donor, and the halogenated

aliphatics act as the electron acceptors and thus become reduced, as shown in the following half-reaction (Aziz et al., 2000):

$$R\text{-}Cl + H^{+} + 2e^{-} \rightarrow R\text{-}H + Cl^{-}$$

During RD, hydrogen atoms are consumed (i.e., alkalinity is produced) and chloride ions are produced.

TCE is part of a biodegradation chain that involves the sequential dechlorination of ethene compounds as follows:

TCE → DCE → vinyl chloride → ethene

One molecule of DCE is created for each molecule of TCE degraded and so on down the chain. Three DCE isomers (cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCE) can be produced during RD. However, the cis-1,2-DCE isomer is typically produced in much greater quantities compared to the other two isomers during the dechlorination of TCE (Vogel and McCarty, 1985; Vogel and McCarty, 1987; Aziz et al., 2000).

As stated above, TCE is the primary chlorinated ethene released at SWMU 8. The other ethene compounds detected in groundwater (i.e., cis-1,2-DCE, vinyl chloride, and ethene) are most likely degradation products resulting from RD and/or aerobic biodegradation processes. Cis-1,2-DCE and vinyl chloride have been detected in significant concentrations in pond sediment, pond water, and groundwater. Most notably, vinyl chloride was detected at a maximum concentration of 40 µg/L in pond water and 120 µg/L in overburden well 08MWT02 next to the pond. The fact that cis-1,2-DCE and vinyl chloride are present almost everywhere and in every medium that TCE is found strongly suggests that RD of TCE is actively occurring at the site.

1,1,1-TCA and TCE are the most significant COPCs at SWMU 8. 1,1,1-TCA and, to a lesser extent, 1,1,2-TCA have been detected in all environmental media at the site. Like TCE, 1,1,1-TCA can undergo RD. As shown in the following equation, 1,1-DCA is usually considered to be the main biodegradation product of 1,1,1-TCA (Lorah et al., 1997; Lorah and Olsen, 1999):

1,1,1-TCA → 1,1-DCA (and 1,1-DCE) → chloroethane → ethane

1,1-DCE can also be a degradation product of 1,1,1-TCA and has been detected in soils, pond sediment, pond water, and groundwater at SWMU 8 . Chloroethane is the last compound in the decay chain that still possesses a chlorine atom. This compound was detected in significant concentrations in subsurface

soil, pond sediment, pond water, and groundwater. Most notably, chloroethane was detected in moderate to high concentrations in pond water and in the overburden well 08MWT02 next to the pond. The fact that 1,1-DCA, 1,1-DCE, and chloroethane are present at almost every location and in every medium that 1,1,1-TCA is found strongly suggests that RD of 1,1-TCA is actively occurring at the site.

6.1.3 Plant Uptake

Vegetation is known to take up VOCs from contaminated soil and/or groundwater and either metabolize them, store them, or transpire them to the atmosphere. Where organic compounds in groundwater are seeping to the edge of the ridge in the Puz and Pmz groundwaters, there is ample opportunity for trees and other vegetation to capture the contaminants before they are transported away via surface runoff.

6.1.4 Volatilization

Volatilization may be a mechanism whereby much of the VOC mass is leaving the pond. This could be especially true in summer when the solubility of the VOCs in water decreases and volatilization rates increase.

The Tributaries and even the Main Stream have fairly steep gradients; surface water cascades over rocks and undergoes significant aeration as it flows downstream. As a result, volatilization may be removing a large portion of the VOCs from the surface runoff as it travels down the gullies. There have been no VOCs detected in the Main Stream flowing past the southern side of SWMU 8. However, if VOCs were entering the stream, in all likelihood they would be quickly lost due to volatilization.

6.2 CONCEPTUAL SITE MODEL AND MIGRATION OF CONTAMINANTS

Figure 6-1 presents a schematic diagram of pathways that contaminants may take as migration routes from the site. Table 6-2 presents an overall summary of chemical concentrations detected in the samples collected from SWMU 8. For each medium or subset of a medium, the average and maximum COPC concentrations are presented. This summary is intended to present the overall picture of which chemicals are migrating, which ones are the most widespread, and which ones have the potential to migrate further.

6.2.1 Historical Operations and Releases

Buildings 106 and 107 have historically been involved with the overhaul of projectile casings. Building 106 housed a cleaning process and equipment consisting of a caustic wash, a TCE degreaser, and a hydrochloric acid wash. Prior to 1972, splash out and overflows of wastewater were discharged into the

Building 106 Pond. Overflows from the pond would occasionally drain into ditches that led to Tributary 8-03 (the incised gully that runs past the eastern side of the pond).

Sometime after 1972, a small treatment plant was constructed on the southern side of the pond. The purpose of this treatment plant was to neutralize the wastewaters and remove some of the contaminants. Treated pond water was then pumped to the nearby sanitary sewer, where it underwent final treatment. Thus, surface discharges to the gully (Tributary 8-03) were discontinued. However, seepage of untreated pond water downward through the pond bottom has probably occurred since the time the pond was first used until the present time.

The following other operations have occurred intermittently in Buildings 106 and 107 since the mid-1970s:

- A phosphatizing process where zinc phosphate was used to coat projectiles, and the projectiles were rinsed with a diluted solution of chromic and/or phosphoric acid.
- Painting in paint booths, including coatings containing 22 percent naphtha.
- Treatment of wooden boxes with PCP.

More details concerning site history and activities are presented in Section 1.2.2.

6.2.2 Conceptual Physical Model and Hydrology

For SWMU 8, the building floor drains, the drain lines leading away from the buildings, the pond, the treatment plant sump and subsurface piping, and the paint lockers are all potential sources of site-related contaminants. Surface and subsurface soils are contaminated to a slight extent. It is not clear whether there are any vadose zone soils near the buildings, the drain lines, or the pond that could constitute a significant potential source for COPCs to leach out and continue to enter the surface water or groundwater systems. There is also potential for the soils to erode and be transported by surface runoff and affect surface waters and sediment in drainageways downstream from SWMU 8.

As presented in Figure 6-1, the contaminants originate primarily in pond water and pond sediments and have been migrating downward and entering the shallow groundwater flow system (Pathway A1 of Figure 6-1), probably since the beginning of SWMU 8 operations in the 1940s. In the past, contaminants have also entered the shallow groundwater system (Puz) from the building floor drains, subsurface drain lines, paint lockers, or other locations where solvents may have been used or spilled (Pathway A2). Based on the distribution and types of contaminants found in the pond and groundwater, there is a strong likelihood that have been releases of contaminants to the subsurface from areas other than the pond.

The Puz groundwater and associated contaminants are migrating laterally to the east, southeast, and south (Pathway B of Figure 6-1). Much of the groundwater in this zone eventually reaches the edge of the hillside and is taken up by vegetation (B1), discharges to the surface as seeps or springs (B2), or continues downslope as seepage through the thin veneer of soil that blankets the hillside (B3).

Some groundwater in the Puz is seeping vertically downward into the Pmz and is moving southeastward and southward (Pathway C). The Pmz groundwater intercepts the land surface along the middle portions of the ridge. The groundwater in the Pmz that reaches the outcrop area will react similarly to the groundwater discharging from the Puz; it will either be taken up by vegetation, discharge as a seep to the land surface, or migrate downhill on the top of bedrock.

A very small portion of the groundwater in the Pmz migrates downward through a shale and siltstone aquitard and enters the deeper groundwater flow system in the Plz. This deeper groundwater (Pathway D of Figure 6-1) is flowing primarily toward the main stream south of SWMU 8. However, the primary and secondary permeability of this water-bearing zone is less than the Puz and Pmz, and the groundwater flow velocities are consequently slower in the deeper groundwater system.

During storms and high flow events, most of the surface water flowing down the hillside (Pathway E) probably enters the main unnamed stream as overland flow in the drainageways (Pathway E1). As the surface water reaches the valley bottom, it slows down and some of the surface water will infiltrate into the soils and alluvial deposits (Pathway E2) and continue to flow toward the creek as subsurface flow. Contaminants moving down Tributary 8-03 and entering the shallow groundwater system may account for the low concentrations of contaminants detected in well 08MWT011 near the base of the ridge.

The E2 groundwater mixes with the deep groundwater migrating from within the ridge (Pathway D) and groundwater moving downhill along the bedrock/soil interface (Pathway B3). This mixing likely occurs in the valley bottom sediments and the creek channel.

Ultimately the creek, when flowing, will have water from several different sources: surface water from upvalley (i.e., upstream of sampling location 08SW/SD010), surface water discharge from the gullies (E1), and groundwater emanating from the sides of the ridge. This section of main stream is dry for a good portion of the year, but groundwater may still be traveling down the valley as underflow in the valley bottom deposits even when the creek bed is dry.

6.2.3 Volatile Organic Compounds and 1,4-Dioxane

Chlorinated VOCs of two different degradation chains (1,1,1-TCA and TCE) are the primary contaminants at SWMU 8 (see Section 5.0). Spills and/or leaks of these solvents occurred beneath Buildings 106 and 107, the pond, and/or subsurface drain lines between them. These VOCs were detected at higher concentrations and more frequently in subsurface soils than in surface soils. This is probably due to the fact that most of the VOCs were originally released in the subsurface (i.e., buried drain lines, beneath the building, or the bottom of the pond) and partially due to the fact that over the years since release, the VOCs in surface soils may have volatilized and escaped to the atmosphere, thus reducing surface soil concentrations.

Only small concentrations of TCE, 1,1,1-TCA, and their degradation products have been detected in surface and subsurface soils (see Table 6-2 and Section 5.0). Concentrations of the VOCs detected in pond sediments are four to six orders of magnitude greater than concentrations detected in soils. Therefore, the pond continues to be a source of VOCs, including TCE, 1,1,1-TCA, and their degradation products entering the groundwater system.

Chlorinated VOCs were detected in the Puz groundwater, primarily in temporary well 08TW002 and in permanent monitoring well 08MWT06. Even greater concentrations of chlorinated VOCs were detected in the Pmz groundwater, primarily in wells 08MWT001 and 08MWT005. This indicates that the aquitard between the Puz and the Pmz is not continuous or is fractured and not effective as an aquitard, thereby resulting in vertical migration of contaminants between the two water-bearing zones. The distribution of contaminants in these two zones indicates that there are at least two sources of contaminants entering the groundwater system. The easternmost wells downgradient of the pond (e.g., 08TW002 and 08MWT001 through 08MWT004) contain various concentrations of TCE, 1,1,1-TCA, and their degradation products. However, the wells located on the southern side of SWMU 8 (08MWT005, 08MWT006, and 08MWT009) contain primarily 1,1,1-TCA and its degradation products, and very little if any of the TCE decay chain compounds. The lack of TCE and decay products in these wells strongly suggests that the source of contaminants in the wells was not the pond, but somewhere closer to the buildings.

In the lowest groundwater zone investigated (i.e., the Plz), very low concentrations of 1,1,1-TCA, 1,1-DCA, and 1,1-DCE were detected, but only in well 08MWT014. As discussed above, this well is south of Building 106 and not downgradient of the pond. It does not contain TCE or daughter products. Hence, it is assumed to be downgradient of a different source. The fact that very little VOCs have been detected in the Plz wells indicates that the permeability of the rocks beneath the Pmz are very low and

that the aquitard between the Pmz and Plz appears to be an effective barrier minimizing downward flow of water and contaminants.

Very low concentrations of TCE and 1,1,1-TCA were detected in gully and Main Stream sediment samples. Thus, surface transport of sorbed VOCs is not a significant transport pathway for the VOCs.

In summary, chlorinated VOCs have apparently been released from one or both of the buildings in the past, which have impacted pond water, pond sediment, and groundwater at the site. However, the VOC contaminants are not significantly present in soils, surface water other than the pond, or stream sediments.

6.2.4 Metals

The average and maximum concentrations of four metals in media sampled at SWMU 8 are listed in Table 6-2. As stated in Section 5.0, metals are naturally occurring and it is often difficult to discern what concentrations are the result of natural occurrence and what concentrations are indicative of site-related contamination.

Metals concentrations do not appear to be any greater in the SWMU 8 surface soils than they do in subsurface soils, gully sediments, or Main Stream sediments (see Table 6-2).

For surface waters, the maximum and mean concentrations of the four metals in the gullies were greater than the concentrations detected in the Main Stream (Table 6-2). This may or may not be related to the fact that turbidities were also greater in the gully water samples than samples collected from the main stream. However, the concentrations of dissolved metals in gully waters were also much greater than found in the Main Stream (see Tables 3-22 and 3-23). Runoff from SWMU 8 may therefore be having a slight effect on metals concentrations in the gullies, and possibly the Main Stream.

In groundwaters, the highest average and maximum concentrations of aluminum, arsenic, and iron were detected in the Puz; whereas, the highest concentrations of manganese were detected in the Pmz. The intermediate monitoring wells (i.e., Pmz) contained the lowest concentrations of aluminum, arsenic, and iron. There does not appear to be any evidence that the pond or other SWMU 8 activities or spills have contributed significantly to metals concentrations in groundwater.

6.3 SUMMARY OF CONCEPTUAL SITE MODEL

Past operations at the site resulted in the release of chlorinated VOCs to the Building 106 Pond. Current releases of contaminants are limited or nonexistent at SWMU 8 because operations have changed and/or control measures have been instituted to eliminate releases. However, releases of chlorinated VOCs from the pond water and sediments continue to occur.

The following is a summary of the conceptualized aspects of contaminant migration, fate, and persistence at SWMU 8 (see Figure 6-1):

- Chlorinated solvents, primarily TCE and 1,1,1-TCA, have been released to the pond and groundwater.

- Interim remedial actions were taken to discontinue surface releases of water from the pond to the adjacent gully. Drainlines from the buildings were routed to the sanitary sewer. Old drainlines to the pond were reportedly capped. A treatment plant was installed to treat water contained in the pond and then discharge the treated water into the sanitary sewer.

- The Puz and Plz have been contaminated with chlorinated VOCs (primarily TCE, 1,1,1-TCA, and their degradation products).

- Nearly all of the groundwater in the uppermost and intermediate bedrock (i.e., the Puz and Pmz) is flowing laterally toward the southern and southeastern slopes of the ridge. Some of this groundwater seeps into the gullies on the side of the ridge, and some of the contaminated groundwater may be taken up by trees and other vegetation and transpired. Thus, natural phytoremediation may be playing a part in controlling and reducing the rate of contaminants reaching the base of the ridge and entering the tributary stream.

- Chlorinated solvents (TCE and 1,1,1-TCA) in groundwater are degrading as evidenced by the presence of degradation products. High concentrations of vinyl chloride, chloroethane, 1,1-DCA, and cis-1,2-DCE in Puz and Plz groundwater around the pond attest to the high rates of biodegradation of chlorinated VOCs. In many wells, the concentrations of daughter products is greater than concentrations of the parent compound.

- Low concentrations of 1,1,1-TCA and its daughter products have reached monitoring well 08MWT014 in the Plz. The other three Plz monitoring wells are devoid of chlorinated VOCs. The siltstone and

shale layers between the middle and lower water-bearing zones are an effective aquitard and prevent much of the shallow groundwater and contaminants from reaching the deeper groundwater system beneath the ridge.

- The unnamed Main Stream is a tributary of Boggs Creek and is the recipient of all waters (surface or subsurface) that flow away from SWMU 8 and the ridge containing SWMU 8. No measurable impact to the stream water has been detected. Only slight concentrations of TCE and 1,1,1-TCA have been detected in the Main Stream sediments.

TABLE 6-1

CHEMICAL AND DEGRADATION CHARACTERISTICS OF SITE CONTAMINANTS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Chemical	Solubility (mg/L)	K_{oc} (L/kg)	K_d (L/kg)	Biodegradation Half-Life (years)
VOCs				
1,1,1-trichloroethane	2,870[2], 2,970[1]	93.3[1], 106.8[2]	0.205 - 0.235[3]	0.02 - 0.5[4]
1,1,2-trichloroethane	1,100[2], 4,420[1]	50.1[1], 67.7[2]	0.110 - 0.149[3]	0.22 - 0.43[5]
1,1-dichloroethene	2,250[1], 2,420[2]	35.04[2], 58.9[1]	0.077 - 0.130[3]	0.08 - 0.5[4]
1,2-dichloroethane	5,100[2], 8,520[1]	17.4[1], 43.79[2]	0.038 - 0.096[3]	0.58 - 3.47[5]
chloroethane	6,710[2]	23.74[2]	0.0522[3]	0.038 - 0.154[4]
trichloroethene	1,100[1], 1,280[2]	67.7[2], 166[1]	0.149 - 0.365[3]	0.22 - 2.31[5]
cis-1,2-dichloroethene	3,500[1,2]	35.5[1], 43.79[2]	0.078 - 0.096[3]	0.03 - 6.93[5]
trans-1,2-dichloroethene	3,500[1,2]	35.5[1], 43.79[2]	0.078 - 0.096[3]	0.03 - 6.93[5]
1,1-dichloroethene	2,250[1], 2,420[2]	35.04[2], 58.9[1]	0.077 - 0.130[3]	0.154 - 0.361[4]
vinyl chloride	2,760[1], 8,800[2]	18.6[1], 23.74[2]	0.041 - 0.052[3]	0.06 - 1.73[5]
SVOCs				
1,4-dioxane	1,000,000[2]	1.0[2]	0.0022[3]	0.154 - 1.0[4]
Metals				
aluminum	WR	NA	1500[2]	∞
arsenic	WR	NA	29[1,2], 200[6]	∞
iron	WR	NA	25[2]	∞
manganese	WR	NA	65[2]	∞

NA = Not applicable.

WR = A wide range of values is possible, depending on pH, groundwater composition, and other geochemical conditions.

L/kg = Liters per kilogram

References:

1 U.S. EPA, 2002a, Table C-1.

2 Oak Ridge National Laboratory, 2005.

3 K_d calculated by multiplying K_{oc} times f_{oc} value of 0.0022 (value of one SWMU 8 soil sample analysis).

4 Howard et al., 1991.

5 Aziz et al., 2002.

6 Baes and Sharp, 1983 and Baes et al., 1984.

TABLE 6-2

GENERAL LEVELS OF CONTAMINANT CONCENTRATIONS IN EACH ENVIRONMENTAL MEDIUM[1]
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Contaminant	mg/kg										µg/L											
	Surface Soil		Subsurface Soil		Pond Sediment		Gully Sediment		Main Stream Sediment		Pond Water		Gully (tributary) Surface Water		Main Stream Surface Waters		Puz and Overburden Groundwater		Pmz Groundwater		Plz Groundwater	
	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum	Mean[2]	Maximum
VOCs																						
1,1,1-trichloroethane	0.00064	0.005	0.00111	0.023	4,780	17,300	0.000851	0.002	0.00108	0.002	51	200	1.26	13	ND	ND	60.88	850	1,087	3,900	0.375	1.5
1,1-dichloroethane	ND	ND	0.00489	0.210	308	1,100	ND	ND	ND	ND	33.7	99	3.84	30	ND	ND	160	2500	204	450	0.275	0.9
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37	4.1	3.81	9.9	ND	ND
1,2-dichloroethane	ND	ND	0.00058	0.006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.58	7.8	1.45	3.3	ND	ND
chloroethane	ND	ND	0.0011	0.380	21	59.9	ND	ND	ND	ND	34.9	89	ND	ND	ND	ND	330.7	5900	1.81	4.2	ND	ND
trichloroethene	0.013	0.430	0.00337	0.071	6,625	27,800	0.00134	0.004	0.00142	0.003	103	590	3.16	34	ND	ND	16.2	180	2,023	8,200	ND	ND
cis-1,2-dichloroethene	ND	ND	0.00079	0.006	138	390	ND	ND	ND	ND	51.7	140	1.24	7.9	ND	ND	37.2	380	74.2	300	ND	ND
trans-1,2-dichloroethene	ND	ND	0.00057	0.005	12	51	ND	ND	ND	ND	0.917	4.4	ND	ND	ND	ND	1.02	15	3.58	14	ND	ND
1,1-dichloroethene	ND	ND	0.00087	0.015	364	1,500	ND	ND	ND	ND	1.84	7.7	0.759	5.6	ND	ND	16.1	200	740	2,600	0.258	0.8
vinyl chloride	ND	ND	0.00054	0.002	3.5	54	ND	ND	ND	ND	12.7	40	0.188	0.8	ND	ND	8.7	120	2.35	5.0	ND	ND
SVOCs																						
1,4-dioxane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9	5.0	2.74	6.0	ND	ND	9.28	64	53.3	150	13.3	44
Metals (total)																						
aluminum	22,477	28,200	19,398	31,500	5,630	5,630	15,300	17,800	11,800	11,800	1,665	6,780	3,373	25,800	287	710	11,045	68,200	137	308	2,609	5,210
arsenic	6.05	8.0	6.06	9.7	2.5	2.5	11.9	18.7	19.7	19.7	4.37	20.6	1.39	7.5	ND	ND	9.01	26.4	0.379	0.8	4.15	4.5
iron	20,946	32,400	17,867	25,400	8,360	8,360	45,050	71,900	71,400	71,400	7,494	31,100	4,349	29,000	254	588	15,552	45,600	2,637	9,510	6,900	13,400
manganese	237	1,730	234	616	79.6	79.6	1,733	3,130	1,790	1,790	1,007	4,310	909	6,200	49	156	1,588	4,120	4,117	10,700	322	533

µg/kg = Microgram per kilogram.
mg/kg = Milligram per kilogram.
NA = Not analyzed.
ND = Not detected.
Plz = Lower Pennsylvanian water-bearing zone.
Pmz = Middle Pennsylvanian water-bearing zone.
Puz = Upper Pennsylvanian and Overburden water-bearing zone.
VOC = Volatile organic compound.
SVOC = Semivolatile organic compound.
1 - Background samples are not included in sample populations used to calculate means or maximum concentrations.
2 - Mean value uses TV/2 for ND values (TV = threshold value, ND = analyte was not detected). All data are presented in Appendix G, and statistical summaries of data are presented in Section 3.0.

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LEGEND:

PATHWAY DESCRIPTIONS:

A1 – POND WATER INFILTRATES INTO GROUND

A2 – SEEPAGE INTO GROUND FROM FLOOR DRAINS, DRAIN PIPES, AND/OR CONTAMINATED SOILS

B – LATERAL GROUNDWATER FLOW IN Puz SANDSTONE AND OVERBURDEN SOIL TOWARD THE HILLSIDE

B1 – GROUNDWATER TAKEN UP BY VEGETATION AND TRANSPIRED

B2 – GROUNDWATER SEEPS INTO GULLIES AT THE SURFACE AND JOINS SURFACE FLOW

B3 – MIGRATION ALONG BEDROCK/SOIL INTERFACE (1–3 FT. BGS.) AND NEAR SURFACE FRACTURES IN WEATHERED BEDROCK

B4 – MIGRATION FROM Puz TO Pmz THROUGH GAP IN AQUITARD

C – LATERAL GROUNDWATER FLOW IN Pmz SANDSTONE TOWARD THE HILLSIDE

D – LATERAL GROUNDWATER FLOW IN Plz SANDSTONE TO THE STREAM

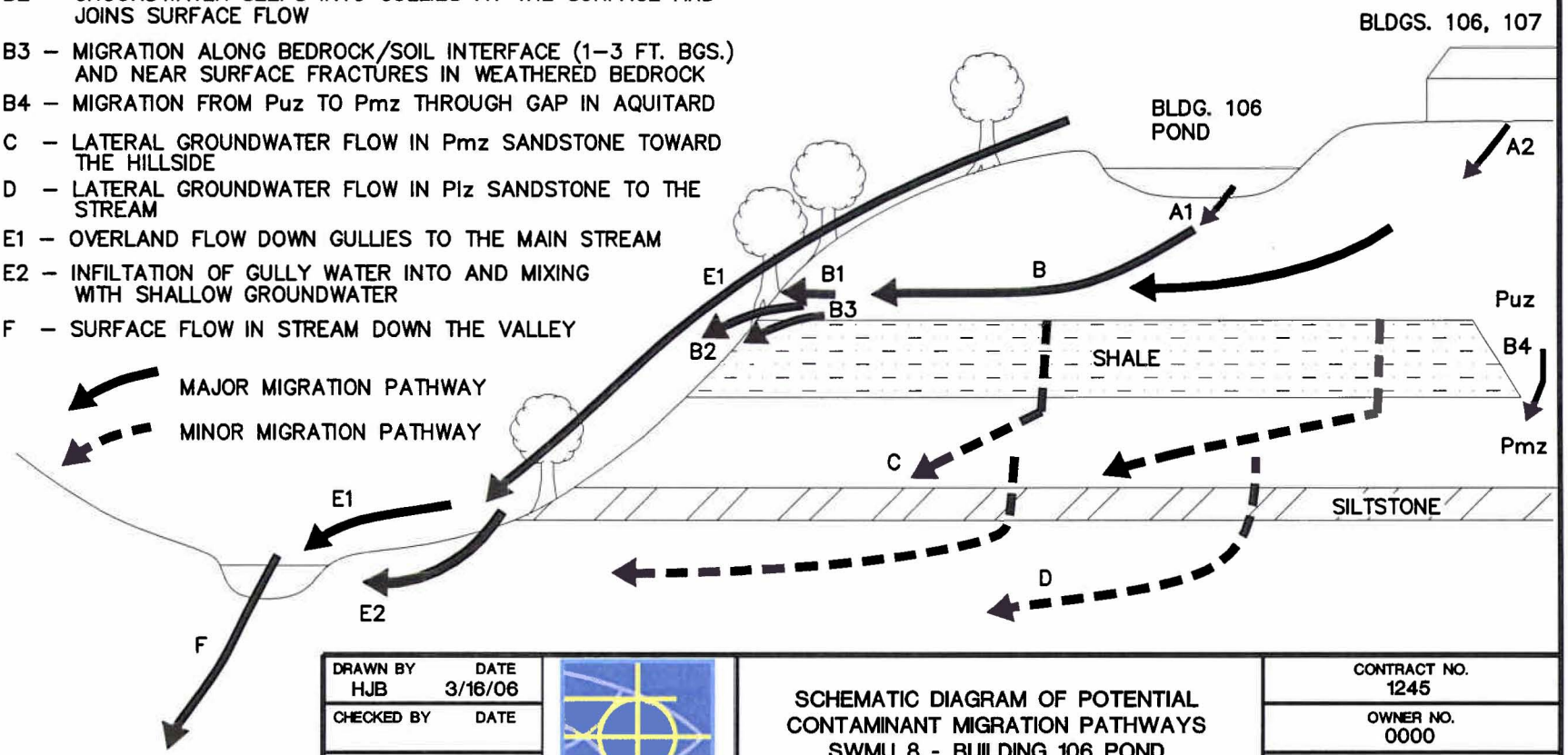
E1 – OVERLAND FLOW DOWN GULLIES TO THE MAIN STREAM

E2 – INFILTATION OF GULLY WATER INTO AND MIXING WITH SHALLOW GROUNDWATER

F – SURFACE FLOW IN STREAM DOWN THE VALLEY

MAJOR MIGRATION PATHWAY

MINOR MIGRATION PATHWAY



DRAWN BY HJB	DATE 3/16/06	SCHEMATIC DIAGRAM OF POTENTIAL CONTAMINANT MIGRATION PATHWAYS SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NO. 1245
CHECKED BY	DATE		OWNER NO. 0000
REVISED BY	DATE		APPROVED BY / DATE
SCALE NOT TO SCALE			DRAWING NO. FIGURE 6-1 / REV. 0

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7.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the HHRA for the Building 106 Pond Area (SWMU 8) at NSWC Crane. The objective of the HHRA is to determine whether detected concentrations of chemicals within the study areas pose a significant threat to potential human receptors under current and/or future land use. The potential risks to human receptors were estimated based on the assumption that no actions were taken to control contaminant releases.

7.1 INTRODUCTION

The following current U.S. EPA, State of Indiana (IDEM), and United States Navy risk assessment guidance documents were used to develop the framework for the baseline HHRA:

- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A) (U.S. EPA, 1989).
- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors (U.S. EPA, 1991).
- Distribution of Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure (U.S. EPA, 1993a).
- Soil Screening Guidance: Technical Background Document (U.S. EPA, 1996).
- Exposure Factors Handbook. Office of Health and Environmental Assessment (U.S. EPA, 1997a).
- Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (U.S. EPA, 2001).
- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final Guidance (U.S. EPA, 2004a).
- Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. (U.S. EPA 2002a).

- Navy Final Policy on the Use of Background Chemical Levels (Navy, 2004).

- Conducting Human Health Risk Assessments under the Environmental Restoration Program (Navy, 2001).

- Risk Integrated System of Closure. User's Guide and Technical Resource Guidance Document [Indiana Department of Environmental Management (IDEM), 2006].

This HHRA was prepared using essentially the same methodology used to prepare the HHRAs for SWMUs 4, 5, 9, and 10 (TtNUS, 2003a), SWMU 3 (TtNUS, 2003b), SWMU 12 (TtNUS, 2006), SWMU 13 (TtNUS, 2005b), and SWMU 16 (TtNUS, 2005a).

An HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Sections 7.2 through 7.6 contain detailed discussions of the five components of the HHRA. A schematic diagram of the general risk assessment process is provided as Figure 7-1.

Three major aspects of chemical contamination and environmental fate and transport must be considered to evaluate potential risks: (1) contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist; and (3) human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of these factors is absent for a site, the exposure route is regarded as incomplete, and no potential risks are considered to exist for human receptors.

7.2 DATA EVALUATION

Data evaluation, the first component of a baseline HHRA, is a medium-specific task involving the compilation and evaluation of analytical data. The main objective of the data evaluation is to develop a medium-specific list of COPCs that will be used to quantitatively determine potential human health risks for site media.

7.2.1 Data Usability

Data from samples collected during the field investigations were used to assess risks to potential human receptors. A data quality report is included in Section 3.0 that provides information on precision, accuracy, representativeness, completeness, and comparability of the analytical data.

Fixed-base analytical results only for the target analyte lists for the field investigation were used in the quantitative risk evaluation. Unfiltered results for groundwater and surface water were used to assess risks associated with these media. Field measurements and data regarded as unreliable (i.e., qualified as "R" during the data validation process) were not used in the quantitative risk assessment. The elimination of data qualified “R” may result in data gaps that may increase the uncertainty in the risk assessment. However, as discussed in Sections 3.0 and 7.6.1, the chemicals qualified “R” are not constituents of concern at SWMU 8. Therefore, it is unlikely that risks have been underestimated by the removal of the unreliable data from the data sets.

7.2.2 Selection of COPCs

The selection of COPCs is a qualitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the baseline HHRA to those site-related constituents that dominate overall potential risks. Screening by risk-based concentrations (RBCs) was used to focus the risk assessment on meaningful chemicals and exposure routes.

In general, a chemical was selected as a COPC and retained for further quantitative risk evaluation if the maximum concentration detected in a sampled medium exceeded a conservative screening concentration(s). Chemicals eliminated from further evaluation during this screening are assumed to present minimal risks to potential human receptors.

7.2.2.1 Derivation of Screening Criteria

Several types of screening levels were used to identify COPCs for SWMU 8. Screening concentrations based on U.S. EPA Region 9 Preliminary Remediation Goals (PRGs) (U.S. EPA, 2004b) and IDEM Risk Integrated System of Closure (RISC) default closure levels were used, as well as other U.S. EPA criteria. The risk-based U.S. EPA Region 9 screening concentrations correspond to a Hazard Quotient (HQ) of 0.1 (for noncarcinogens) or an Incremental Lifetime Cancer Risk (ILCR) of 1×10^{-6} (for carcinogens). It should be noted that the U.S. EPA Region 9 PRGs for non-carcinogens are based on a Hazardous Index (HI) of 1. The Region 9 PRG values for noncarcinogens were multiplied by 0.1 to account for potential cumulative effects of several chemicals affecting the same target area or producing the same adverse noncarcinogenic health effect.

The IDEM default closure levels for soil are based on the lesser of the risk-based direct contact criteria, soil attenuation capacity, soil saturation concentration, and migration from soil to groundwater criteria.

The IDEM default closure level for groundwater is based on the U.S. EPA Maximum Contaminant Level (MCL), if available. If not, the default closure level is the lesser of the risk-based criteria and solubility limit. The IDEM risk-based default closure levels correspond to a systemic HQ of 0.1 (for noncarcinogens) or an ILCR of 1×10^{-5} (for carcinogens). The screening levels to be used for each medium in the risk assessments are briefly discussed below.

Soil

Screening concentrations based on the following criteria were used to select COPCs for surface and subsurface soil:

- U.S. EPA Region 9 PRGs for residential soil (U.S. EPA, 2004b).
- IDEM residential default closure levels for direct contact (IDEM, 2006)
- U.S. EPA generic soil screening levels (SSLs) for the inhalation of volatiles and fugitive dusts published online at http://risk.lsd.ornl.gov/calc_start.shtml based on methodology from U.S. EPA's Soil Screening Guidance (U.S. EPA, 1996).
- U.S. EPA generic SSLs for migration from soil to groundwater published online at http://risk.lsd.ornl.gov/calc_start.shtml based on methodology from the U.S. EPA's Soil Screening Guidance (U.S. EPA, 1996).
- IDEM residential default closure levels for migration from soils to groundwater (IDEM, 2006)

Because of the different exposure scenarios for potential human receptors, COPCs were identified for surface and subsurface soil. Surface soil was defined as soil collected from 0 to 2 feet bgs. Subsurface soil was defined as soil collected from depths greater than 2 feet bgs.

The comparison of site soil data to U.S. EPA generic SSLs for transfers from soil to air was used to identify whether a quantitative analysis of the inhalation of particulates or vapors from the soil exposure pathway was warranted. If the maximum soil concentration of a chemical exceeded the SSL, a quantitative evaluation of potential risks from inhalation was performed, as described in Section 7.3.4. Otherwise, the risks associated with the inhalation pathway are considered insignificant, and the exposure pathway was eliminated from further evaluation.

U.S. EPA SSLs and IDEM default closure levels for transfers from soil to groundwater were not used to select COPCs for quantitative risk evaluation but were presented to allow a qualitative evaluation of the potential for chemical migration from soil to groundwater. Chemicals with concentrations exceeding the SSLs and IDEM default closure levels may potentially migrate from the soil to groundwater in sufficient quantities to pose concerns about groundwater quality.

Sediment

No specific screening levels exist for human exposure to sediment. COPCs were selected for sediment by comparing detected site concentrations to screening levels based on the following:

- U.S. EPA Region 9 PRGs for residential soil (U.S. EPA, 2004b)
- IDEM residential default closure levels for direct contact (IDEM, 2006)

A chemical detected in sediment was selected as a COPC for sediment if the maximum detected concentration exceeded screening levels based on these values. The use of soil screening criteria for sediment COPC identification is regarded as a conservative approach because exposure to sediment is anticipated to be less intensive than exposure to soil. U.S. EPA generic SSLs for transfers from soil to air and for migration to groundwater are not considered to be appropriate for sediment screening because of the high moisture content associated with sediment matrices.

Groundwater/Surface Water

The same screening levels were used to select COPCs for groundwater and surface water. The following criteria were used as the basis of the screening criteria:

- U.S. EPA Region 9 PRGs for tap water (U.S. EPA, 2004b).
- U.S. EPA MCLs (U.S. EPA, 2004b).
- IDEM residential default closure levels for groundwater (IDEM, 2006).
- U.S. EPA Groundwater Screening Levels for Evaluating the Vapor Intrusion to Indoor Air (U.S. EPA, 2002b).

Risk-based COPC screening levels for tap water ingestion, which are based on daily, residential exposure assumptions, were used to select COPCs for groundwater and surface water. In general, the use of tap water screening levels is regarded as a highly conservative approach to COPC selection at SWMU 8, because groundwater at the site is not used as a potable drinking water source. Potential

human exposure to the surface water in intermittent ditches, streams, and ponds located within SWMU 8 is expected to be limited to incidental exposures such as that which occurs during trespassing, which is anticipated to be significantly less than the daily exposure assumed for the tap water ingestion scenario.

The groundwater screening levels for evaluating the vapor intrusion to indoor air are published in Table 2c of the recent draft U.S. EPA guidance titled: Evaluating the Vapor Intrusion into Indoor Air (2002b). These SSLs were derived to identify chemical concentrations in groundwater that may adversely affect the indoor air quality of a building overlying subsurface VOC contamination.

Federal Ambient Water Quality Criteria (AWQCs) were not used to select COPCs for surface water. AWQCs applicable to the protection of human health assuming routine consumption of water were not used because the conservative U.S. EPA Region 9 PRGs for tap water, U.S. EPA MCLs, and IDEM residential closure levels for residential groundwater were used to select COPCs for groundwater and surface water. In addition, the surface water bodies present within and downgradient of the site, because of their size and intermittent nature, do not support game fish populations.

Lead as a COPC

Limited criteria are available to evaluate the potential risks associated with lead. There are no RBCs for this chemical because the U.S. EPA has not derived toxicity values [i.e., cancer slope factors (CSFs) and reference doses (RfDs)] for lead. However, recommended screening levels are available for lead in soil that are used to indicate the need for response activities.

Guidance from both the Office of Prevention, Pesticides, and Toxic Substances (OPPTS) and the Office of Solid Waste and Emergency Response (OSWER) recommend 400 mg/kg as the lowest screening level for lead-contaminated soil in a residential setting where children are frequently present (U.S. EPA, 1994a and 1994b). The IDEM default closure level for residential exposures to soil is also 400 mg/kg. OPPTS identifies 2,000 to 5,000 mg/kg as an appropriate range for areas where contact with soil by children in a residential setting is less frequent. A value of 400 mg/kg is used as the screening level for soil and sediment in the HHRA for SWMU 8.

The Safe Drinking Water Act Action Level and IDEM default closure level of 15 µg/L is used as the screening level for lead in groundwater and surface water.

Essential Nutrients and Chemicals without Toxicity Criteria

The essential nutrients calcium, magnesium, potassium, and sodium were not identified as COPCs because these inorganic chemicals are naturally abundant in environmental matrices and are only toxic at high doses. In addition, because of the lack of toxicity criteria, risk-based COPC screening levels are not available for some chemicals [e.g., acenaphthylene, 2-methylnaphthalene, benzo(g,h,i)perylene, and phenanthrene]. In the COPC screening for SWMU 8, acenaphthene was used as a surrogate for acenaphthylene, naphthalene was used as a surrogate for 2-methylnaphthalene, and pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene.

Determination of Site-Related Chemicals

The evaluation of chemical concentrations detected in SWMU 8 media in relation to background levels follows guidance presented in the U.S. EPA's Role of Background in the CERCLA Cleanup Program (2002c). This guidance document recommends that all chemicals that exceed risk-based screening concentrations be evaluated in the quantitative risk assessment. Therefore, if the maximum concentration of any chemical exceeded screening levels (i.e., if it was selected as a COPC), risks were calculated for that chemical and are presented in Section 7.5. Potential risks attributed to background levels are discussed in the risk characterization section (Section 7.5).

7.2.2.2 Decision Rules for Establishing COPCs

The following decision rules were used to select initial lists of COPCs for SWMU 8:

- A chemical detected in soil was selected as a COPC for soil if any detected chemical concentration exceeded the screening levels for soils.

- A chemical detected in groundwater was selected as a COPC for groundwater if the maximum detected concentration in any downgradient well exceeded screening levels.

- A chemical detected in surface water or sediment was selected as a COPC for surface water or sediment if the maximum detected concentration in a potentially impacted surface water body exceeded the screening level for surface water or sediment.

- If a chemical was not detected in any of the samples in a particular medium, and the detection limit exceeded the risk-based screening levels, the chemical was not selected as a COPC but is qualitatively discussed in the uncertainty analysis section.

- Chemicals that exceeded toxicity screening concentrations but were within background levels were selected as COPCs and carried through the risk assessment. The potential risks associated with chemicals present at naturally occurring levels are discussed in Section 7.5.

7.2.3 COPCs Selected for HHRA

COPCs at SWMU 8 were selected for surface soil, subsurface soil, groundwater, surface water, and sediment using the risk-based COPC screening levels described in Section 7.2.2. A discussion of the chemicals identified as COPCs and the rationale for COPC selection are provided in the following subsections. The following subsections do not discuss the nature and extent of contamination associated with the chemicals detected in site media; the discussion of nature and extent is presented in Section 5. COPC selection tables for each medium are presented in Tables 7-1 through 7-28. Chemicals retained as COPCs for SWMU 8 are presented in Table 7-29. The Risk Assessment Guidance for Superfund (RAGS) Part D tables for COPC selection are included in Appendix I.

7.2.3.1 Surface Soil in the Vicinity of the Building 106 Pond

One VOC, 13 SVOCs, and 19 inorganics were detected in the four surface soil samples collected near the southern and western sides of the Building 106 Pond. A comparison of the maximum detected surface soil concentrations to screening levels based on the U.S. EPA Region 9 PRGs for residential exposure and IDEM residential default closure levels for direct contact is presented in Table 7-1. The following chemicals were detected in surface soil at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for surface soil near the Building 106 Pond:

- PAHs [benzo(a)pyrene]
- Inorganics (aluminum, arsenic, iron, manganese, vanadium)

The maximum detected concentrations of aluminum, manganese, and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. The maximum concentration of benzo(a)pyrene exceeded the screening level based on the U.S. EPA Region 9 PRG, but was less than the IDEM default closure level. The

exceedance of the screening level was reported for one sample only (08SS009) located at the southwestern corner of the pond. As discussed in Section 5.2, concentrations of most metals in surface soil, with the possible exception of aluminum, appear to be within site background levels and are not considered to be site-related. Although aluminum concentrations in SWMU 8 surface soil samples were often on the high end or greater than the range of background concentrations, the elevated concentrations were within approximately 50 percent of the background UTL. Consequently, the elevated concentrations do not appear to be significant. In addition, the maximum concentration of aluminum (24,500 mg/kg) is significantly less than the Region 9 PRG (76,000 mg/kg), and risk from exposure to the maximum concentration is expected to be negligible.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-2. Concentrations reported for all chemicals were less than U.S. EPA SSLs for soil to air.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is presented in Table 7-2. The following inorganics were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for surface soil near the Building 106 Pond:

- Metals (arsenic, barium, cadmium, chromium, cobalt, lead, manganese, nickel)

The concentrations of all organic chemicals detected in surface soil were less than the screening levels for migration from soil to groundwater, and only one of these (acetone) was detected in groundwater samples at the site. Concentrations of barium, cadmium, and nickel exceeded U.S. EPA SSLs but not IDEM default closure levels for migration from soil to groundwater. As discussed in Section 5.2, concentrations of the metals listed above appear to be within site background levels and are not considered to be site related. These data indicate that groundwater at the site does not appear to have been impacted by site-related chemicals leaching from the four surface soil locations near the Building 106 Pond.

7.2.3.2 Subsurface Soil in the Vicinity of the Building 106 Pond

Fourteen VOCs, 17 SVOCs, and 21 inorganics were detected in nine subsurface soil samples collected at four locations near the Building 106 Pond. A comparison of maximum detected subsurface soil concentrations to U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default

closure levels for direct contact is presented in Table 7-3. The following chemicals were detected in subsurface soils at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil in the vicinity of the pond:

- PAHs [benzo(a)pyrene]
- Inorganics (aluminum, antimony, arsenic, iron, manganese, vanadium)

The maximum detected concentrations of aluminum, antimony, iron, manganese, and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. The maximum concentration of benzo(a)pyrene exceeded the screening level based on the U.S. EPA Region 9 PRG, but was less than the IDEM default closure level. An exceedance was reported for one boring only (08SB007 in the 2- to 6-foot and 10- to 13-foot bgs depth intervals) located immediately south of the pond. Maximum concentrations of most VOCs also occurred at this location at the 10- to 13-foot bgs depth interval, indicating the impact of releases from the pond to the subsurface in this area. As discussed in Sections 5.2 and 7.2.3.1, concentrations of most metals (with the possible exception of aluminum) detected in soil appear to be within site background levels and are not considered to be site related. As with the surface soil, aluminum concentrations in the subsurface soil samples were often on the high end or greater than the range of background concentrations. However, the elevated concentrations were within approximately 50 percent of the background UTL and, consequently, do not appear to be significant. In addition, the maximum concentration of aluminum (23,700 mg/kg) is significantly less than the Region 9 PRG (76,000 mg/kg), and risk from exposure to the maximum concentration is expected to be negligible.

A comparison of maximum detected subsurface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-4. Concentrations reported for all chemicals detected in subsurface soil were less than the U.S. EPA SSLs for soil to air.

A comparison of maximum detected subsurface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is also presented in Table 7-4. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the COPC screening levels for migration from soil to groundwater and were retained as COPCs for subsurface soil in the vicinity of the Building 106 Pond:

- VOCs (1,2-DCA, methylene chloride, TCE)
- PAH (chrysene)
- Inorganics (antimony, arsenic, barium, cadmium, chromium, cobalt, lead, manganese, nickel)

Maximum concentrations of methylene chloride, antimony, and arsenic exceeded both the U.S. EPA SSL and IDEM default closure level for migration from soil to groundwater. The maximum concentration of lead exceeded the IDEM default closure level for migration from soil to groundwater. Concentrations of the remaining chemicals only exceeded the U.S. EPA SSL for migration from soil to groundwater. As discussed in Section 5.2, concentrations of the metals listed above appear to be within site background levels and are not considered to be site related. Because the VOCs detected in subsurface soil near the pond were also detected in nearby groundwater samples, it appears that groundwater has been impacted by releases from the pond and/or subsurface soil.

7.2.3.3 Surface Soil in Grass and Gravel Areas in the Vicinity of Buildings 106 and 107

Three VOCs were detected in 23 surface soil samples, and 14 SVOCs and 20 inorganics were detected in eight surface soil samples collected in the grass and gravel areas of SWMU 8. A comparison of the maximum detected surface soil concentrations to screening levels based on the U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact is presented in Table 7-5. The following chemicals were detected in surface soil at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for surface soil in the grass and gravel areas:

- PAHs [benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene]
- Inorganics (aluminum, arsenic, iron, manganese, vanadium)

The maximum detected concentrations of aluminum, manganese, and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. The maximum concentrations of benzo(b)fluoranthene and dibenzo(a,h)anthracene exceeded the screening levels based on U.S. EPA Region 9 PRGs, but were less than the IDEM default closure levels. PAHs were detected infrequently (in one or two samples) with the maximum concentrations of all PAHs occurring in sample 08SS005002 located approximately midway between Building 106 and the Building 106 Pond. As discussed in Section 5.2, concentrations of most metals in surface soil, with the possible exception of aluminum, appear to be within site background levels and are not considered to be site related. Although aluminum concentrations in SWMU 8 surface soil samples were often on the high end or greater than the range of background concentrations, the elevated

concentrations were within approximately 50 percent of the background UTL. Consequently, the elevated concentrations do not appear to be significant. In addition, the maximum concentration of aluminum (28,200 mg/kg) is significantly less than the Region 9 PRG (76,000 mg/kg), and risk from exposure to the maximum concentration is expected to be negligible.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-6. Concentrations reported for all chemicals were less than the U.S. EPA SSLs for soil to air.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is also presented in Table 7-6. The following chemicals were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for the grass and gravel areas:

- Methylene chloride
- PAHs [benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, chrysene]
- Inorganics (arsenic, barium, cadmium, chromium, cobalt, manganese)

Maximum concentrations of these constituents (except arsenic) exceeded U.S. EPA SSLs for migration from soil to groundwater but were less than IDEM residential default closure levels for migration to groundwater. Methylene chloride (a common laboratory contaminant) was detected in 3 of 23 soil samples at concentrations ranging from 1 to 4 µg/kg but was not detected in any groundwater samples at SWMU 8. None of the PAHs that exceeded soil to groundwater SSLs were detected in any groundwater samples. As discussed in Section 5.2, concentrations of the metals listed above appear to be within site background levels and are not considered to be site related. These data indicate that groundwater at the site does not appear to have been impacted by site-related chemicals leaching from surface soil in the grass and gravel areas.

7.2.3.4 Subsurface Soil in Grass and Gravel Areas in the Vicinity of Buildings 106 and 107

Sixteen VOCs were detected in 37 subsurface soil samples, and three SVOCs and 20 inorganics were detected in five subsurface soil samples collected in the grass and gravel areas of SWMU 8. A comparison of maximum detected subsurface soil concentrations to U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact is presented in Table 7-7. The following chemicals were detected in subsurface soils at maximum concentrations exceeding

the direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil in for the grass and gravel areas:

- Inorganics (aluminum, arsenic, iron, manganese, thallium, vanadium)

The maximum detected concentrations of aluminum, iron, manganese, thallium, and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. As discussed in Section 5.2 and 7.2.3.1, concentrations of most metals (with the possible exception of aluminum) detected in soil appear to be within site background levels and are not considered to be site related. As with the surface soil, aluminum concentrations in the subsurface soil samples were often on the high end or greater than the range of background concentrations. However, the elevated concentrations were within approximately 50 percent of the background UTL and, consequently, do not appear to be significant. In addition, as indicated above, the maximum detected concentration of aluminum (31,500 mg/kg) in subsurface soil is significantly less than the Region 9 PRG (76,000 mg/kg), and the risk from exposure to the maximum concentration is expected to be minimal.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-8. Concentrations reported for all chemicals were less than the U.S. EPA SSLs for soil to air.

A comparison of maximum detected subsurface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is presented in Table 7-8. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the COPC screening levels for migration from soil to groundwater and were retained as COPCs for subsurface soil in the grass and gravel areas:

- VOCs (1,2-DCA, benzene, methylene chloride, vinyl chloride)
- Inorganics (arsenic, barium, chromium, cobalt, manganese, thallium)

Maximum concentrations of methylene chloride and arsenic exceeded both U.S. EPA SSLs and IDEM default closure levels for migration from soil to groundwater. Concentrations of the other chemicals only exceeded U.S. EPA SSLs for migration from soil to groundwater. Most VOCs were detected in only a few (one or two) of 21 subsurface soil samples, with the maximum concentration occurring at location 08SB013 in the 10- to 13-foot bgs depth interval. This location is downgradient of the Building 106 Pond. The VOCs detected in this subsurface soil sample were also detected in groundwater samples collected

close to this location. It is likely that subsurface soil and groundwater have been impacted by releases from the pond. As discussed in Section 5.2, concentrations of the metals that exceeded migration from soil to groundwater SSLs are within site background levels and are not considered to be site related.

7.2.3.5 Surface Soil Under Building 106 and Surrounding Pavement

Six VOCs, 14 SVOCs, and 17 inorganics were detected in surface soil samples collected under Building 106 and the surrounding pavement. Eleven samples were analyzed for VOCs and one sample was analyzed for SVOCs and metals. A comparison of maximum detected surface soil concentrations with screening levels based on the U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact is presented in Table 7-9. The following chemicals were detected in surface soil at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for surface soil at Building 106:

- PAHs [benzo(a)pyrene, dibenzo(a,h)anthracene]
- Inorganics (aluminum, arsenic, iron, vanadium)

The maximum detected concentrations of aluminum, iron, and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. The concentrations of benzo(a)pyrene and dibenzo(a,h)anthracene exceeded the screening levels based on U.S. EPA Region 9 PRGs, but were less than IDEM default closure levels. As discussed in Section 5.2, concentrations of most metals in surface soil, with the possible exception of aluminum, appear to be within site background levels and are not considered to be site-related. Although aluminum concentrations in SWMU 8 surface soil samples were often on the high end or greater than the range of background concentrations, the elevated concentrations were within approximately 50 percent of the background UTL. Consequently, the elevated concentrations do not appear to be significant. In addition, the maximum concentration of aluminum (20,900 mg/kg) is significantly less than the Region 9 PRG (76,000 mg/kg), and risk from exposure to the maximum concentration is expected to be negligible.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-10. Concentrations reported for all chemicals were less than the U.S. EPA SSLs for soil to air.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is also presented in Table 7-10. The following chemicals were detected at maximum concentrations in surface

soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for surface soil at Building 106:

- VOCs (methylene chloride, TCE)
- PAHs [benzo(a)anthracene, chrysene]
- Inorganics (arsenic, barium, chromium, cobalt, manganese)

The maximum concentrations of these constituents exceeded the U.S. EPA SSLs but were less than IDEM default closure levels for migration from soil to groundwater. Methylene chloride (a common laboratory contaminant) was detected in 1 of 11 surface soil samples at a concentration of 6 µg/kg, but it was not detected in any groundwater samples collected at SWMU 8. TCE was detected in 4 of 11 samples, all of which were located directly beneath Building 106. TCE has also been detected in shallow and intermediate zone groundwater samples collected at SWMU 8. The presence of TCE in groundwater may be related to releases from the Building 106 area or from the Building 106 Pond. None of the PAHs that exceeded soil to groundwater SSLs were detected in any groundwater samples at the site. As discussed in Section 5.2, concentrations of the metals listed above appear to be within site background levels and are not considered to be site related.

7.2.3.6 Subsurface Soil Under Building 106 and Surrounding Pavement

Six VOCs, four SVOCs, and 17 inorganics were detected in subsurface soil samples collected under Building 106 and the surrounding pavement. Nine samples were analyzed for VOCs and one sample was analyzed for SVOCs and metals. A comparison of maximum detected subsurface soil concentrations to U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact is presented in Table 7-11. The following chemicals were detected in the subsurface soils at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for subsurface soil at Building 106:

- Inorganics (aluminum, arsenic, iron, vanadium)

The maximum detected concentrations of aluminum, iron, and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. As discussed in Section 5.2 and 7.2.3.1, concentrations of most metals (with the possible exception of aluminum) detected in soil appear to be within site background levels and are not considered to be site related. As with the surface soil, aluminum concentrations in the subsurface soil samples were often on the high end or greater than the range of background concentrations. However,

the elevated concentrations were within approximately 50 percent of the background UTL and, consequently, do not appear to be significant. In addition, the concentration of aluminum (22,100 mg/kg) is significantly less than the Region 9 PRG (76,000 mg/kg), and risk from exposure to the maximum concentration is expected to be negligible.

A comparison of maximum detected subsurface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-12. Concentrations reported for all chemicals detected in subsurface soil were less than the U.S. EPA SSLs for soil to air.

A comparison of maximum detected subsurface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is also presented in Table 7-12. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the COPC screening levels for migration from soil to groundwater and were retained as COPCs for subsurface soil in the vicinity of the Building 106 Pond:

- VOCs (methylene chloride, TCE)
- Inorganics (arsenic, barium, chromium, cobalt, manganese)

The maximum concentrations of these constituents exceeded U.S. EPA SSLs but were less than IDEM default closure levels for migration from soil to groundwater. Methylene chloride was detected in one of nine subsurface soil samples at a concentration of 21 µg/kg, but it was not detected in any groundwater samples collected at SWMU 8. TCE was detected in three of nine subsurface soil samples, all of which were located directly beneath Building 106 (in the same locations where TCE was detected in surface soil samples). As stated previously, TCE was also detected in shallow and intermediate zone groundwater samples collected at SWMU 8. The presence of TCE in groundwater may be related to releases from the Building 106 area or from the Building 106 Pond. As discussed in Section 5.2, concentrations of the metals listed above appear to be within site background levels and are not considered to be site related.

7.2.3.7 Surface Soil Under Building 107 and Surrounding Pavement

Surface soil samples at Building 107 were analyzed for VOCs only. Seven VOCs were detected in six surface soil samples collected under Building 107 and the surrounding pavement. A comparison of maximum detected surface soil concentrations with screening levels based on the U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact is presented in Table 7-13.

No chemicals were identified as COPCs for quantitative risk evaluation for surface soil at Building 107.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-14. Concentrations reported for all chemicals were less than the U.S. EPA SSLs for soil to air.

A comparison of maximum detected surface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is also presented in Table 7-14. The following chemicals were detected at maximum concentrations in surface soil that exceeded the COPC screening levels for migration from soil to groundwater and were retained as COPCs for surface soil at Building 107:

- VOCs (1,1,2-TCA, 1,1-DCE, TCE)

Concentrations of TCE exceeded both the U.S. EPA SSL and IDEM default closure level for migration from soil to groundwater. Concentrations of 1,1,2-TCA and 1,1-DCE only exceeded the U.S. EPA SSL for migration from soil to groundwater. 1,1,2-TCA, 1,1-DCE, and TCE were detected two of six surface soil samples (08SS041 and 08SS042), both of which were located directly beneath Building 107. No groundwater samples were collected in the vicinity of Building 107, but the above listed VOCs have been detected in shallow and intermediate zone groundwater samples collected near Building 106 and the Building 106 pond. The presence of these VOCs in groundwater may be related to releases from the Building 107 area but are more likely to be due to releases from Building 106 and/or the Building 106 Pond.

7.2.3.8 Subsurface Soil Under Building 107 and Surrounding Pavement

Subsurface soil samples at Building 107 were analyzed for VOCs only. Five VOCs were detected in six subsurface soil samples collected under Building 107 and the surrounding pavement. A comparison of the maximum detected subsurface soil concentrations with screening levels based on U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact is presented in Table 7-15. No chemicals were identified as COPCs for quantitative risk evaluation for subsurface soil at Building 107.

A comparison of maximum detected subsurface soil concentrations to U.S. EPA SSLs for chemical migration from soil to air is presented in Table 7-16. Concentrations reported for all chemicals detected in subsurface soil were less than the U.S. EPA SSLs for soil to air.

A comparison of maximum detected subsurface soil concentrations to U.S. EPA SSLs for chemical migration from soil to groundwater and IDEM residential default closure levels for migration to groundwater is also presented in Table 7-16. The following chemicals were detected in subsurface soil at maximum concentrations exceeding the COPC screening levels for migration from soil to groundwater and were retained as COPCs for subsurface soil in the vicinity of Building 107:

- VOCs (methylene chloride, TCE)

The maximum concentration of TCE exceeded both the U.S. EPA SSL and IDEM default closure level for migration from soil to groundwater. The maximum concentration of methylene chloride exceeded the U.S. EPA SSL but was less than IDEM default closure level for migration from soil to groundwater. Methylene chloride was detected in one of six subsurface soil samples at a concentration of 2 µg/kg, but it was not detected in any groundwater samples collected at SWMU 8. TCE (maximum concentration of 71 µg/kg) was detected in two of six subsurface soil samples, all of which were located directly beneath Building 107 (in the same locations where TCE was detected in surface soil samples). No groundwater samples were collected in the vicinity of Building 107, but the above listed VOCs were detected in shallow and intermediate zone groundwater samples near the Building 106 Pond. The presence of these VOCs in groundwater may be related to releases from the Building 107 area but are more likely to be from Building 106 and/or the Building 106 Pond.

7.2.3.9 Groundwater

Shallow Bedrock and Overburden

Seventeen VOCs, 9 SVOCs, 2 energetics, and 23 inorganics were detected in shallow bedrock and overburden groundwater samples collected at SWMU 8. Thirteen samples were analyzed VOCs, four samples were analyzed for SVOCs, and eight samples were analyzed for inorganics. A comparison of maximum detected groundwater concentrations to screening levels based on U.S. EPA Region 9 PRGs for ingestion of tap water, U.S. EPA MCLs, and IDEM default groundwater closure levels is presented in Table 7-17. Comparisons for shallow groundwater presented in Table 7-17 are based on a data set consisting of combined permanent monitoring well and temporary well data. Use of temporary well (hydropunch) samples with high levels of turbidity tends to increase the number of chemicals selected as COPCs, especially for metals. The following chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for shallow groundwater at SWMU 8:

- VOCs (1,1,1-TCA, 1,1,2-TCA, 1,1-DCA, 1,1-DCE, 1,2-DCA, benzene, chloroethane, cis-1,2-DCE, toluene, trans-1,2-DCE, TCE, vinyl chloride)

- SVOCs (1,4-dioxane, 3&4 methylphenol)

- Total Inorganics (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, thallium, and vanadium)

- Dissolved Inorganics (antimony, arsenic, cadmium, chromium, iron, and manganese)

Concentrations of 1,1,2-TCA, benzene, toluene, trans-1,2-DCE, 3&4 methylphenol, antimony, barium, cadmium, chromium, and thallium exceeded the screening criteria based on U.S. EPA Region 9 PRGs, but were less than the U.S. EPA MCLs and IDEM default closure levels. Turbidity in the samples appears to have affected the concentrations and chemicals selected as COPCs. For example, most COPCs were identified in samples 08GWT00601, 08GWTW002, and 08GWTW004. The turbidity levels in these samples were greater than 1,000 NTU, 980 NTU, and greater than1,000 NTU, respectively, indicating that high levels of suspended matter were present in the samples. As discussed above, COPC selection for shallow groundwater was based on analytical data from both permanent monitoring wells and temporary (hydropunch) wells. However, the quantitative risk assessment was performed using only permanent monitoring well data. Potential risks associated with the temporary well data are presented and discussed in the uncertainty section (Section 7.6).

A comparison of maximum detected groundwater VOC concentrations to U.S. EPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 7-18. The following VOCs were detected in groundwater at maximum concentrations exceeding the COPC screening levels for migration from groundwater to indoor air and were retained as COPCs for shallow groundwater:

- 1,1-DCA, 1,1-DCE, 1,2-DCA, cis-1,2-DCE, TCE, vinyl chloride

<u>Intermediate Zone</u>

Fourteen VOCs, 1 SVOC, and 18 inorganics were detected in groundwater samples collected from permanent monitoring wells in the intermediate groundwater zone. A comparison of maximum detected groundwater concentrations to screening levels based on U.S. EPA Region 9 PRGs for ingestion of tap

water, U.S. EPA MCLs, and IDEM groundwater closure levels is presented in Table 7-19. The following chemicals were detected at maximum concentrations in groundwater that exceeded the COPC screening levels and were retained as COPCs for intermediate zone groundwater:

- VOCs (1,1,1-TCA, 1,1,2-TCA, 1,1-DCA, 1,1-DCE, 1,2-DCA, chloroform, cis-1,2-DCE, PCE, trans-1,2-DCE, TCE, vinyl chloride)
- SVOCs (1,4-dioxane)
- Total Inorganics (aluminum, arsenic, cobalt, iron, manganese, nickel)

Concentrations of 1,1-DCA, 1,2-DCA, chloroform, PCE, trans-1,2-DCE, arsenic, and nickel exceeded the screening criteria based on U.S. EPA Region 9 PRGs but were less than the U.S. EPA MCLs and IDEM default closure levels. The maximum concentrations of the VOCs selected as COPCs occurred at locations 08MWT001, 08MWT003, and 08MWT005 situated downgradient of the Building 106 Pond. The maximum concentrations of the metals identified as COPCs occurred in sample 08GWT00901, which is located approximately 250 feet south of the SWMU 8 boundary.

A comparison of maximum detected groundwater VOC concentrations to U.S. EPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 7-20. The following VOCs were detected in groundwater at maximum concentrations exceeding the COPC screening levels for migration from groundwater to indoor air and were retained as COPCs for intermediate zone groundwater:

- 1,1,1-TCA, 1,1,2-TCA, 1,1-DCE, cis-1,2-DCE, TCE, vinyl chloride

Deep Zone

Three VOCs, 1 SVOC and 21 inorganics were detected in groundwater samples collected from the deep groundwater zone at SWMU 8. Six samples were analyzed for VOCs and SVOCs, and two samples were analyzed for metals. A comparison of maximum detected groundwater concentrations to screening levels based on U.S. EPA Region 9 PRGs for ingestion of tap water, U.S. EPA MCLs, and IDEM groundwater closure levels is presented in Table 7-21. The following chemicals were detected in groundwater at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for deep groundwater at SWMU 8:

- SVOCs (1,4-dioxane)
- Total Inorganics (aluminum, arsenic, iron, manganese, vanadium)
- Dissolved Inorganics (manganese)

Concentrations of arsenic exceeded the screening criteria based on U.S. EPA Region 9 PRGs but were less than the U.S. EPA MCLs and IDEM default closure levels. The maximum concentration of vanadium exceeded the screening level (set at an HI of 0.1); however, it did not exceed the U.S. EPA Region 9 PRG and IDEM default closure level for groundwater. The maximum concentrations of all chemicals identified as COPCs occurred in sample 08GWT01101, which is located approximately 250 feet south of the SWMU 8 boundary (on the southeastern side). Analytical data for the filtered sample collected at this location indicate that the results for the unfiltered sample may have been affected by turbidity. The concentration of aluminum in the unfiltered sample was 5,210 µg/L, but the concentration was only 15.1 µg/L in the associated filtered sample. Likewise, the concentration of iron in the unfiltered sample was 13,400 µg/L but only 24.3 µg/L in the filtered sample. The concentrations of aluminum and iron in the filtered sample are less than the risk-based screening levels by more than an order of magnitude. Arsenic and vanadium were not detected in the filtered sample from this location.

A comparison of maximum detected groundwater VOC concentrations to U.S. EPA screening levels for chemical migration from groundwater through building foundations and into indoor air is presented in Table 7-22. The concentrations of all VOCs detected in groundwater samples collected from the deep groundwater zone were less than the screening criteria for migration from groundwater into indoor air.

7.2.3.10 Surface Water

Surface water and sediment samples were collected from the Building 106 Pond, from tributaries consisting of four drainage channels that may or may not contain water at any given time (i.e., intermittent surface water flow only), and from the Mainstream located east and south of SWMU 8. The COPC screening for surface water is presented in Tables 7-23, 7-24, and 7-25. The COPC screening for surface water consists of comparing maximum detected concentrations to screening levels based on residential ingestion of tap water (i.e., the COPC screening levels are based on the U.S. EPA Region 9 PRGs). The use of these criteria for surface water assumes that the surface water is used as a drinking source (i.e., potential receptors ingest 2 liters of water per day for 350 days per year). Drinking water criteria were used because surface water criteria representative of the occasional/incidental human exposure to surface water are currently not available. The use of these criteria for screening and risk assessment is conservative because it is unlikely that the surface water at SWMU 8 would ever be used as a source of drinking water. Upgradient surface water samples were also collected during the RFI. Comparisons of

surface water concentrations with concentrations in upgradient samples are presented in Tables 7-23, 7-24, and 7-25 and discussed in the uncertainty section (Section 7.6).

Pond Surface Water

Fifteen VOCs, 11 SVOCs, and 21 inorganics were detected in surface water samples collected from the Building 106 Pond. A comparison of maximum detected surface water concentrations to screening levels based on U.S. EPA Region 9 PRGs for ingestion of tap water, U.S. EPA MCLs, and IDEM groundwater closure levels is presented in Table 7-23. The following chemicals were detected in the surface water at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for the Building 106 Pond:

- VOCs (1,1-DCA, 1,1-DCE, 2-butanone, 4-methyl-2-pentanone, chloroethane, cis-1,2-DCE, toluene, TCE, vinyl chloride, xylenes)

- SVOCs (2-Methylnaphthalene)

- Total Inorganics (aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, vanadium, zinc)

Concentrations of 1,1-DCA, 2-butanone, 4-methyl-2-pentanone, toluene, xylenes, 2-methylnaphthalene, antimony, barium, chromium, copper, and zinc exceeded the screening levels based on U.S. EPA Region 9 PRGs but were less than U.S. EPA MCLs and/or IDEM default closure levels for groundwater. Concentrations of 1,1-DCA, 4-methyl-2-pentanone, toluene, xylenes, 2-methylnaphthalene, aluminum, antimony, barium, cadmium, chromium, vanadium, and zinc exceeded the screening levels (set at an HI of 0.1) but were less than U.S. EPA Region 9 PRGs.

Tributaries

Nine VOCs, 2 SVOCs, and 22 metals were detected in surface water samples collected from the tributaries. A comparison of maximum detected surface water concentrations to screening levels based on the U.S. EPA Region 9 PRGs for ingestion of tap water, U.S. EPA MCLs, and IDEM groundwater closure levels is presented in Table 7-24. The following chemicals were detected in surface water at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for surface water in the tributaries:

- VOCs (cis-1,2-DCE, TCE, vinyl chloride)
- Total Inorganics (aluminum, arsenic, chromium, iron, lead, manganese, thallium, vanadium)

Concentrations of cis-1,2-DCE, vinyl chloride, arsenic, chromium, and thallium exceeded the screening level based on U.S. EPA Region 9 PRGs but were less than U.S. EPA MCLs and IDEM default closure level for groundwater. The maximum detected concentrations of cis-1,2-DCE, chromium, and thallium exceeded the screening levels (set at an HI of 0.1) but were less than U.S. EPA Region 9 PRGs. The maximum concentrations of all metals identified as COPCs occurred in sample 08SP00201. Analytical data for the filtered sample collected at this location indicate that the results for the unfiltered sample may have been affected by turbidity. The concentration of aluminum in the unfiltered sample was 25,800 µg/L, but the concentration was only 213 µg/L in the associated filtered sample. Likewise, the concentration of iron in the unfiltered sample was 29,000 µg/L but was 260 µg/L in the filtered sample. The concentrations of aluminum and iron in the filtered sample are less than the risk-based screening levels. Arsenic, thallium, and vanadium were not detected in the filtered sample from this location. No upgradient metals data are available for the tributaries.

Main Stream

One VOC and 14 metals were detected in Main Stream surface water samples. A comparison of maximum detected surface water concentrations to screening levels based on U.S. EPA Region 9 PRGs for ingestion of tap water, U.S. EPA MCLs, and IDEM groundwater closure levels is presented in Table 7-25. The following chemicals were detected in surface water at maximum concentrations exceeding the COPC screening levels and were retained as COPCs for surface water in the Main Stream:

- Total Inorganics (aluminum, iron, manganese)

Aluminum and iron were identified as COPCs only because the maximum concentrations exceeded U.S. EPA secondary MCLs, which are not health-based criteria. However, concentrations of aluminum and iron were less than the risk-based screening levels. The maximum detected concentration of manganese exceeded the screening level (set at an HI of 0.1) but was less than the U.S. EPA Region 9 PRG. The concentrations of aluminum, iron, and manganese are significantly less than the Region 9 PRGs (based on an HI of 1). Consequently, adverse health effects would not be expected to occur even if the Main Stream surface water was used as a drinking water source.

7.2.3.11 Sediment

The COPC selection process for sediment involves the comparison of maximum concentrations in sediment with screening levels based on Region 9 residential soil PRGs. The use of residential screening criteria for sediment COPC identification is regarded as a conservative approach because exposure to sediment is anticipated to be less intensive than the daily exposure assumed for soil under a residential land use scenario.

Pond Sediment

Fifteen VOCs, 21 SVOCs, 19 metals, and perchlorate were detected in sediment samples collected from the Building 106 Pond. A comparison of maximum detected sediment concentrations to screening levels based on U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact to soil is presented in Table 7-26. The following chemicals were detected in sediment at maximum concentrations exceeding the direct contact risk-based COPC screening levels and were retained as COPCs for pond sediment:

- VOCs (1,1,1-TCA, 1,1-DCA, 1,1-DCE, chloroethane, cis-1,2-DCE, trans-1,2-DCE, TCE)
- PAHs [benzo(a)pyrene]
- Inorganics (arsenic, iron, vanadium)
- Perchlorate

The maximum detected concentrations of iron, vanadium, and perchlorate exceeded the screening levels (set at an HI of 0.1); however, they do not exceed U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. The maximum concentration of benzo(a)pyrene exceeded the screening levels based on U.S. EPA Region 9 PRGs but was less than the IDEM default closure level for soil.

Tributaries

Two VOCs, 17 SVOCs, 20 metals, and perchlorate were detected in sediment samples collected from the tributaries associated with SWMU 8. A comparison of maximum detected sediment concentrations to screening levels based on U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact to soil is presented in Table 7-27. The following chemicals were detected at maximum concentrations in sediment that exceeded the direct contact risk-based COPC screening levels and were retained as COPCs for sediment in the tributaries:

- PAHs [benzo(a)pyrene]
- Inorganics (aluminum, arsenic, iron, manganese, and vanadium)

The maximum detected concentrations of aluminum and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. The maximum concentration of vanadium is also less than the concentration in the upgradient sample. The maximum concentration of benzo(a)pyrene exceeded the screening levels based on U.S. EPA Region 9 PRGs but was less than the IDEM default closure level for soil. As discussed in Section 5.4, concentrations of metals detected in tributary sediment appear to be comparable to concentrations in background soil and upgradient site background sediment and are not considered to be site related.

Main Stream

Two VOCs, 13 SVOCs, 17 SVOCs, and 20 metals were detected in Main Stream sediment samples. A comparison of maximum detected sediment concentrations to screening levels based on U.S. EPA Region 9 PRGs for residential exposures and IDEM residential default closure levels for direct contact to soil is presented in Table 7-28. The following chemicals were detected at maximum concentrations in sediment that exceeded the direct contact risk-based COPC screening levels and were retained as COPCs for Main Stream sediment:

- Inorganics (aluminum, arsenic, iron, manganese, and vanadium)

The maximum detected concentrations of aluminum and vanadium exceeded the screening levels (set at an HI of 0.1); however, they do not exceed the U.S. EPA Region 9 PRGs and IDEM default closure levels for soil. The maximum concentration of vanadium is also less than the concentration in the upgradient sample. As discussed in Section 5.4, concentrations of metals detected in Main Stream sediment appear to be comparable to concentrations in background soil and upgradient site background sediment and are not considered to be site related.

7.2.4 Summary

Table 7-29 summarizes the chemicals retained as COPCs for soil, groundwater, surface water, and sediment at the SWMU 8. RAGS Part D tables for COPC selection are included in Appendix I.

7.3 EXPOSURE ASSESSMENT

This portion of the risk assessment defines and evaluates, quantitatively or qualitatively, the type and magnitude of human exposure to the chemicals present at or migrating from a site. The exposure assessment is designed to depict the physical setting of the site, to identify potentially exposed populations and applicable exposure pathways, to calculate concentrations of COPCs to which receptors might be exposed, and to estimate chemical intakes under the identified exposure scenarios.

Actual or potential exposures at SWMU 8 were determined based on the most likely pathways of contaminant release and transport, as well as human activity patterns. A complete exposure pathway has three components: a source of chemicals that can be released to the environment, a route of contaminant transport through an environmental medium, and an exposure or contact point for a human receptor.

7.3.1 Conceptual Site Model

This section discusses the conceptual site model for SWMU 8. A conceptual site model facilitates consistent and comprehensive evaluation of the potential risks to human health by creating a framework for identifying the pathways by which human receptors may come in contact with contaminated media resulting from the source area. A conceptual site model depicts the relationships among the following elements, which are necessary for defining complete exposure pathways:

- Site sources of contamination
- Contaminant release mechanisms and transport/migration pathways
- Exposure routes
- Potential receptors

Section 6.0 presented a detailed conceptual site model for SWMU 8. This section summarizes the conceptual site model as it applies to the HHRA. Figure 7-2 illustrates the conceptual site model for SWMU 8.

The elements of the conceptual site model (contaminant source, release mechanisms, transport/migration pathways, exposure routes, and potential receptors) establish the manner and degree to which a potential receptor may be exposed to chemicals present at the site. The degree of risk incurred by a potential receptor varies according to the means of exposure, the duration of exposure, and the specific chemical to which the receptor is exposed. An exposure, however long in duration, does not necessarily result in

an “unacceptable” health or environmental risk, although risks generally increase with increased frequency and/or duration of exposure.

The elements of the conceptual site model, including how they pertain to SWMU 8 are discussed below. Sources of contamination, contaminant release mechanisms, transport and migration pathways, exposure routes, and potential receptors are defined. Table 7-30 provides a site-specific summary of the potential receptors evaluated for SWMU 8. A summary of the exposure routes addressed quantitatively for each human receptor is also provided in Table 7-30.

Site Sources of Environmental Contamination

The description and history of SMMU 8 are presented in Section 1.0. Buildings 106 and 107 have historically been involved with the overhaul of projectile casings. The process involved phosphatizing steel by the application of a zinc phosphate coating to projectiles. Building 106 activities also included a cleaning process that consisted of a caustic wash, a degreaser, and an acid wash. Prior to 1972, untreated wastewater from the cleaning processes in Buildings 106 was pumped into the Building 106 Pond, which was unlined. Malfunctions of the wastewater pumping system reportedly caused the pond to overflow into a neutralizing system and then flow into the sanitary sewage system. In 1981, cooling water from the degreasers, which contained high concentrations of heavy metals, was discharged to a storm drain. SWMU 8 also includes Building 107, which was originally used to refinish wooden and metal boxes. The metal boxes were cleaned with TCE. Wooden boxes were treated with PCP. Metal and wooden boxes were painted in four paint booths. Overflow and floor drainage from Buildings 106 and 107 flowed into the Building 106 Pond. In addition, spills or leaching from drums potentially containing metals, organic solvents and fuels, pesticides, herbicides, and PCBs to surface soil are suspected. As discussed in Section 5.5, there is evidence connecting the observed groundwater contamination at SWMU 8 to the pond as a primary contaminant source. The Building 106 Pond is expected to be remediated in the near future, thereby eliminating the major known source of contamination at SWMU 8.

Based on historical site data and sampling, the following parameters are among the site-related chemical contaminants known to be present or potentially present in environmental media at SWMU 8:

- Explosives [e.g., 2,4,6-trinitrotoluene (TNT) and cyclotetramethylene tetranitramine (HMX)]
- Inorganics
- PCBs (from PCB-contaminated fuels or materials)
- SVOCs

- VOCs
- Petroleum hydrocarbons (from waste oils and fuels)

Potential Contaminant Release Mechanisms and Transport/Migration Pathways

Media of concern at the Building 106 Pond have historically included air, soil, surface water and sediments, and groundwater (Halliburton NUS, 1992a). Air was considered a medium of concern because particulates had been released from building ventilation systems in the past. However, air is no longer considered an important medium because a particulate abatement system was installed in 1973. Surface water was considered a medium of concern because explosive powders and particulates were generated from the operations in Buildings 106 and 107, and the wastewater (e.g., floor drains) for these buildings flowed into the Building 106 Pond, potentially contaminating nearby surface waters during pond overflow events (Halliburton NUS, 1992a). Soil was considered a medium of concern because overflow from the Building 106 Pond could have resulted in the migration of contaminants to soil. Based on historical information, plausible contaminant release and migration mechanisms for SWMU 8 include the following:

- Transport of surface soil contaminants to subsurface soils and groundwater (and from one aquifer to another) via infiltration, percolation, and migration within the groundwater aquifer.

- Overland runoff of surface waters and migration of sediments and surface soil from SWMU 8 via ditches and culverts to intermittent drainageways on the eastern and western borders of the site. The intermittent drainageways flow into larger intermittent drainageways that flow south-southeastward into Boggs Creek. Boggs Creek flows south-southeastward and merges with Turkey Creek.

- Migration of contaminants in groundwater (i.e., lateral migration) to potential receptor locations downgradient of SWMU 8 source areas and beyond the NSWC Crane boundary.

- Volatilization of VOCs from groundwater (e.g., into the indoor air of buildings).

- Migration of fugitive dusts and VOCs from surface soils (and subsurface soils if construction and excavation activities occur).

A more detailed conceptual site model analysis is presented in Section 6.0.

Potential Current and Future Receptors of Concern and Exposure Pathways

NSWC Crane is an active naval base and will remain active for the foreseeable future. Currently, repair operations are intermittently performed in Buildings 106 and 107 and are expected to continue for the foreseeable future. However, for purposes of completeness, the baseline risk assessment considers receptor exposure under residential, industrial, and recreational land use scenarios. Based on current and potential future land use, the following potential receptors may be exposed to contaminated environmental media within the study area:

- **Maintenance Workers** – A plausible receptor under current and future land use. This includes adult military or civilian personnel assigned duties on an infrequent basis within the study area (e.g., groundskeeping activities, storm sewer and drainage maintenance). This receptor could be exposed to surface soils (incidental ingestion, dermal contact), surface water (dermal contact), sediments (incidental ingestion, dermal contact), and air (inhalation). Direct contact with groundwater or subsurface soils is not anticipated for this receptor.

- **Occupational Worker** – A plausible receptor under current and future land use. This includes adult military or civilian personnel assigned to routine daily work tasks. This receptor could be exposed to surface soil (incidental ingestion, dermal contact) and air (inhalation). In addition, it is conservatively assumed that the occupational worker may be exposed to groundwater (ingestion, dermal contact) because a public water supply is not currently available within the study area. It is anticipated that this receptor would not be routinely exposed to subsurface soils, surface waters, or sediments. This receptor is expected to be exposed on a more frequent basis than the maintenance or construction worker.

- **Trespassers** – A plausible receptor under current or future land use. Although access to the base is controlled, once inside the base, access to the study area is not limited by any physical constraints. In addition, hunting activities are permitted at the base. Because the study area is relatively remote and surrounded by forested areas, hunters (particularly adolescents) may trespass within the study areas. This receptor may be exposed to potentially contaminated surface soil (0 to 2 feet bgs) (incidental ingestion, dermal contact), air (inhalation), and surface water (incidental ingestion, dermal contact) and sediments (incidental ingestion, dermal contact) in the intermittent streams. However, exposure to surface water is likely to be limited in some areas because of the intermittent nature of the surface water in swales and drainage ditches. Also potential exposures to surface water is limited to wading because the Building 106 Pond (which is to be remediated) and the streams at the site are

not suitable for swimming. Direct contact with groundwater or subsurface soils is not anticipated for this receptor.

- **Construction Workers** – A plausible receptor under future land use. No construction activities are currently planned for the study area. Additionally, the shallow depth to groundwater in some sections of the study areas would likely preclude excavation and construction. However, excavation and construction are plausible in other sections of the study area. Consequently, this receptor could be exposed to surface and subsurface soils (to an estimated maximum depth of 10 feet bgs) (incidental ingestion, dermal contact), shallow groundwater (dermal contact), and air (inhalation). Routine exposure to surface water and sediments is not expected for the construction worker. It should be noted that significant exposures by a construction worker to groundwater are unlikely because if a construction worker is going to have prolonged contact with groundwater, he/she would most likely wear protective clothing such as rubber boots and/or hip waders, which would limit receptor exposure. In addition, most excavation activities would utilize construction equipment such as a back hoe, which would limit a construction worker's exposure. Also, if significant groundwater was encountered during an excavation of a trench or foundation, groundwater would most likely be pumped out of the excavation so that the construction activities could be completed.

- **Recreational Users** – A plausible receptor under future land use. If NSWC Crane was to close, the most likely scenario is that the property would be converted to a park. A recreational user may be exposed to potentially contaminated surface soil (0 to 2 feet bgs) (incidental ingestion, dermal contact), air (inhalation), surface water (incidental ingestion, dermal contact), and sediments (incidental ingestion, dermal contact). Exposure to surface water is expected to be limited to wading because the streams at the site are not deep enough for swimming. In addition, it is conservatively assumed that the recreational user may be exposed to groundwater (ingestion, dermal contact) while cleaning up (e.g., washing hands, face, and legs) after visiting the hypothetical park. (A public water supply is not currently available within the study area.) Direct contact with subsurface soils is not anticipated for this receptor. NSWC Crane is not expected to close because principal base operations, the demilitarization of munitions, are critical to the support of the United States Naval fleet.

- **On-Base Residents** – An unlikely receptor under future land use. Although this scenario is highly unlikely, a future residential scenario is typically evaluated in a risk assessment for decision-making purposes. For example, the need for deed restrictions at a site may be eliminated prior to site closure if minimal risks are estimated for residential receptors. It is assumed that a hypothetical resident may

be exposed to surface soils (incidental ingestion, dermal contract), groundwater (ingestion, dermal contact), surface water (ingestion, dermal contact), air (inhalation), and sediment (incidental ingestion, dermal contact). Potential exposures to surface water are limited to wading because the streams at the sites are not deep enough for swimming.

Details regarding the assumed receptor characteristics (e.g., intake rate, frequency, and duration of exposure) are defined in Section 7.3.4.

To aid risk managers in making remedial decisions for SWMU 8, potential risks are also evaluated for exposure of current/future occupational workers and future residents to subsurface soil. These scenarios are based on the assumption that subsurface soil may be brought to the surface during future excavation activities. The results of this evaluation are presented in the uncertainty section (Section 7.6.2).

7.3.2 Central Tendency Exposure Versus Reasonable Maximum Exposure

Traditionally, exposures evaluated in the HHRA were based on the concept of a reasonable maximum exposure (RME) only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (U.S. EPA, 1989). However, subsequent risk assessment guidance (U.S. EPA, 1992) indicates the need to address an average case or central tendency exposure (CTE).

To provide a full characterization of potential exposure, both RME and CTE scenarios were evaluated in the HHRA for SWMU 8. The available guidance (U.S. EPA, 1993a) concerning the evaluation of CTE is limited and at times vague. Therefore, professional judgment was exercised when defining CTE conditions for a particular receptor at a site.

7.3.3 Exposure Point Concentrations

The EPC, which is calculated for COPCs only, is an estimate of the chemical concentration within an exposure unit (EU) likely to be contacted over time by a receptor and is used to estimate exposure intakes. An EU is defined as the area typically encountered/traversed by a receptor under a particular land use scenario. For example, a residential lot size of ¼ acre to 2 acres is often used for the evaluation of a hypothetical future resident. However, the size of an EU is typically based on the distribution of the chemical concentrations in a medium as well as on presumed receptor activity patterns.

The following EUs were considered in the risk assessment for SWMU 8:

- Surface and subsurface soil - As described in Sections 7.2.3.1 through 7.2.3.8, the following four EUs were defined for quantitative risk evaluation at SWMU 8:

  - The soil in the vicinity of the Building 106 Pond. The soil near the Building 106 Pond is likely to have been impacted by releases from the pond.

  - The grass and gravel areas near Building 106 and Building 107.

  - The soil under Building 106 and the surrounding pavement.

  - The soil under Building 107 and the surrounding pavement. As described in Sections 7.2.3.7 and 7.2.3.8, no COPCs for direct contact with surface or subsurface soil were identified for this EU. Therefore, a quantitative risk evaluation was not performed for Building 107.

- Groundwater - As described in Sections 5.5 and 7.2.3.9, three EUs were evaluated for groundwater:

  - Shallow bedrock and overburden zone
  - Intermediate bedrock zone
  - Deep bedrock zone

As explained in Section 5.5, available evidence indicates that the Building 106 Pond is the likely source of the contamination in groundwater. The three groundwater zones were evaluated as distinct EUs because they are separate water-bearing zones and because of differences in the analytical results reported for each zone.

- Surface water and sediment - As described in Sections 5.1.2, 7.2.3.10, and 7.2.3.11, three EUs were defined for evaluating risks from surface water and sediment:

  – The Building 106 Pond.
  – The tributaries consisting of four drainage channels with intermittent flow that discharge into the Main Stream.
  – The Main Stream located east and south of SWMU 8.

These were evaluated as distinct EUs because of they are separate geographic areas and because of differences noted in the analytical results reported for these areas.

The following guidelines were used to calculate the EPCs for the EUs defined above:

- If a soil, surface water, or sediment data set for an EU contained fewer than 10 samples, the EPC for the RME and CTE cases was defined as the maximum detected concentration.

- If a soil, surface water, or sediment data set for an EU contained 10 or more samples, the 95-percent upper confidence limit (UCL) on the arithmetic mean, which was based on the distribution of the data set, was selected as the EPC for the RME and CTE cases. EPCs were calculated following U.S. EPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (2002d) using the U.S. EPA's ProUCL guidance (Singh. et al., 2004).

- The EPCs for groundwater were the arithmetic averages of concentrations in wells in the highly concentrated area of the plume. As discussed in Section 7.2.3.9, the data set for shallow groundwater consisted of both permanent monitoring well and temporary well samples. The EPCs calculated for groundwater were based on permanent monitoring well data because permanent wells are more representative of the types of wells used for drinking water and because of the very high turbidity of most temporary wells. Risks associated with exposure to chemical concentrations in the temporary wells are presented and discussed in the uncertainty section (Section 7.6). The following wells were used to estimate EPCs in the three groundwater zones:

  - Shallow Bedrock and Overburden Zone. For organic chemicals and metals, the EPCs are the concentrations in permanent monitoring well 08GWT006. The COPC concentrations in well 08GWT006 were conservatively used as the EPCs for shallow groundwater because the highest concentrations of organic chemicals and inorganics were detected at this location.

  - Intermediate Bedrock Zone. Average of concentrations at locations MWT001, MWT003, and MWT005 for organics and concentrations in sample 08GWT00901 for metals. The averages of locations MWT001, MWT003, and MWT005 were used as EPCs for organic chemicals because these wells are located downgradient of the Building 106 Pond and because they contained the highest concentrations of VOCs. The concentrations from sample 08GWT00901 were used as EPCs for metals because the highest concentrations of metals in the intermediate zone were reported in this sample.

  - Deep Bedrock Zone. For organic chemicals and metals, the EPCs are the concentrations in well GWT01101. The concentrations in well GWT01101 were conservatively used as the EPCs for

the deep groundwater zone because the highest concentrations of organic chemicals and inorganics were detected at this location.

Data values less than sample-specific detection limits were substituted with one-half the detection limit. Table 7-31 summarizes the EPCs used in this HHRA. RAGS Part D Tables for the EPCs are presented in Appendix I.

7.3.4 Chemical Intake Estimation

The methodologies and techniques used to estimate exposure intakes are presented in this section. Intakes for the identified potential receptor groups were calculated using current U.S. EPA risk assessment guidance (e.g., U.S. EPA, 1991, 1997a, and 2004a) and are presented in the risk assessment spreadsheets. All quantitative risk assessment results are presented in RAGS Part D format tables (Appendix I).

Noncarcinogenic intakes were estimated using the concept of an average annual exposure. Carcinogenic intakes were calculated as an incremental lifetime exposure, which assumed a life expectancy of 70 years. Assumptions regarding exposure are presented in Tables 7-32 and 7-33 for the RME and CTE scenarios, respectively.

7.3.4.1 Dermal Contact with Soil/Sediment

Direct physical contact with soil and sediment may result in the dermal absorption of chemicals. Exposures associated with the dermal route are estimated using the following equation and exposure factors (U.S. EPA, 2004a):

$$\text{Intake}_{si} = \frac{(C_{si})(SA)(AF)(ABS)(CF)(EF)(ED)}{(BW)(AT)}$$

where:

Intake_{si}	=	amount of chemical "i" absorbed during contact with soil/sediment (mg/kg/day)
C_{si}	=	concentration of chemical "i" in soil/sediment (mg/kg)
SA	=	skin surface area available for contact (cm^2/day)
AF	=	skin adherence factor (mg/cm^2)
ABS	=	absorption factor (dimensionless)
CF	=	conversion factor (1×10^{-6} kg/mg)

EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365 days/year
		for carcinogens, AT = 70 years x 365 days/year

Exposed surface areas of the body available for dermal contact are determined on a receptor-specific basis because they correspond with assumed human activities and clothing worn during exposure events. Current guidance documents (U.S. EPA, 1997b and 2004a) were used to develop the default assumptions concerning the amount of skin surface area available for contact for a receptor. To maintain consistency from project to project, input parameters previously used for other NSWC Crane risk assessments (e.g., TtNUS, 2003a and 2003b) were reviewed when developing the exposed surface areas. The rationales used to select the skin areas were as follows:

- For construction workers, maintenance workers, and occupational workers exposed to surface soil or sediment, the surface area available for soil contact was assumed to be the head, hands, and forearms. The skin surface area is 3,300 centimeter squared (cm^2) for the CTE and RME scenarios. These values represent the 50th-percentile areas for the head, hands, and forearms (U.S. EPA, 2004a).

- For adolescent trespassers, 25 percent of the total body surface area for an adolescent (aged 6 to 16) was assumed to be available for surface soil and/or sediment contact. The RME value (3,820 cm^2) was derived from the 95th-percentile surface area data, and the CTE value (3,100 cm^2) was derived from the 50th-percentile data, as provided in Table 6-6 of the Exposure Factors Handbook (U.S. EPA, 1997a).

- For adult recreational users assumed to be exposed to soil/sediment, the exposed surface area available for contact was the sum of the head, arms, hands, lower legs, and feet of an adult male. This skin surface area is 9,070 cm^2 for the RME and CTE scenarios. This value represents the 50th-percentile areas for the arms, hands, lower legs, and feet (U.S. EPA, 1997a). For a small child recreational user (0 to 6 years old), it was assumed that 50 percent of the body surface area was exposed to surface soil and sediment (i.e., 3,300 cm^2). This value represents the 50th-percentile areas presented in Table 6-6 of the Exposure Factors Handbook (U.S. EPA, 1997a).

- For adult residents exposed to surface soil/sediment, the exposed surface area available for contact is the U.S. EPA recommended value of 5,700 cm^2 for the RME and CTE scenarios (U.S. EPA, 2004a). This value assumes that the adult resident is wearing a short-sleeved shirt, shorts, and shoes; therefore, the exposed skin surface is limited to the head, hands, forearms, and lower legs. For a child resident, the recommended value of 2,800 cm^2 was used as the exposed skin surface area for the RME and CTE scenarios (U.S. EPA, 2004a). This value assumes that the child resident is wearing a short-sleeved shirt, shorts, and no shoes; therefore, the exposed skin surface area is limited to the head, hands, forearms, lower legs, and feet.

The following values of soil adherence factors provided in RAGS Part E (U.S. EPA, 2004a) were used to evaluate risks from exposure to soil and sediment:

- Construction workers - 0.3 mg/cm^2 for the RME and 0.1 mg/cm^2 for the CTE. These values are the 95th-percentile and geometric mean values for construction workers, respectively (U.S. EPA, 2004a and 2002a).

- Maintenance workers and occupational workers - 0.2 mg/cm^2 for the RME and 0.02 mg/cm^2 for the CTE (U.S. EPA, 2004a).

- Adolescent trespassers, child recreational users, and child residents - 0.2 mg/cm^2 for the RME and 0.04 mg/cm^2 for the CTE. These values are the 95th-percentile and geometric mean values presented for soccer players (teens) playing in moist conditions (U.S. EPA, 2004a).

- Adult recreational users and adult residents - 0.07 mg/cm^2 for the RME and 0.01 mg/cm^2 for the CTE (U.S. EPA, 2004a).

For the constituents identified as COPCs in soil, the following absorption factors were used (U.S. EPA, 2004a):

- PAHs - 0.13
- Arsenic - 0.03
- Cadmium - 0.001
- Semivolatile organics - 0.1

As indicated in RAGS Part E, absorption factors for other metals and volatile organics have not been developed due to insufficient data to support a default value. Therefore, risks from dermal absorption of metals (other than arsenic and cadmium) and VOCs from soil were not quantified in this risk assessment. The uncertainty associated with the omission of these constituents is discussed in the uncertainty analysis.

7.3.4.2 Incidental Ingestion of Soil and Sediment

Incidental ingestion of soil (and sediment) by potential receptors coincides with dermal exposure. Exposures associated with incidental ingestion were estimated in the following manner (U.S. EPA, 1989):

$$\text{Intake}_{si} = \frac{(C_{si})(IR_s)(FI)(EF)(ED)(CF)}{(BW)(AT)}$$

where:

Intake_{si}	=	intake of contaminant "i" from soil or sediment (mg/kg/day)
C_{si}	=	concentration of contaminant "i" in soil or sediment (mg/kg)
IR_s	=	ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (dimensionless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365 days/year
		for carcinogens, AT = 70 years x 365 days/year

The same exposure frequencies and durations used in the estimation of dermal intakes were used to estimate exposure via incidental ingestion. Default values of 1.0 were used for the fraction of soil ingested from the source for both the RME and CTE scenarios. Sediment ingestion rates were the same as those assumed for soil ingestion except that, for recreational users, the fraction ingested was assumed to be 0.5 for both the RME and CTE scenarios.

7.3.4.3 Dermal Contact with Groundwater and Surface Water

The same equation was used to estimate intakes for dermal contact with groundwater and surface water. Direct contact with groundwater at SWMU 8 is limited to exposure that would occur under residential, recreational, typical industrial (occupational), and construction scenarios. Hypothetical future on-base residential receptors were assumed to use groundwater for domestic purposes (i.e., bathing, showering, and dish washing) that can result in dermal exposure. Short-term dermal exposure was assumed to occur for the construction worker during excavation activities and for the hypothetical recreational user or occupational worker receptors that may occasionally use restroom facilities (supplied by groundwater pumped from the underlying aquifer) while working or recreating (neither restroom facilities nor groundwater supply wells exist at SWMU 8 at this time). Dermal contact with surface water may also occur while receptors are involved in certain activities such as landscaping (maintenance worker), trespassing, or recreational sports (e.g., hiking, wading, etc.).

The following equation was used to assess exposures resulting from dermal contact with water (U.S. EPA, 2004a):

$$DAD_{wi} = \frac{(DA_{event})(EV)(ED)(EF)(A)}{(BW)(AT)}$$

where:

DAD_{wi}	=	dermally absorbed dose of chemical "i" from water (mg/kg/day)
DA_{event}	=	absorbed dose per event (mg/cm^2-event)
EV	=	event frequency (events/day)
ED	=	exposure duration (years)
EF	=	exposure frequency (days/year)
A	=	skin surface area available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365 days/year
		for carcinogens, AT = 70 years x 365 days/year

Groundwater exposure for hypothetical future on-base residential receptors using groundwater at SWMU 8 as a domestic water supply was assumed to occur on a daily basis. Exposure to groundwater for construction workers, recreational users, and typical occupational workers and exposure to surface water for maintenance workers, trespassers, and recreational users were also assumed to occur each day the

receptor visits the study area. Dermal intakes for residents hypothetically exposed to groundwater assumed total body exposure. For construction workers, trespassers, occupational workers, maintenance workers, and recreational users, the exposed surface area of the body available for contact was based on assumed activities and was similar to the assumptions outlined for dermal contact with soil and sediment. Tables 7-32 and 7-33 summarize recommendations for exposure parameters used in the baseline risk assessment.

The absorbed dose per event (DA_{event}) was estimated using a non-steady-state approach for organic compounds and a traditional steady-state approach for inorganics. For organics, the following equations apply:

$$\text{If } t_{event} < t^{*}, \text{ then: } DA_{event} = (2)(K_p)(FA)(C_{wi})(CF)\left(\sqrt{\frac{6\,\tau\, t_{event}}{\pi}}\right)$$

$$\text{If } t_{event} > t^{*}, \text{ then: } DA_{event} = (K_p)(FA)(C_w)(CF)\left(\frac{t_{event}}{1+B} + 2\,\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right)$$

where:

t_{event}	=	duration of event (hours/event)
t^{*}	=	time it takes to reach steady-state conditions (hours)
K_p	=	permeability coefficient from water through skin (cm/hour)
FA	=	chemical-specific fraction absorbed (dimensionless)
C_{wi}	=	concentration of chemical "i" in water (mg/L)
τ	=	lag time (hours)
π	=	Pi (dimensionless; equal to 3.1416)
CF	=	conversion factor (0.001 L/cm^3)
B	=	dimensionless ratio of the permeability of the stratum corneum relative to the permeability across the viable epidermis

Values for the chemical-specific parameters (t^{*}, K_p, τ, FA, and B) were obtained from RAGS Part E, the current dermal guidance (U.S. EPA, 2004a), and are presented in the RAGS Part D Tables in Appendix I. If no published values were available for a particular compound, values were calculated using equations provided in the cited guidance.

The following non-steady-state equation was used to estimate DA_{event} for inorganics:

$$DA_{event} = (K_p)(C_{wi})(t_{event})$$

In general, the recommended default value of 0.001 was used for the dermal permeability of inorganic constituents. For most metals, dermal absorption is not a significant pathway because penetration through the skin is minimal.

7.3.4.4 Direct Ingestion of Groundwater and Incidental Ingestion of Surface Water

Residents may be exposed to groundwater via direct ingestion. In addition, maintenance workers, trespassers, recreational users, and residents may incidentally ingest surface water while at the site. Intakes associated with ingestion of water were evaluated using the following equation (U.S. EPA, 1989):

$$\text{Intake}_{wi} = \frac{(C_{wi})(IR_w)(EF)(ED)}{(BW)(AT)}$$

where:

Intake_{wi}	=	intake of chemical "i" from water (mg/kg/day)
C_{wi}	=	concentration of chemical "i" in water (mg/L)
IR_w	=	ingestion rate for groundwater (L/day)
IR_w	=	ingestion rate for surface water (L/day) = (CR)(ET)
CR	=	contact rate for surface water (L/hour)
ET	=	exposure time for surface water (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365 days/year
		for carcinogens, AT = 70 years x 365 days/year

The same exposure times, frequencies, and durations used to assess dermal exposure to water were used to estimate intakes for ingestion of water.

7.3.4.5 Inhalation of Volatiles in Groundwater

Groundwater exposure may also result in an inhalation exposure if the water resource is used as a domestic water supply. This exposure route was evaluated for residential receptors only who may be exposed while showering, bathing, washing dishes, etc. Inhalation exposures were estimated using a mass transfer model developed specifically for this exposure route, in combination with an air intake estimation model. The mass transfer model accounts for inhalation that occurs during a shower and after a shower while the receptor remains in the closed bathroom. The method used to calculate intake is as follows (U.S. EPA, 1989 and Foster and Chrostowski, 1987):

$$\text{Intake}_{si} = \frac{(S)(IR_{sh})(K)(EF)(ED)}{(BW)(AT)(R_a)(CF)}$$

$$K = D_s + \frac{\exp(-R_a \times D_t)}{R_a} - \frac{\exp\left[R_a \times (D_s - D_t)\right]}{R_a}$$

where:

Intake_{wi}	=	intake of chemical "i" from water via inhalation (mg/kg/day)
S	=	volatile chemical generation rate (µg/m^3-min-shower)
IR_{sh}	=	inhalation rate (L/min)
K	=	mass transfer coefficient (min)
EF	=	exposure frequency (showers/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time or period of exposure (days)
R_a	=	air exchange rate (min^{-1})
CF	=	conversion factor (1 x 10^{-6} µg-L/mg-m^3)
D_s	=	shower duration (min)
D_t	=	total time in bathroom (min)

The volatile chemical generation rate was estimated using the Foster and Chrostowski mass transfer model, which is based on two-phase film theory. The model employs contaminant-specific mass transfer coefficients, Henry's Law constants, droplet diameter, drop time, viscosity, temperature, etc. For most metals detected at SWMU 8, volatilization is not a significant pathway because these substances do not vaporize at room temperature.

Construction workers may be exposed to COPCs that have volatilized from groundwater when excavation exposes the shallow water table. Exposures for construction workers associated with the inhalation route were estimated in the following manner (U.S. EPA, 1989):

$$Intake_{ai} = \frac{(C_{ai})(IR_a)(ET)(EF)(ED)}{(BW)(AT)}$$

where: $Intake_{ai}$ = intake of chemical "i" from air via inhalation (mg/kg/day)

C_{ai} = concentration of chemical "i" in air (mg/m^3)

IR_a = inhalation rate (m^3/hr)

ET = exposure time (hours/day)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg)

AT = averaging time (days)

for noncarcinogens, AT = ED x 365 days/year

for carcinogens, AT = 70 year x 365 days/year

The same exposure frequency and exposure time used to estimate intake from dermal contact with groundwater were used to evaluate intake from inhalation of VOCs from groundwater during construction activities.

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. To estimate the EPC for air in a construction trench, this HHRA followed an approach suggested by the Virginia Department of Environmental Quality (VDEQ) (2004), which is based on a combination of a vadose zone model (to estimate volatilization of gases from contaminated groundwater into a trench) and a box model (to estimate dispersion of the contaminants from the air inside the trench into the above-ground atmosphere). The VDEQ methodology is described in the following paragraphs.

The airborne concentration of a contaminant in a trench can be estimated using the following equation:

$$C_{air} = C_{GW} \times VF$$

where:

C_{air} = air concentration of contaminant in the trench (µg/m^3)

C_{GW} = concentration of contaminant in groundwater (µg/L)

VF = volatilization factor (L/m^3)

It is assumed that a construction project could result in an excavation of 15 feet bgs or less. If the depth to groundwater at a site is less than 15 feet, the VDEQ model assumes that a worker would encounter groundwater when digging an excavation ditch or a trench. The worker would then have direct exposure to the groundwater. The worker would also be exposed to contaminants in the air inside the trench that would result from volatilization from groundwater pooling at the bottom of the trench.

The following equation is used to calculate the volatilization factor (VF) for a trench less than 15 feet deep:

$$VF = (K_i \times A \times F \times 10^{-3} \times 10^{4} \times 3{,}600) / (ACH \times V)$$

where:

K_i	=	overall mass transfer coefficient of contaminant (cm/s)
A	=	area of the trench (m^2)
F	=	fraction of floor through which contaminant can enter (unitless)
ACH	=	air changes per hour (h^{-1}) = 360 h^{-1}
V	=	volume of trench (m^3)
10^{-3}	=	conversion factor (L/cm^3)
10^{4}	=	conversion factor (cm^2/m^2)
3,600	=	conversion factor (seconds/hour)

Studies of urban canyons suggest that if the ratio of trench width, relative to wind direction, relative to trench depth is less than or equal to 1, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere and, based on measured ventilation rates of buildings, the air changes per hour (ACHs) are assumed to be 2. Based on the ratio of trench depth to the average wind speed, if the ratio of trench width to trench depth is greater than 1, the air exchange between the trench and above-ground atmosphere is not restricted, and the ACHs are assumed to be 360. The exposure assessment performed for these HHRAs assumes the width-to-trench depth ratio is greater than 1; therefore, ACHs were assumed to be 360.

K_i is calculated using the following equation:

$$K_i = 1 / \{(1/k_iL) + [(RT) / (H_i\ k_iG)]\}$$

where:

K_i	=	overall mass transfer coefficient of containment (cm/s)
k_iL	=	liquid-phase mass transfer coefficient of i (cm/s)
R	=	ideal gas constant (atm-m^3/mole-°K) = 8.2×10^{-5}
T	=	average system absolute temperature (°K) (Default = 298°K)
H_i	=	Henry's Law constant of i (atm-m^3/mole)
k_iG	=	gas-phase mass transfer coefficient of i (cm/s)

The formulas for calculating k_iL and k_iG are as follows:

$$k_iL = (MWO_2/MW_i)^{0.5} \times (T/298) \times kL,O_2$$

where:

k_iL	=	liquid-phase mass transfer coefficient of component i (cm/s)
MWO_2	=	molecular weight of oxygen (g/mole)
MW_i	=	molecular weight of component i (g/mole)
T	=	average system absolute temperature (°K) (Default = 298°K)
kL,O_2	=	liquid-phase mass transfer coefficient of oxygen at 25°C (cm/s) = 0002 cm/s

$$k_iG = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times kG,H_2O$$

where:

k_iG	=	gas-phase mass transfer coefficient of component i (cm/s)
MWH_2O	=	molecular weight of water (g/mole)
kG,H_2O	=	gas-phase mass transfer coefficient of water vapor at 25°C (cm/s)= 0.833 cm/s (Superfund Exposure Assessment Manual, U.S. EPA, 1988).
T	=	average system absolute temperature (°K) (Default = 298°K)

Chemical properties were obtained from the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (U.S. EPA, 2002a). Data and calculations of the shower model and construction worker in a trench model are presented in Appendix I.

7.3.4.6 Vapor Intrusion into Buildings

Current/future occupational workers and hypothetical residents may be exposed to COPCs that have volatilized from groundwater and migrated through building foundations into indoor air. Indoor air concentrations resulting from vapor intrusion from groundwater were estimated using the Johnson and Ettinger volatilization model (U.S. EPA, 2004c). The model assumes that volatile chemicals are emitted from groundwater, migrate through subsurface soil, through cracks in the building foundation, and accumulate in air inside a building. The results of the vapor intrusion evaluation are presented in the uncertainty section (Section 7.6.2) due to the uncertainty associated with the EPCs generated using the Johnson and Ettinger volatilization model.

7.3.4.8 Summary of Exposure Parameters

A summary of the exposure input parameters for all exposure pathways are presented in Tables 7-32 and 7-33 for the identified potential receptor groups at SWMU 8. In general, standard default parameters (e.g., U.S. EPA, 1991 and 1997a), which combine mid-range and upper-end exposure factors, were used to assess RME conditions. CTE was assessed primarily by the use of mid-range exposure factors presented in current risk assessment guidance (U.S. EPA, 1989 and 1993a).

7.3.5 Exposure to Lead

The equations and methodology presented in the previous section cannot be used to evaluate exposure to lead because of the absence of published dose-response parameters. Exposure to lead was assessed using the following models:

- The latest version of U.S. EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead (U.S. EPA, 2002e). This model is typically used to evaluate lead exposure assuming a residential land use scenario.

- The U.S. EPA's Technical Review Work Group (TRW) Model for Lead (U.S. EPA, 2003a). This model is typically used to evaluate lead exposure assuming a non-residential land use scenario.

The IEUBK Model for lead (U.S. EPA, 2002e) is designed to estimate blood levels of lead in children (under 7 years of age) based on either default or site-specific input values for air, drinking water, diet, dust, and soil exposure. Studies indicate that infants and young children are extremely susceptible to adverse effects from exposure to lead. Considerable behavioral and developmental impairments have been noted in children with elevated blood-lead levels. The threshold for toxic effects from this chemical is believed to be in the range of 10 to 15 micrograms per deciliter (µg/dL). Blood-lead levels greater than 10 µg/dL are considered to be a "concern."

For SWMU 8, the IEUBK Model for lead was used to address exposure to lead in children when detected groundwater concentrations exceeded the 15 µg/L federal Action Level promulgated under the Safe Drinking Water Act and/or when detected soil or sediment concentrations exceeded the OSWER soil screening level of 400 mg/kg for residential land use (U.S. EPA, 1994b). Average chemical concentrations, as well as default parameters for some input parameters, were used in the evaluation. Estimated blood-lead levels and probability density histograms are presented as support documentation in Appendix I.

Non-residential adult exposure to lead in soil is evaluated using U.S. EPA's TRW Model for lead (U.S. EPA, 2003a). In this model, adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood-lead concentration in the developing fetuses of adult women. The adult lead model generates a spreadsheet for each exposure scenario that is evaluated (i.e., industrial, recreational). The output of the spreadsheet is the probability that the blood-lead concentrations in the fetus exceed 10 µg/L. However, because lead was not identified as a COPC in soil or sediment at SWMU 8, an evaluation using the TRW Model was not performed in this HHRA.

No models are currently available to evaluate the periodic exposure of adolescent trespassers to lead. Therefore, the results of the IEUBK Model for children were used to qualitatively assess exposure of this receptor.

7.4 TOXICITY ASSESSMENT

The objective of the toxicity assessment is to identify the potential health hazards and adverse effects of chemicals in exposed populations. Quantitative estimates of the relationship between the magnitude and type of exposures and the severity or probability of human health effects are defined for the identified COPCs. Quantitative toxicity values determined during this component of the risk assessments were integrated with outputs of the exposure assessments to characterize the potential for the occurrence of adverse health effects for each receptor group.

The toxicity value used to evaluate noncarcinogenic health effects is the RfD; carcinogenic effects are quantified using the CSF.

7.4.1 Toxicity Criteria

Oral and inhalation RfDs and CSFs used in the HHRA for SWMU 8 were obtained from the following primary literature sources (U.S. EPA, 2003e):

- Integrated Risk Information System (IRIS) (U.S. EPA, 2006).
- U.S. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by U.S. EPA's Superfund program.
- Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (CA EPA) toxicity values, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), and the Annual Health Effects Assessment Summary Tables (HEAST) (U.S. EPA, 1997b).

Although RfDs and CSFs can be found in several toxicological sources, U.S. EPA's IRIS on-line database is the preferred source of toxicity values. This database is continuously updated and values presented have been verified by U.S. EPA. The U.S. EPA Region 9 PRG Tables and Region 3 Risk-Based Concentration (RBC) Tables were also used as a source of toxicity criteria when these criteria were not available from the aforementioned references. The RfDs and CSFs for the constituents selected as COPCs for SWMU 8 are presented in Tables 7-34 through 7-37.

7.4.1.1 Toxicity Criteria for Dermal Exposure

RfDs and CSFs found in literature are typically expressed as administered doses; therefore, these values are considered inappropriate for estimating the risks associated with dermal routes of exposure. Oral dose-response parameters based on administered doses must be adjusted to absorbed doses before the evaluation of estimated dermal exposure intakes is made.

The adjustment from administered to absorbed dose was made using chemical-specific absorption efficiencies published in available guidance [i.e., U.S. EPA, 2004a (the primary reference), IRIS, ATSDR toxicological profiles, etc.] and the following equations:

$$RfD_{dermal} = (RfD_{oral})(ABS_{GI})$$

$$CSF_{dermal} = (CSF_{oral}) \ / \ (ABS_{GI})$$

where: ABS_{GI} = absorption efficiency in the gastrointestinal tract

Absorption efficiencies used in the risk assessment reflect U.S. EPA's current dermal assessment guidance (U.S. EPA, 2004a).

7.4.1.2 Toxicity Criteria for Carcinogenic Effects of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by U.S. EPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other carcinogenic PAHs. Toxic effects for these chemicals were evaluated using the concept of estimated orders of potential potency, which relate the potency of the other potentially carcinogenic PAHs to the potency of benzo(a)pyrene, as presented in current U.S. EPA guidance (1993b). The equivalent oral and inhalation CSFs for these chemicals were derived by multiplying the CSFs for benzo(a)pyrene by the orders of potential potency.

7.4.1.3 Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Because there is no evidence that hexavalent chromium is present at the site, speciation analyses was not completed for SWMU 8. However, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the chromium detected in an environmental medium is present in the hexavalent state.

7.4.1.4 Toxicity Criteria for TCE

Toxicity criteria (i.e., RfDs, CSFs) for TCE are not currently published in U.S. EPA's IRIS database or in HEAST. The toxicity criteria developed by the CA EPA (2002) were used for TCE in this risk assessment. Use of the CA EPA values is consistent with previous risk assessments performed at NSWC Crane. The

Indiana Office of Land Quality (OLQ) has recently proposed draft CSFs for TCE for residential and industrial exposure scenarios and a draft TCE document has been released for public comment. The uncertainty associated with the use of the CA EPA toxicity values relative to current U.S. EPA NCEA and proposed State of Indiana values is discussed in Section 7.6.3.

7.5 RISK CHARACTERIZATION

This section provides a characterization of the potential human health risks associated with the potential exposures to COPCs at SWMU 8. Section 7.5.1 outlines the methods used to quantitatively estimate the type and magnitude of potential risks for human receptors. A summary of the risk characterization for the SWMU 8 is provided in Section 7.5.2.

7.5.1 Quantitative Analysis

Quantitative estimates of risk were calculated according to risk assessment methods outlined in U.S. EPA guidance (1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities, referred to as ILCRs, based on CSFs. Noncarcinogenic risk estimates are presented in the form of HQs determined through a comparison of intakes with published RfDs.

ILCR estimates were generated for each carcinogenic COPC, using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = (\text{Estimated Exposure Intake})(\text{CSF})$$

If the above equation resulted in an ILCR greater than 0.01, the following equation was used to calculate cancer risk estimates:

$$\text{ILCR} = 1\text{-}[\exp(\text{-Estimated Exposure Intake})(\text{CSF})]$$

An ILCR of 1×10^{-6} indicates that the exposed receptor has a one-in-one-million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million persons.

As mentioned previously, noncarcinogenic risks were assessed using the concepts of HQs and HIs. The HQ for a noncarcinogenic COPC is the ratio of the estimated intake to the RfD, as follows:

HQ = (Estimated Exposure Intake) / (RfD)

An HI was generated by summing the individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

7.5.1.1 Comparison of Quantitative Risk Estimates to Benchmarks

To interpret quantitative risks and to aid risk managers in determining the need for remediation at a site, quantitative risk estimates were compared to typical benchmarks. Calculated ILCRs were interpreted using the U.S. EPA's "target risk range" (1×10^{-6} to 1×10^{-4}), and HIs were evaluated using a value of 1.0.

U.S. EPA has defined the range of 1×10^{-6} to 1×10^{-4} as the ILCR target risk range for most hazardous waste sites addressed under CERCLA and RCRA. IDEM has defined the same range for the non-default evaluation under their RISC program. Individual or cumulative ILCRs greater than 1×10^{-4} will typically not be considered as protective of human health, and ILCRs less than 1×10^{-6} will typically be regarded as protective. Risk management decisions are necessary when the ILCR is within the 1×10^{-4} to 1×10^{-6} cancer risk range.

An HI exceeding unity (1.0) indicates that there may be potential noncarcinogenic health risks associated with exposure. If an HI exceeded unity, a segregation of target organ effects associated with exposure to the COPCs was performed. Only those chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for a cumulative HI to exceed 1.0, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect.

7.5.2 Results of the Risk Characterization

This section contains a summary of the results of the risk characterization for SWMU 8. Quantitative risk estimates for potential human receptors were developed for those chemicals identified as COPCs. Uncertainties associated with the risk estimates are discussed in Section 7.6. The exposure assessment and toxicity assessment methodology used to calculate the risks presented in this section is provided in Sections 7.3 and 7.4. Potential cancer risks and HIs were calculated for current/future maintenance workers, occupational workers, adolescent trespassers, future construction workers, child recreational users, adult recreational users, and on-site residents under the RME and CTE scenarios and are summarized in Tables 7-38 and 7-39, respectively. Example calculations are presented in Appendix I, and the results of the risk assessment in RAGS Part D format are also included in Appendix I.

7.5.2.1 Non-Carcinogenic Risks - RME

Noncarcinogenic Risks for Exposure to Soil - RME

The target organ-specific HIs for all EUs for all receptors potentially exposed to surface and subsurface soils at SWMU 8 were less than unity (1.0), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined RME exposure conditions.

Noncarcinogenic Risks for Exposure to Surface Water and Sediment - RME

Target organ-specific HIs for all potential receptors for all EUs were less than unity (1.0), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined RME exposure conditions.

Noncarcinogenic Risks for Exposure to Groundwater - RME

For the evaluation of groundwater, the shallow bedrock and overburden (Puz), intermediate bedrock (Pmz), and deep bedrock (P/z) groundwater zones were treated as distinct exposure units and are discussed separately in the following narrative. The risk estimates presented are based on data reported for unfiltered groundwater samples from permanent monitoring wells because permanent wells are more representative than temporary wells of the types of wells used for residential drinking water and because of the very high turbidity of most temporary wells.

Shallow Bedrock and Overburden Groundwater Zone - RME

Target organ-specific HIs for exposure of construction workers, occupational workers, and child and adult recreational users to COPCs in shallow groundwater were less than unity (1.0). The cumulative HIs for hypothetical future child (HI = 43) and adult (HI = 12) residents exceeded unity (1.0). As discussed in Section 7.3.3, these risks are based on exposure to the most contaminated permanent monitoring well (08GWT006), which is located near the southwestern boundary of SWMU 8 (i.e., not in the source area). The main contributors to these HIs were aluminum, arsenic, iron, manganese, and vanadium. The concentrations of these metals in 08GWT006 are generally much greater than concentrations in the other permanent monitoring well samples. For example, the concentration of aluminum in sample 08GWT00601 was 68,200 µg/L, but the next highest aluminum concentration in a permanent well was 63.4 µg/L (the concentration of aluminum in the upgradient sample was 463 µg/L). Field notes indicate that the turbidity reading for sample 08GWT00601 was greater than 1,000 NTU while the average

turbidity reading for other shallow monitoring well samples was less than 5 NTU. Therefore, it is likely that the elevated concentrations of some metals are due to the presence of suspended matter in the sample.

Intermediate Bedrock Groundwater Zone - RME

The HI for exposure of adult recreational users to COPCs in intermediate zone groundwater was less than unity (1.0). The cumulative HIs for occupational workers (HI = 6), child recreational users (HI = 6), hypothetical future child residents (HI = 60), and adult residents (HI = 18) exceeded unity (1.0). The main contributors to these HIs were 1,1-DCE, TCE, iron, manganese, and nickel, with manganese accounting for 67 percent of the total HI (e.g., the child resident HI for manganese = 40). As indicated in Section 7.3.3, the EPCs for organic COPCs in the intermediate zone were the averages of results for locations MWT001, MWT003, and MWT005, and the EPCs for metals were the concentrations reported for sample 08GWT00901. Monitoring wells MWT001, MWT003, and MWT005 are located downgradient of the Building 106 Pond, and monitoring well 08GW009 is located south of the SWMU 8 boundary. The highest concentration of TCE occurred in sample 08GWT00102 from a location near the southeastern corner of the Building 106 Pond. Field notes indicate that the turbidity reading for the sample with the highest metal concentrations (08GWT00901) was 4.9 NTU, indicating that the metals concentrations were probably not greatly effected by suspended matter in the sample. However, as discussed in Section 5.5, the concentrations of a number of metals (aluminum, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, mercury, tin, vanadium, and zinc) appear in groundwater predominantly associated with the suspended matter.

Deep Bedrock Groundwater Zone - RME

Target organ-specific HIs for exposure of occupational workers, child and adult recreational users, and adult residents to COPCs in the deep aquifer were less than unity (1.0). The cumulative HIs for hypothetical future child resident (HI = 10) exceeded unity (1.0). The primary contributors to the HI for the child resident were iron and manganese. As indicated in Section 7.3.3, the EPCs for COPCs in the deep groundwater zone were the concentrations reported for sample 08GWT01101 from a location south of the SWMU 8 boundary. The concentrations of some metals in this sample appear to be associated with particulate matter, as indicated by a comparison of the analytical results for the filtered and unfiltered samples collected at this location. For example, the concentration of iron in the unfiltered sample was 13,400 µg/L, but the concentration was only 23.4 µg/L in the filtered sample. The concentration in the filtered sample is much less than the risk-based screening concentration for iron (1,100 µg/L). In addition, the turbidity reading for sample 08GWT01101 was 108 NTU.

7.5.2.2 Carcinogenic Risks – RME

Carcinogenic Risks for Exposure to Soil - RME

Cumulative ILCRs for all potential receptors exposed to COPCs in soil in all EUs were within the U.S. EPA target risk range, $1x10^{-6}$ to $1x10^{-4}$. The total soil ILCRs represent the summation of risk estimates for COPCs selected for soil near Building 106, the grass and gravel areas near Buildings 106 and 107, and the soil beneath Building 106.

Carcinogenic Risks for Exposure to Surface Water and Sediment - RME

Cumulative ILCRs for all potential receptors exposed to COPCs in surface water and sediment in the three EUs were within the U.S. EPA target risk range, $1x10^{-6}$ to $1x10^{-4}$. As indicated in Table 7-38, the risks for exposure to surface water and sediment in the Building 106 Pond accounted for 90 percent of the total surface water and sediment risks.

Carcinogenic Risks for Exposure to Groundwater - RME

In the evaluation of groundwater, the shallow, intermediate, and deep groundwater zones were treated as distinct exposure units and are discussed separately in the following narrative. The risk estimates presented are based on data reported for unfiltered groundwater samples from permanent monitoring wells because permanent wells are more representative than temporary wells of the types of wells used for residential drinking water and because of the very high turbidity of most temporary wells.

Shallow Bedrock and Overburden Groundwater - RME

The ILCR for construction workers exposed to COPCs in overburden and shallow bedrock was less than $1x10^{-6}$. The ILCRs for occupational workers and recreational users were within the U.S. EPA target risk range. The total residential ILCR (child + adult ILCR = $7x10^{-4}$) exceeded the target risk range. The primary contributor to the elevated ILCRs for shallow groundwater (i.e., ILCRs greater than 10^{-4}) was arsenic, which accounted for approximately 95 percent of the total residential ILCR. Vinyl chloride, TCE, and 1,4-dioxane were minor contributors to the residential receptor risk, accounting for 5 percent of the total ILCR. As indicated previously, these risks are based on exposure to COPCs in the most contaminated permanent monitoring well (08GWT006). The EPC for arsenic was 26.4 µg/L, but arsenic was detected in only one other permanent monitoring well at a concentration of 10.3 µg/L (which is less than the MCL for arsenic).

As stated above, the elevated concentrations of some metals (including arsenic) in the sample from this well were likely due to the presence of suspended matter in sample 08GWT00601.

Intermediate Bedrock Groundwater Zone - RME

The total ILCR for recreational users (child + adult) was within the U.S. EPA target risk range. The ILCR for occupational workers ($2x10^{-4}$) and the total residential ILCR ($1x10^{-3}$) exceeded the target risk range. The primary contributor to the elevated ILCRs for intermediate zone groundwater was TCE, which accounted for approximately 90 percent of the total residential ILCR. Vinyl chloride (total residential ILCR = $8x10^{-5}$) accounted for 6 percent of the total ILCR. Other minor contributors to the total ILCR were 1,1,2-TCA, 1,2-DCA, PCE, 1,4-dioxane, and arsenic. As indicated previously, the EPCs for organic COPCS in the intermediate zone were the averages of results reported for locations MWT001, MWT003, and MWT005, and the EPCs for metals were the concentrations reported for sample 08GWT00901.

Deep Bedrock Groundwater Zone - RME

Cumulative ILCRs for all potential receptors were within the U.S. EPA target risk range.

The HIs and ILCRs calculated for exposure to environmental media at SWMU 8 are subject a number of significant sources of uncertainty. Among these are the fact that the HIs and ILCRs calculated for groundwater were based on exposure to average concentrations of COPCs in the most contaminated area of the plume or on maximum concentrations; the elevated concentrations of some metals (e.g., aluminum, arsenic, lead, iron, and vanadium) are likely due, in part, to suspended particulates in the samples; no constituents were eliminated as COPCs on the basis of background; and groundwater is not currently used at SWMU 8 nor is it expected to be used in the future. A more detailed discussed of these uncertainties are presented in Section 7.6

7.5.2.3 Noncarcinogenic Risks - CTE

Noncarcinogenic Risks for Exposure to Soil - CTE

The sums of target organ-specific HIs for all EUs for all receptors potentially exposed to surface and subsurface soils at SWMU 8 were less than unity (1.0), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined RME exposure conditions.

Noncarcinogenic Risks for Exposure to Surface Water and Sediment - CTE

Target organ-specific HIs for all potential receptors for all EUs were less than unity (1.0), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined RME exposure conditions.

Shallow Bedrock and Overburden Groundwater - CTE

Target organ-specific HIs for construction workers, occupational workers, and child and adult recreational users were less than unity (1.0). The cumulative HIs for hypothetical future child (HI = 13) and adult (HI = 6 residents exceeded unity (1.0). The main contributors to the CTE HIs for the future residents were aluminum, arsenic, iron, and manganese.

Intermediate Groundwater Zone - CTE

The HI for the adult recreational user was less than unity (1.0). The cumulative HIs for occupational workers (HI = 5), child recreational users (HI = 3), hypothetical future child residents (HI = 18), and adult residents (HI = 8) exceeded unity (1.0). Manganese was the primary contributor to the His for these receptors, accounting for approximately 70 percent of the total HIs.

Deep Groundwater Zone - CTE

Target organ-specific HIs for all potential receptors were less than unity (1.0), indicating that adverse noncarcinogenic health effects are not anticipated for these receptors under the defined RME exposure conditions.

7.5.2.4 Carcinogenic Risks – CTE

Carcinogenic Risks for Exposure to Soil - CTE

Cumulative ILCRs for all potential receptors were less than or within the U.S. EPA target risk range.

Carcinogenic Risks for Exposure to Surface Water and Sediment - CTE

Cumulative ILCRs for all potential receptors were less than or within the U.S. EPA target risk range.

Shallow Bedrock and Overburden Groundwater Zone - CTE

The ILCR for construction workers was less than $1x10^{-6}$. The ILCRs for occupational workers, recreational users, and future residents were within the U.S. EPA target risk range of 1×10^{-6} to 1×10^{-4}.

Intermediate Groundwater Zone - CTE

The ILCRs for occupational workers and recreational users were within the U.S. EPA target risk range. The total residential ILCR ($2x10^{-4}$) exceeded the target risk range. The primary contributor to the elevated ILCRs for intermediate zone groundwater was TCE, which accounted for approximately 90 percent of the total residential CTE ILCR. Vinyl chloride (total residential ILCR = $9x10^{-6}$) and arsenic (total residential ILCR = $3x10^{-6}$) were minor contributors to the total ILCR.

Deep Groundwater Zone - CTE

Cumulative ILCRs for all potential receptors were within the U.S. EPA target risk range.

7.5.2.5 Risks from Lead

Lead was identified as a COPC for shallow groundwater at SWMU 8 because the maximum detected concentration (112 µg/L in temporary well 08GWTW002) exceeded the U.S. EPA Safe Drinking Water Act (SDWA) Action Level (15 µg/L).

As discussed in Section 7.3.5, the methodology used to calculate the risks presented in Sections 7.5.2.1 through 7.5.2.4 cannot be used to evaluate exposure to lead because of the absence of published dose-response parameters. Exposure to lead in groundwater was assessed using the U.S. EPA's IEUBK Model for lead (U.S. EPA, 2002e). The IEUBK model is typically used to evaluate lead exposure assuming a residential land use scenario.

The blood-lead concentration of a receptor is considered a key indicator of the potential for adverse health effects. The IEUBK model calculates the probability of a receptor's blood-lead level exceeding 10 µg/dL. The U.S. EPA goal is to limit the childhood risk of exceeding a 10 µg/dL blood-lead concentration to 5 percent.

Child Lead Model (IEUBK) Results

Current U.S. EPA guidance recommends using the average concentration to evaluate exposure to lead. Therefore, the average lead concentration for shallow groundwater (29.3), the average

lead concentration in soil (15.3 mg/kg), and model default values for other model parameters were used in the IEUBK Model. The results of the IEUBK Model evaluation for exposure to lead in shallow groundwater using an average concentration of 29.3 µg/L indicate that the estimated geometric mean blood-lead level for a child resident is 3.65 µg/dL. This blood-lead level is less than the established level of concern (10 µg/dL). Approximately 1.6 percent of children assumed to ingest this concentration of lead in drinking water are expected to experience blood-lead levels greater than 10 µg/dL. This estimate is less than the U.S. EPA's goal of limiting exposure to lead so that no more than 5 percent of the exposed children have an estimated blood-lead level greater than the established level of concern. Analytical results for the four shallow permanent monitoring wells (not detected at 0.09 µg/L and 0.069 µg/L, and detected at 0.18 µg/L and 87.7 µg/L) were used to derive the average groundwater concentration. These data indicate that the concentration in one well (08GWT00601) exceeded the screening concentration. If the concentration in this well (87.7 µg/L) were used in the IEUBK Model, the predicted blood lead levels and probabilities would be unacceptable. However, as discussed previously, the turbidity reading for sample 08GWT00601 was greater than 1,000 NTU, and the elevated concentrations of lead in this sample are likely due to the presence of suspended matter.

Lead was also identified as a COPC for surface water in the Building 106 Pond and in the tributaries because the maximum detected concentrations exceeded the U.S. EPA SDWA Action Level for ingestion of tap water (15 µg/L). No models are currently available to evaluate the limited, periodic exposure of potential receptors to lead in surface water. The concentration in only one tributary sample (29.8 µg/L) exceeded the tap water screening level, and the average lead concentration in tributary surface water was 4.7 µg/L. If either the maximum or average concentrations were evaluated in the IEUBK Model, the predicted blood-lead levels and probabilities of exceeding the level of concern would be acceptable for a residential exposure scenario. The risks from the periodic exposure to lead in tributary surface water for maintenance workers, trespassers, and recreational users are expected to less than risks predicted by the IEUBK Model and would also be acceptable. Because the Navy intends to remediate the Building 106 Pond in the near future, the potential for exposure to surface water in the pond will be removed.

7.6 UNCERTAINTY ANALYSIS

There is uncertainty associated with all aspects of the baseline HHRA. A summary of the uncertainties, including a discussion of how they may affect the final risk estimates, is provided in this section.

Uncertainty in the selection of COPCs is related to the current status of the predictive databases, the grouping of samples, the numbers, types and distributions of samples, and the procedures used to

include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment includes the values used as input variables for a given intake route or scenario, the assumptions made to determine EPCs, and the predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment includes the quality of the existing toxicity data needed to support dose-response relationships and the weight of evidence used to determine the carcinogenicity of COPCs. Uncertainty in risk characterization includes that associated with exposure to multiple chemicals and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the risk assessment process.

Whereas there are various sources of uncertainty, the direction of uncertainty can be influenced by the assumptions made throughout the risk assessment, including selection of COPCs and selection of values for dose-response relationships. Throughout the entire risk assessment, assumptions are biased toward a margin of safety so that the final calculated risks are overestimated.

Generally, risk assessments include two types of uncertainty: measurement and informational uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements. For example, this type of uncertainty is associated with analytical data collected for each site. The risk assessment reflects the accumulated variances of the individual values used.

Informational uncertainty is associated with inadequate availability of information needed to complete the toxicity and exposure assessments. Often, this gap is significant, such as the absence of information on the effects of human exposure to low doses of a chemical, on the biological mechanism of action of a chemical, or on the behavior of a chemical in soil.

After the risk assessment is complete, the results must be reviewed and evaluated to identify the types and magnitude of uncertainty involved. Reliance on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to account for uncertainties in the development of exposure assumptions, conservative estimates must be made to ensure that the particular assumptions made are protective of sensitive subpopulations or the maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can propagate the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward over predicting both carcinogenic and noncarcinogenic risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk management decisions.

This interpretation is especially relevant when the risks exceed the point of departure for defining "acceptable" risk. For example, when risks calculated using a high degree of uncertainty are less than an acceptable risk level (i.e., 10^{-4} to 10^{-6}), the interpretation of no significant risk is typically straightforward. However, when risks calculated using a high degree of uncertainty exceed an acceptable risk level (i.e., 10^{-4}), a conclusion can be difficult unless uncertainty is considered.

7.6.1 Uncertainty in Selection of COPCs

The most significant issues related to uncertainty in COPC selection were the usability of existing databases [i.e., the use of validated and unvalidated sample results (only validated data were used in this risk assessment) and the completeness, precision, and accuracy of the data set], the inclusion of chemicals potentially attributable to background in the quantitative risk assessment, the screening levels used, and the absence of screening levels for a few chemicals detected in site media. A brief discussion of each of these issues is provided in the remainder of this section.

Usability of Existing Databases

Data from samples collected for the RFI were used to assess risks to potential human receptors. The RFI samples were biased because they were collected in areas of known or suspected contamination. For example, soil samples were collected in areas impacted by releases from the Building 106 Pond. Surface and subsurface soil samples were also collected from beneath and around Buildings 106 and 107 where wastewater was discharged into drains and spills are known to have occurred. Surface water and sediment samples were collected from drainage channels downgradient of source areas (i.e., downgradient of the Building 106 Pond). Likewise, most groundwater samples were collected downgradient of the pond, which is considered to be the main source of groundwater contamination at SWMU 8. Because the sampling was biased, the uncertainty is expected to be minimal and risks are not likely to be underestimated.

All the data used in the HHRA were validated, as discussed in Section 3.0. A review of data quality is also provided in this section. The qualification of data during the formal data validation process is not expected to impact the results of the baseline HHRA. Analytical data qualified as estimated were utilized, even though the reported positive concentrations or sample-specific quantitation limits may be somewhat imprecise. The use of estimated data adds to the uncertainty associated with the risk assessment; however, the associated uncertainty is expected to be negligible compared to the other uncertainties inherent in the risk evaluation process (i.e., uncertainties with land uses, exposure scenarios, toxicological criteria, etc.). Analytical data attributable to blank contamination were used in the baseline

risk assessment. When determining exposure concentrations via statistical procedures, a chemical selected as a COPC but not detected in a particular sample was conservatively assumed to be present in that sample at a concentration equal to one-half the sample-specific quantitation limit. Analytical results for some chemicals were qualified “R," rejected, and were not used in the risk assessment. The rejection of a few chemicals in a few samples is not considered to be problematic because there are enough usable analytical data for these parameters to identify whether they are actually present at the site and to estimate the necessary data distribution parameters. In addition, based on historical knowledge of the site, the chemicals with rejected results (acetone, acetonitrile, acrolein, dichlorodifluoromethane, isobutanol, kepone, phenol, propionitrile, 2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 2,4-dimethylphenol, 2,4-dinitrophenol, 2,6-dichlorophenol, 2-chlorophenol, 2-methylphenol, 2-nitrophenol, 3&4-methylphenol, 3,3'-dichlorobenzidine, 4,6-dinitro-2-methylphenol, 4-chloro-3-methylphenol, 4-chloroaniline, 4-nitrophenol, and 4-nitroquinoline-1-oxide) are not expected to be present and are not expected to have been related to site activities. Because all data have been validated, the uncertainty in the calculated risks associated with the data is minimal. This is especially true because the COPCs used in the quantitative risk calculations were minimally affected by data quality problems.

As discussed in Section 2, eight of the nine proposed surface water samples were collected at SWMU 8. Planned sample 08SW00201 was not collected due to the absence of water at the location. The inability to collect this one surface water sample introduces minimal uncertainty into the risk assessment because the area is frequently dry and only contains water after rainfall events. Consequently, there is limited potential for exposure to surface water in these areas.

COPC Screening Levels

The use of risk-based screening concentrations, based on conservative land use scenarios (i.e., residential land use), corresponding to an ILCR of 10^{-6} and HI of 0.1 should ensure that all the significant contributors to risk from a site are evaluated. The elimination of chemicals present at concentrations that correspond to an ILCR less than 10^{-6} and an HI less than 0.1 should not affect the final conclusions of the risk assessment because these chemicals are not expected to cause a potential health concern at the detected concentrations.

Chemicals Without Established Screening Levels

Risk-based screening levels are currently not available for some constituents [e.g., acenaphthylene, 2-methylnaphthalene, benzo(g,h,i)perylene, and phenanthrene]. Therefore, surrogates with similar

chemical structures were selected for these chemicals. In the COPC screening, acenaphthene was used as a surrogate for acenaphthylene, naphthalene was used as a surrogate for 2-methylnaphthalene, and pyrene was selected as a surrogate for benzo(g,h,i)perylene and phenanthrene. Also, the PRG for 4-methylphenol was used as the basis of the screening concentration for 3&4-methylphenol. Applying toxicity values for one compound to another adds to uncertainty in the risk assessment both in regard to the selection of COPCs and the subsequently calculated risks.

A number of constituents do not have U.S. EPA SSLs for the migration from soil to air pathway. This uncertainty is expected to be small because potential risks associated with exposures via inhalation are typically orders of magnitude lower than those associated with exposures via incidental ingestion and dermal contact with soil. A comparison of the screening criteria for direct contact exposures with the screening criteria for migration from soil to air shows that, in most cases, the direct contact screening criteria are at least an order of magnitude lower than the soil to air migration screening criteria for the same compound. If there are unacceptable risks resulting from inhalation exposures, there are usually also unacceptable risks from exposures via the incidental ingestion and dermal contact exposure pathways.

Chemicals Potentially Attributable to Background

Background concentrations were not a consideration in the COPC selection process. If the maximum concentration of a chemical exceeded its respective screening level, that chemical was selected as a COPC and evaluated in the quantitative risk assessment. However, background soil concentrations have been characterized for the facility, and upgradient groundwater, surface water, and sediment samples were collected at SWMU 8. The implications of not including background screening in the COPC selection process are discussed in the following paragraphs.

Surface Water and Sediment

Upgradient samples were collected for Tributary and Main Stream sediment and for Tributary surface water, and results are summarized in Tables 7-23 through 7-28. A comparison of maximum concentrations detected in samples from upgradient locations versus those reported for site-related surface water and sediment sampling locations indicates that the concentrations of a number metals at the site-related sampling locations were less than concentrations in the upgradient samples. If the COPC selection protocol for SWMU 8 had included a background screen (i.e., the elimination of a chemical as a COPC because site concentrations did not exceed background concentrations), the following metals would not have been selected as COPCs:

- Iron and manganese in Main Stream surface water. The concentration of aluminum only slightly exceeded the concentration in the upgradient location and is probably also within naturally occurring levels.
- Aluminum, arsenic, iron, manganese, and vanadium in Main Stream sediment.
- Vanadium in Tributary sediment

If statistical data set-to-data set comparisons had been used (instead of maximum site concentration to upgradient location comparisons), it is likely that more constituents could have been shown to be within background levels. However, as shown in Tables 7-38 and 7-39, the HIs and ILCRs calculated for surface water and sediment were less than the U.S. EPA goal of 1 for noncarcinogens and less than or within U.S. EPA's target risk range for carcinogens. Therefore, the results and conclusions of the risk assessment for surface water and sediment are not significantly affected by not eliminating COPCs from the quantitative risk assessment on the basis of background.

Groundwater

Thirteen metals were selected as COPCs for the shallow groundwater zone, six metals for the intermediate groundwater zone, and five metals for deep groundwater zone. As described in Section 7.5.2.1, a number of the metals selected as COPCs were identified as risk drivers for groundwater (e.g. aluminum, arsenic, iron, and manganese in shallow groundwater, and manganese in the intermediate zone). A comparison of maximum detected concentrations in site wells to metals concentrations in upgradient wells presented in Tables 7-17, 7-19, and 7-21, indicates that the number of metals selected as COPCs would not change (except for aluminum in intermediate zone groundwater) and results of the risk assessment for the three groundwater zones would not be affected if background comparisons were used to select COPCs.

Soil

Seven metals (aluminum, antimony, arsenic, iron, manganese, thallium, and vanadium) were identified as COPCs for quantitative risk evaluation in one or more of the three EUs evaluated in the risk assessment. A discussion of metals concentrations detected in soil relative to facility background concentrations is presented in Section 5.2. Section 5.2 states that metals concentrations in soil samples are generally similar to background soil concentrations, with the possible exception of aluminum, antimony, and lead at a few locations. Of these metals, only aluminum was identified as a COPC for surface or subsurface soil in the three EUs. Antimony was identified as a COPC for subsurface soil in the grass and gravel areas, and lead was not identified as a COPC for soil in any area. However, as shown in Tables 7-38 and 7-39,

the results of the risk assessment indicate the HIs and ILCRs calculated for the metals selected as COPCs for the three soil EUs did not exceed U.S. EPA goals (i.e., target organ specific HIs were less than unity and ILCRs calculated for exposure to arsenic in soil were less than or within the U.S. EPA's target risk range). Furthermore, the concentrations (and risks) for arsenic are uniform across the site, indicating that the levels of arsenic in soil are naturally occurring. Based on the above analysis, the inclusion of metals in the quantitative risk assessment may result in a slight overestimation of risks but does not affect the results and conclusions of the risk assessment.

In summary, inclusion of metals in the quantitative risk assessment for soil, sediment, surface water, and groundwater without considering background does not greatly impact risk assessment conclusions.

Uncertainty Associated with Elevated Turbidity in Groundwater and Surface Water Samples

Another significant source of uncertainty for the risk estimates developed for groundwater and surface water exposure is the fact that elevated concentrations of some metals (e.g., aluminum, arsenic, lead, iron, and vanadium) selected as COPCs appear to be, in part, the result of particulate matter in unfiltered samples. As discussed in Sections 7.2.3.9 and 7.5.2, this was evident in shallow, intermediate, and deep permanent monitoring well samples, in temporary well samples, and in surface water samples. The concentrations of several metals identified as risk drivers in groundwater at SWMU 8 (i.e., aluminum, arsenic, iron, and vanadium) appear to be noticeably affected by high turbidity levels while other metals such as manganese are not. Elevated turbidity readings were reported for unfiltered samples, and metal concentrations reported for the unfiltered samples significantly exceed concentrations reported for filtered samples. Risks based on the samples with high turbidity readings might be greatly overestimated because groundwater that is highly turbid is unlikely to be used as a domestic water supply source and/or is often filtered before being used for drinking and other residential uses.

7.6.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment arises because of the methods used to calculate EPCs, the determination of land use conditions, the selection of receptors and scenarios, and the selection of exposure parameters. Each of these is discussed below.

Land Use

The current land use patterns at NSWC Crane are well established, thereby limiting the uncertainty associated with land use assumptions. Land use at SWMU 8 is currently limited and is expected to be limited in the future as long as NSWC Crane remains an active base (i.e., occupational workers,

maintenance workers, and potential and infrequent trespassers are the only current and likely future receptors). To be conservative, risks to potential current and future construction workers, current and future recreational users, and hypothetical future residents were estimated for the site.

Exposure Point Concentrations

Uncertainty is associated with the use of the 95-percent UCL on the mean concentration as the EPC. As a result of using the 95-percent UCL, the estimations of potential risk for the RME scenario are most likely overstated because the UCL is a representation of the upper limit that potential receptors would be exposed to over the entire exposure period. In some cases (because data sets contained less than 10 samples or because the UCL was greater than the maximum concentration), the maximum concentration was used as the EPC. Use of the maximum concentration tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period. Uncertainty is also introduced when non-detects are assigned a value of one-half the sample-specific quantitation limit in the calculation of the EPC. This may either overstate or understate the risks to the receptors.

There is uncertainty in assuming that current groundwater and surface water concentrations will not change in the future, and this would introduce additional uncertainty in the EPC and risks for any groundwater or surface water COPCs. Concentrations in groundwater and surface water may diminish over time due to natural attenuation processes involving source depletion and dilution. This is an important consideration for SWMU 8 because contaminated surface water and sediment will be removed from the Building 106 Pond in the near future. Because the pond is considered to be the primary source of VOC contamination in groundwater and surface water, the VOC concentrations in these media will likely decrease over time.

As discussed in Section 7.3.3, the risks calculated for groundwater were based on COPC concentrations in the most contaminated permanent monitoring wells. Concentrations in well 08GWT006 were used to estimate risks for the shallow groundwater zone. In the intermediate zone, the averages of concentrations for locations MWT001, MWT003, MWT005 were used as EPCs for organics, and concentrations reported for sample 08GWT00901 were used as EPCs for metals. In order to eliminate some of the uncertainty associated with use of the most contaminated samples to estimate groundwater risks, risk estimates for COPC concentrations detected in the other permanent and temporary wells were also calculated assuming residential exposures and are presented in the following table.

Groundwater Sample	Turbidity (NTU)	Cancer Risks Total Residential ILCR	Noncancer Effects Adult Resident HI	Noncancer Effects Child Resident HI
08GWT00201(S-Perm)	1.2	2E-04	1	4
08GWT00401(S-Perm)	9.3	3E-04	6	19
08GWT00601(S-Perm)	>1000	1E-03	18	60
08GWT00801(S-Perm)	2.3	1E-05	1	3
08GWTW001(S-Temp)	>1000	1E-04	3	10
08GWTW002(S-Temp)	980	3E-03	9	31
08GWTW003(S-Temp)	7.1	7E-04	5	17
08GWTW004(S-Temp)	>1000	2E-04	8	28
08GWTW006(S-Temp)*	NA	5E-05	0.8	3
08GWT00101(I-Perm)	8.7	3E-03	2	8
08GWT00301(I-Perm)	9.2	1E-03	2	6
08GWT00501(I-Perm)	8.29	1E-04	9	30
08GWT00901(I-Perm)	4.9	3E-05	15	53
08GWT01201(I-Perm)*	3	5E-06	0.006	0.02
08GWT01001(D-Perm)	8.05	1E-04	0.5	2
08GWT01101(D-Perm)	108	1E-04	3	10
08GWT01301(D-Perm)*	>1000	No COPCs Detected		
08GWT01401(D-Perm)*	>1000	No COPCs Detected		

S-Perm = Shallow Zone Permanent Monitoring Well
I-Perm = Intermediate Zone Permanent Monitoring Well
D-Perm = Deep Zone Permanent Monitoring Well
NA = Not available
S-Temp = Shallow Temporary Well
* = Sample analyzed for organic chemicals only

The elevated ILCRs shown in the table are mainly due to exposure to VOCs and arsenic. The risks from VOCs in intermediate zone wells are generally greater than risks from VOCs in the shallow wells by as much as an order of magnitude, primarily because of TCE concentrations in samples 08GWT00101 and 08GWT00301. In most cases, elevated arsenic concentrations appear to be related to high turbidity readings. The elevated HIs for adult and child residents shown above are mainly due to exposure to several metals (especially, aluminum, arsenic, iron, manganese, and vanadium). Turbidity in the samples appears to be an important factor in the risks for these metals, but a cause/effect relationship between turbidity and risk is not evident in all samples (e.g., 08GWT00901).

Exposure Routes and Receptor Identification

The determination of various receptor groups and exposure routes of potential concern was based on current land use observed at the site and the anticipated future land use. Therefore, the uncertainty associated with the selection of exposure routes and potential receptors is minimal because they are

considered to be well defined. Although residential use of groundwater was evaluated as an exposure scenario, groundwater is not currently used at the site nor is it expected to be used in the future. Therefore, the evaluation of direct exposure to groundwater performed in this baseline HHRA was included primarily to aid in risk management decision making.

Exposure Parameters

Each exposure factor (for RME and CTE scenarios) selected for use in the risk assessment has some associated uncertainty. Generally, exposure factors are based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally have a broad distribution. To avoid underestimation of exposure, in most cases, the U.S. EPA guidelines (1991 and 1993a) on the RME receptor were used, which generally specify the use of the 95th percentile for most parameters. Therefore, the selected values for the RME receptor represent the upper bound of the observed or expected habits of the majority of the population.

Generally, the uncertainty can be assessed quantitatively for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from statistical analyses on human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty.

For many parameters for which limited information exists (i.e., dermal absorption of chemicals from soil), greater uncertainty exists. For example, current U.S. EPA guidance (2004a) does not provide dermal absorption factors for exposure to VOCs and most metals (except arsenic and cadmium) in soil. Therefore, risks for dermal contact from soil are not evaluated for VOCs and most metals in this risk assessment. Consequently, risks from exposure to soil may be underestimated.

Many of the exposure parameters used to calculate exposures and risks in this report were selected from a distribution of possible values, including U.S. EPA guidance (1991 and 1993a) and dermal guidance (U.S. EPA, 1997a and 2004a). For the RME scenario, the value representing the 95th percentile is generally selected for each parameter to ensure that the assessment bounds the actual risks from a postulated exposure. This risk number is used in risk management decisions but does not indicate what a more average or typical exposure might be or what risk range might be expected for individuals in the exposed population.

To address these issues, U.S. EPA (1992) has suggested the use of the CTE receptor, whose intake variables are often set at approximately the 50th-percentile of the distribution. The risks for this receptor seek to incorporate the range of uncertainty associated with various intake assumptions. Some of the parameters presented in this risk assessment were estimated using professional judgment, although U.S. EPA does provide limited guidance for the CTE evaluation (1993).

Uncertainty Associated with Exposures to Surface Water and Sediment in the Building 106 Pond

As discussed in Sections 5.3, 5.4, and 7.2.3, VOC concentrations in surface water and sediment samples collected from the Building 106 Pond exceeded risk-based screening levels and IDEM default closure levels. The HHRA assumed that receptors would be exposed to surface water and sediment on an infrequent basis (1 day a week for recreational users and hypothetical residents and 1 day every other week for trespassers and maintenance workers). If the receptors are exposed to these media on a more frequent basis than was assumed in the HHRA, the risks would be greater than those presented in Section 7.5. For most VOCs, the ILCRs and HIs for exposures to surface water and sediment are low enough that, even if the exposure frequency was changed from 1 day a week to 7 days a week, the ILCRs and HIs (on a target organ basis) would still be within acceptable levels. However, as discussed previously, surface water and sediment in the Building 106 Pond will be remediated in the near future, and exposure to these media will no longer be a concern.

Uncertainty Associated with Risk Estimates for Occupational Workers and Hypothetical Residents

There is uncertainty in risk estimates developed for both the occupational worker and hypothetical resident because the HHRA did not assume that these receptors would be directly exposed to subsurface soil contamination. In order to determine the effects of possible exposure to subsurface soil, risk estimates were calculated for occupational workers and hypothetical residents assuming that these receptors are exposed to subsurface soil contamination (i.e., assuming that subsurface soils are excavated and distributed across surface soils). The risks were calculated for subsurface soil in the vicinity of the Building 106 Pond, in the grass and gravel areas, and under Building 106. The results of the subsurface soil evaluation was that ILCRs for occupational workers and hypothetical future residents were within U.S. EPA's target risk range of 10^{-4} to 10^{-6} in the three areas. HIs for occupational workers and hypothetical future residents developed on a target organ-specific basis were less than 1, indicating that potential adverse noncarcinogenic health effects are not anticipated under the defined conditions. The results of the subsurface soil evaluation are presented in the following tables.

Risk Estimates for Exposure of Future Residents and Occupational Worker to COPCs in Subsurface Soil in the Vicinity of the Building 106 Pond (RME)		
Receptor	**Hazard Index (HI)**	**Incremental Lifetime Cancer Risk (ILCR)**
Occupational Worker	0.2	6×10^{-6}
Future Child Resident	3	---
Future Adult Resident	0.3	---
Total Residential (Child + Adult)	NA	2×10^{-5}

Risk Estimates for Exposure of Future Residents and Occupational Worker to COPCs in Subsurface Soil in the Grass and Gravel Areas (RME)		
Receptor	**Hazard Index (HI)**	**Incremental Lifetime Cancer Risk (ILCR)**
Occupational Worker	0.2	6×10^{-6}
Future Child Resident	3	---
Future Adult Resident	0.3	---
Total Residential (Child + Adult)	NA	2×10^{-5}

Risk Estimates for Exposure of Future Residents and Occupational Worker to COPCs in Subsurface Soil – Building 106 and Surrounding Pavement (RME)		
Receptor	**Hazard Index (HI)**	**Incremental Lifetime Cancer Risk (ILCR)**
Occupational Worker	0.1	3×10^{-6}
Future Child Resident	2	---
Future Adult Resident	0.2	---
Total Residential (Child + Adult)	NA	1×10^{-5}

Potential Risks Associated with the Migration of Chemicals from Groundwater through Building Foundations into Indoor Air

As discussed in Section 7.2.3.9, several VOCs were detected in shallow and intermediate zone groundwater at concentrations exceeding the screening levels for migration from groundwater through building foundations and into indoor air. Exposures by hypothetical residents to COPCs that have migrated from groundwater into indoor air were evaluated with U.S. EPA's Johnson and Ettinger volatilization model (2004c). Results of the evaluation are presented and discussed in the following paragraphs. Printouts for the Johnson and Ettinger volatilization model are presented in Appendix I.

Risks for Exposure to Indoor Air – Migration of VOCs from Shallow Groundwater

HIs for hypothetical child (HI = 0.01) and adult (HI = 0.003) residents exposed to COPCs assumed to migrate from shallow zone groundwater through building foundations into indoor air are less than unity, indicating that adverse noncarcinogenic effects are not anticipated for these receptors under the defined exposure conditions. The ILCRs for hypothetical child (ILCR = 1×10^{-7}), adult (ILCR = 1×10^{-7}), and lifelong residents (ILCR = 2×10^{-7}) exposed to COPCs migrating from groundwater through building foundations into indoor air are less than the U.S. EPA's target risk range of 1×10^{-4} to 1×10^{-6}.

Risks for Exposure to Indoor Air – Migration of VOCs from Intermediate Zone Groundwater

HIs for hypothetical child (HI = 0.4) and adult (HI = 0.1) residents exposed to COPCs assumed to migrate from intermediate zone groundwater through building foundations into indoor air are less than unity, indicating that adverse noncarcinogenic effects are not anticipated for these receptors under the defined exposure conditions. The ILCRs for hypothetical child (ILCR = 2×10^{-5}), adult (ILCR = 2×10^{-5}), and lifelong residents (ILCR = 4×10^{-5}) exposed to COPCs that have migrated from groundwater through building foundations into indoor air are within the U.S. EPA's target risk range of 1×10^{-4} to 1×10^{-6}.

HIs and ILCRs for occupational workers would also be expected to be within acceptable levels because these receptors would be exposed to volatiles in indoor air on a less frequent basis than residential receptors. In addition, industrial facilities are typically larger than residential housing units and have larger air exchange rates, which would result in lower indoor air concentrations.

The results of the vapor intrusion modeling are subject to the following sources of uncertainty:

- The model assumes that the areal extent of contamination is greater than that of the building floor in contact with the soil and that the contamination is homogeneously distributed within the zone of contamination. At SWMU 8, the areal extent of contamination in groundwater is greater than the size of the building used in the evaluation, but the contamination is not homogenously distributed in groundwater.

- The model does not take into account transformation processes such as biodegradation. As discussed in Section 6, biodegradation of VOCs appears to be occurring in groundwater at SWMU 8.

- The model assumes an infinite source. As discussed previously, the source of the VOC contamination (the Building 106 Pond) will be remediated, and VOCs should no longer be released to soil and groundwater at SWMU 8.

7.6.3 Uncertainty in the Toxicological Evaluation

Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are presented in this section.

Derivation of Toxicity Criteria

Uncertainty associated with the toxicity assessment is associated with hazard assessment and dose-response evaluations for the COPCs. The hazard assessment deals with characterizing the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity is evaluated as a weight-of-evidence determination using the U.S. EPA methods. Positive animal cancer test data suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of noncancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arises from the nature and quality of the animal and human data. Uncertainty is reduced when similar effects are observed across species, strain, sex, and exposure route; when the magnitude of the response is clearly dose related; when pharmacokinetic data indicate a similar fate in humans and animals; when postulated mechanisms of toxicity are similar for humans and animals; and when the COC is structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose-response evaluation includes the determination of a CSF for the carcinogenic assessment and derivation of an RfD for the noncarcinogenic assessment. Uncertainty is introduced from interspecies (animal to human) extrapolation, which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also results from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity, including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposure reflect a bias because only those

individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study and the database from which the quantitative estimate is derived. For cancer effects, the uncertainty associated with dose-response factors is mitigated by assuming the 95-percent upper bound for the slope factor. Another source of uncertainty in carcinogenic assessment is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal data, is based on a nonthreshold assumption of carcinogenesis. Evidence suggests however, that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are noncarcinogenic. Therefore, the use of the linearized multistage model is conservative for chemicals that exhibit a threshold for carcinogenicity.

For noncancer effects, additional uncertainty factors may be applied in the derivation of the RfD to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for noncancer effects arises from the use of an effect level in the estimation of an RfD, because this estimation is predicated on the assumption of a threshold less than which adverse effects are not expected. Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arises in estimation of an RfD for chronic exposure from subchronic data. Unless empirical data indicate that effects do not worsen with increasing duration of exposure, an additional uncertainty factor is applied to the no-effect level in the subchronic study. Uncertainty in the derivation of RfDs is mitigated by the use of uncertainty and modifying factors that normally range between 3 and 10. The resulting combination of uncertainty and modifying factors may reach 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values may cause uncertainty. This is particularly the case when no gastrointestinal absorption rates are available in the literature or when only qualitative statements regarding absorption are available.

Uncertainty Associated with Evaluation of the Dermal Exposure Pathway

According to RAGS Part E (U.S. EPA, 2004a), risks for dermal absorption of inorganics in soil are to be quantitatively evaluated for arsenic and cadmium only. Therefore, risks from dermal exposure to aluminum, antimony, iron, manganese, thallium, and vanadium in soils and/or sediment were not quantified in the risk assessment. Consequently, potential risks for these media may be underestimated as a result of the exclusion of these constituents from the dermal risk assessment calculations. The following paragraphs provide further discussion regarding the uncertainty associated with the evaluation of the dermal absorption of metals from soil and sediment.

The model for dermal exposure to soil and sediment assumes that only a very thin layer of soil of constant thickness is available for contaminant transfer to the stratum corneum and that a constant amount of contaminant, proportional to the soil concentration, will be absorbed per unit area of skin and per exposure event. However, adherence to skin varies with such factors as particle size, soil type, and organic carbon content. As estimated by U.S. EPA (2004a), the absorbed dermal dose could vary by as much as a factor of 50 from the model estimates, even assuming that activity patterns leading to the exposure duration applied in the experimental trials used to develop absorption factors.

Experimental determination of absorption rates indicates that interspecies differences are considerable, which, along with other variables related to condition and age of skin, differences in lag time, and site of application effects, yields appreciable uncertainty in estimated dermal exposures using published chemical-specific permeation functions. In addition, literature data indicate a variation by as much as a factor of 300 in chemical absorption rates for skin in different anatomical areas of the body. It should also be noted that children generally have greater absorption rates than adults.

Uncertainty Associated with Toxicity Criteria for TCE

As noted in Section 7.4.1.4, toxicity criteria (i.e., RfDs, CSFs) for TCE are not currently published on the U.S. EPA's IRIS database or in HEAST. The toxicity criteria developed by the CA EPA (2002) were used for TCE in this risk assessment. U.S. EPA has published draft toxicity values for TCE in a recent technical document (2001). The draft toxicity criteria are currently undergoing peer review. A range of CSFs [0.02 to 0.4 $(mg/kg/day)^{-1}$], as opposed to a single recommended value, is presented in the recent guidance. The draft CSFs are 2 to 30 times higher than the CA EPA CSF [0.013 $(mg/kg/day^{-1}$]. The draft oral RfD is 0.0004 mg/kg/day compared to the CA EPA RfD of 0.5 mg/kg/day. TCE was identified as a COPC in groundwater, pond and tributary surface water, and pond sediment. Risks for exposures to TCE in pond and tributary surface water were within acceptable levels using the CA EPA toxicity values and would be within acceptable levels if the draft U.S. EPA criteria had been used in the calculations. Risks for exposures to TCE in pond sediment were within acceptable levels using the CA EPA toxicity values but would not be within acceptable levels if the draft U.S. EPA criteria had been used in the calculations. Risks for exposures to TCE in groundwater exceeded acceptable levels using the CA EPA toxicity volumes and would also exceed acceptable levels if the draft U.S. EPA toxicity values had been used in the calculations. Therefore, the conclusions of the HHRA would be the same for groundwater and surface water if the draft U.S. EPA toxicity values had been used in the calculations instead of the CA EPA values but would have been different for pond sediment. However, as indicated previously, the sediment in the Building 106 Pond will be removed in remedial activities planned for SWMU 8.

In addition, as indicated in Section 7.4.1.4, in December 2005, the State of Indiana proposed alternate CSFs for TCE. These proposed CSFs are within the draft U.S. EPA range cited in the preceding paragraph. The State has proposed an oral slope factor of 0.034 $(mg/kg/day)^{-1}$ for commercial exposures and an oral CSF of 0.1 $(mg/kg/day)^{-1}$ for residential exposures. If the proposed Indiana CSFs had been used in the SWMU 8 HHRA, the conclusions of the HHRA would be the same for groundwater and surface water. The risks for exposure to TCE in pond sediment would be different for hypothetical future residents (i.e., would be unacceptable) but would be acceptable for workers if the proposed State values were used.

Uncertainty Associated with Toxicity Criteria for Aluminum and Iron

NCEA provisional RfDs were used to evaluate noncarcinogenic effects from exposure to aluminum and iron. The provisional RfDs for these chemicals are based on allowable intakes rather than adverse effect levels. Therefore, there is some degree of uncertainty associated with the use of the RfDs. Some U.S. EPA regions (e.g., Region 1) consider the use of the oral RfD for aluminum and iron inappropriate and recommend that these metals not be evaluated quantitatively in risk assessments.

Alternate RfD for Iron

As previously discussed, there is uncertainty associated with the toxicity data for iron. The RfD for iron is based on the recommended daily allowance (RDA) for adult human nutrition. Children and adolescents require more iron in their diets than adults do; consequently, using an RfD based on the adult RDA for iron to evaluate exposures to children results in an overestimation of the risks for children. When the HI for exposures to iron by children exceeds unity, U.S. EPA Region 3 recommends recalculating the HI using an RfD of 1.1 mg/kg/day (instead of the 0.3 mg/kg/day provided in IRIS). If this value was used to estimate risks for children, the HQs calculated for iron would decrease by a factor of 1.1/0.3. Therefore, the risk estimates calculated for iron may be overestimated. The HIs for the child resident assumed to be exposed to shallow, intermediate, and deep zone groundwater were 14, 3, and 4, respectively. If the alternate RfD was used, the HQ for shallow groundwater would be 4 and would still exceed the goal of unity (1.0) for the RME. However, the HQs for iron in the intermediate and deep zones would be less than unity if the alternate RfD was used. In addition, the HQ for the CTE for shallow groundwater would be less than unity. The HQs for child exposure to iron in other media were less than unity and therefore the overestimation is not significant.

Alternate RfD for Manganese

The oral RfD for manganese listed in the Region 9 PRG table (0.024 mg/kg/day) was used to calculate risks for ingestion of groundwater. This value includes a modification factor of 3 and an adjustment factor for the dietary contribution, which is applied to the non-dietary RfD (0.14 mg/kg/day) presented in IRIS. IRIS indicates that an adjustment for the dietary contribution should be subtracted from this allowable intake. Using the modified and adjusted RfD results in risk estimates six times higher than if the non-dietary RfD were used. If the non-dietary RfD was used for shallow and intermediate zone groundwater, the HQs for manganese for the future child resident would still exceed the goal of unity. However, the HQ for manganese would be less than unity for the deep groundwater zone if the non-dietary RfD was used.

Uncertainty in the Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Because there is no evidence that hexavalent chromium is present at the SWMU 8, speciation analyses were not performed for any media at the SWMU. Risks associated with this chemical were assessed by conservatively assuming that 100 percent of the reported total chromium result is attributable to hexavalent chromium. Therefore, the risks calculated for chromium in groundwater and surface water were likely overestimated. However, because the HQs calculated for chromium in these media were less than unity, the uncertainty introduced into the risk assessment is minimal.

7.6.4 Uncertainty in the Risk Characterization

Uncertainty in risk characterization resulted from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing noncancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Even when compounds affect the same target organs, they may have different mechanisms of action or differ in their fate in the body, so additivity may not have been an appropriate assumption. However, the assumption of additivity was considered acceptable because in most cases it represented a conservative estimate of risk.

Risks to any individual may also have been overestimated by summing multiple assumed exposure pathway risks for any single receptor. Although every effort was made to develop reasonable scenarios, not all individual receptors may have been exposed via all pathways considered.

Also, the risk characterization did not consider antagonistic or synergistic effects. Little or no information was available to determine the potential for antagonism or synergism for the COPCs. Because

chemical-specific interactions could not be predicted, the likelihood for risks to be over predicted or under predicted could not be defined, but the methodology used was based on current U.S. EPA guidance.

7.7 SUMMARY AND CONCLUSIONS

This section summarizes the results of the HHRA performed for SWMU 8.

The baseline HHRA for the SWMU 8 was performed to characterize the potential risks to likely human receptors under current and potential future land use. Potential receptors under current land use are maintenance workers, occupational workers, and adolescent trespassers. Potential receptors under future land use are construction workers, child and adult recreational users, and hypothetical child and adult residents. Although future land use is likely to be the same as current land use, the potential future receptors were evaluated in the baseline HHRA primarily for decision-making purposes.

The list of direct contact COPCs for SWMU 8 is as follows:

- Surface soil in the vicinity of the Building 106 Pond – benzo(a)pyrene, aluminum, arsenic, iron, manganese, and vanadium.

- Subsurface soil in the vicinity of the Building 106 Pond – benzo(a)pyrene, aluminum, antimony, arsenic, iron, manganese, and vanadium.

- Surface soil in the grass and gravel areas around Buildings 106 and 107 – benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, aluminum, arsenic, iron, manganese, and vanadium.

- Subsurface soil in the grass and gravel areas around Buildings 106 and 107 – aluminum, arsenic, iron, manganese, thallium, and vanadium.

- Surface soil under Building 106 and surrounding pavement – benzo(a)pyrene, dibenzo(a,h)anthracene, aluminum, arsenic, iron, and vanadium.

- Subsurface soil under Building 106 and surrounding pavement – aluminum, arsenic, iron, and vanadium.

- Surface Soil under Building 107 and surrounding pavement – None.

- Subsurface Soil under Building 107 and surrounding pavement – None.

- Groundwater, Shallow Bedrock and Overburden Zone - 1,1,1-TCA, 1,1,2-TCA, 1,1-DCA, 1,1-DCE, 1,2-DCA, benzene, chloroethane, cis-1,2-DCE, toluene, trans-1,2-DCE, TCE, vinyl chloride, 1,4-dioxane, 3&4 methylphenol, aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, thallium, and vanadium.

- Groundwater, Intermediate Zone - 1,1,1-TCA, 1,1,2-TCA, 1,1-DCA, 1,1-DCE, 1,2-DCA, chloroform, cis-1,2 DCE, PCE, trans-1,2-DCE, TCE, vinyl chloride, 1,4-dioxane, aluminum, arsenic, cobalt, iron, manganese, nickel.

- Groundwater, Deep Zone - 1,4-dioxane, aluminum, arsenic, iron, manganese, and vanadium.

- Surface Water, Building 106 Pond - 1,1-DCA, 1,1-DCE, 2-butanone, 4-methyl-2-pentanone, chloroethane, cis-1,2-DCE, toluene, TCE, vinyl chloride, xylenes, 2-Methylnaphthalene, aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, vanadium, zinc.

- Surface Water, Tributaries - cis-1,2-DCE, TCE, vinyl chloride, aluminum, arsenic, chromium, iron, lead, manganese, thallium, vanadium.

- Surface Water, Main Stream - aluminum, iron, manganese.

- Sediment, Building 106 Pond - 1,1,1-TCA, 1,1-DCA, 1,1-DCE, chloroethane, cis-1,2-DCE, trans-1,2-DCE, TCE, benzo(a)pyrene, arsenic, iron, vanadium, and perchlorate.

- Sediment, Tributaries - benzo(a)pyrene, aluminum, arsenic, iron, manganese, and vanadium.

- Sediment, Main Stream - aluminum, arsenic, iron, manganese, and vanadium.

In addition to the COPCs based on direct contact listed above, COPCs were also identified for migration from soil to groundwater and for migration from groundwater through building foundations into indoor air (See Section 7.2.3). Section 7.2.3 also presents comparisons of concentrations in filtered groundwater and surface water samples to screening criteria.

Risk Assessment Results - Exposure to Soil

Quantitative estimates of noncarcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors. Target organ-specific HIs for the all receptors assumed to be exposed to surface soil and subsurface soil under the RME scenario are less than or equal to unity (1).

ILCRs for all receptors exposed to surface and subsurface soil were less than or within U.S. EPA's target risk range of 1×10^{-4} to 1×10^{-6}.

Risk Assessment Results - Exposure to Surface Water and Sediment

Target organ-specific HIs for the all receptors assumed to be exposed to surface water and sediment under the RME scenario are less than or equal to unity.

ILCRs for all receptors exposed to surface water and sediment were less than or within U.S. EPA's target risk range of 1×10^{-4} to 1×10^{-6}.

Although the risks calculated for direct contact with surface water and sediment in the Building 106 Pond were acceptable, the contamination from the pond, especially VOCs, has likely impacted other site media. For example, the sediment in the pond is the likely source of the COPCs that were identified for groundwater. This is one reason why remediation of the pond is warranted.

Risk Assessment Results - Exposure to Groundwater

Shallow Bedrock and Overburden

Target organ-specific HIs for the potable use of shallow groundwater by hypothetical child and adult residents exceeded unity. Aluminum, arsenic, iron, manganese, and vanadium were the major contributors to the HI for hypothetical child residents. Aluminum, arsenic, iron, and manganese were the major contributors to the HI for adult residents. High turbidity readings were reported for the sample on which risks to shallow groundwater were based; the elevated concentrations of aluminum, arsenic, iron, and vanadium in the sample are likely due to the presence of suspended matter in the sample.

The ILCRs for domestic use of shallow groundwater by hypothetical future residents exceeded U.S. EPA's target risk range. Arsenic was the major contributor to the ILCRs for shallow groundwater (ILCR greater than 1×10^{-4}). Vinyl chloride (ILCR greater than 1×10^{-5}), TCE, and 1,4-dioxane (ILCRs between 1×10^{-5} and 1×10^{-6}) were minor contributors to the ILCRs. As stated above, the elevated concentration

of arsenic used to estimate risks was likely due to the presence of suspended matter in the unfiltered groundwater sample. The concentrations of arsenic in most shallow groundwater samples and the average arsenic concentration in the shallow overburden/bedrock were less than the MCL.

Intermediate Zone

HIs for the potable use of intermediate zone groundwater by occupational workers, child recreational users, hypothetical child residents and hypothetical adult residents exceeded unity. Manganese was the major contributor to the HIs for occupational workers, child recreational users, and hypothetical adult residents. 1,1-DCE, TCE, iron, manganese, and nickel were the major contributors to the HI for hypothetical child residents.

ILCRs for domestic use of intermediate zone groundwater by occupational workers and hypothetical future residents exceeded U.S. EPA's target risk range. TCE was the major contributor to the ILCRs for intermediate zone groundwater (ILCR greater than 1×10^{-4}). Several other VOCs, 1,4-dioxane, and arsenic (ILCRs less than 1×10^{-4} but greater than 1×10^{-6}) were minor contributors to the ILCRs.

Deep Zone

HIs for the potable use of deep zone groundwater by hypothetical future child residents exceeded unity. Iron and manganese were the major contributors to the HI for the child resident.

ILCRs for domestic use of deep zone groundwater for all potential receptors evaluated were within U.S. EPA's target risk range.

<u>Risk Assessment Results - Exposure to Lead</u>

Exposures to lead in surface water (the Building 106 Pond and tributaries) and in shallow groundwater were evaluated using U.S. EPA's IEUBK Model. The IEUBK Model analysis indicated that blood-lead levels for children based on exposure to average concentrations at SWMU 8 did not exceed the U.S. EPA goal that no more than 5 percent of exposed children should exceed the 10 µg/L blood-lead level of concern.

In summary, no significant potential human health risks are expected for exposures to surface soil, surface water, and sediment under current or future land use at SWMU 8. Noncarcinogenic and/or carcinogenic risks exceeded U.S. EPA risk benchmarks for occupational workers, child and adult recreational users, and hypothetical child and adult residents using groundwater as a potable water supply. VOCs, 1,4-dioxane,

and several metals were the major contributors to the risks for shallow and intermediate zone groundwater. Iron and manganese were the major contributors to the risks for deep zone groundwater. As discussed in the risk assessment, the risk estimates were subject to a number of significant uncertainties. Among these is the fact that background was not used in the COPC screening process, concentrations of metals in some groundwater samples appear to be elevated because of suspended matter in the samples, and groundwater is not currently used at SWMU 8 nor is it expected to be used in the future. In addition, it is expected that the Building 106 Pond, which is considered to be the primary source of soil, surface water, sediment, and groundwater contamination at SWMU 8, will be remediated in the near future.

TABLE 7-1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U. S. EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 near Building 106 Pond	**Volatile Organic Compounds**														
	67-64-1	Acetone	2 J	5 J	ug/kg	08SS0080002	2/4	0.993 - 1.06	79	NA	1400000 N	35000000	IDEM	No	BSL
	Semivolatile Organic Compounds														
	208-96-8	Acenaphthylene	22	22	ug/kg	08SS0090002	1/4	3.76 - 4.01	1200	NA	370000 N[9]	1100000	IDEM	No	BSL
	120-12-7	Anthracene	7 J	7 J	ug/kg	08SS0090002	1/4	3.76 - 4.01	1200	NA	2200000 N	47000000	IDEM	No	BSL
	56-55-3	Benzo(a)anthracene	4 J	44	ug/kg	08SS0090002	3/4	4.01	44	NA	620 C	5000	IDEM	No	BSL
	50-32-8	**Benzo(a)pyrene**	6 J	91	ug/kg	08SS0090002	3/4	4.01	91	NA	**62 C**	500	IDEM	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	7 J	94	ug/kg	08SS0090002	3/4	4.01	94	NA	620 C	5000	IDEM	No	BSL
	191-24-2	Benzo(g,h,i)perylene	16 J	140 J	ug/kg	08SS0090002	2/4	3.76 - 4.01	140	NA	230000 N[10]	NA	IDEM	No	BSL
	207-08-9	Benzo(k)fluoranthene	8	55	ug/kg	08SS0090002	2/4	3.76 - 4.01	55	NA	6200 C	50000	IDEM	No	BSL
	218-01-9	Chrysene	6 J	65	ug/kg	08SS0090002	3/4	4.01	65	NA	62000 C	500000	IDEM	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	37 J	37 J	ug/kg	08SS0090002	1/4	3.76 - 4.01	37	NA	62 C	500	IDEM	No	BSL
	206-44-0	Fluoranthene	9	29	ug/kg	08SS0090002	2/4	3.91 - 4.01	29	NA	230000 N	6300000	IDEM	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	10 J	91 J	ug/kg	08SS0090002	2/4	3.76 - 4.01	91	NA	620 C	5000	IDEM	No	BSL
	85-01-8	Phenanthrene	8	16	ug/kg	08SS0090002	2/4	3.91 - 4.01	16	NA	230000 N[10]	470000	IDEM	No	BSL
	129-00-0	Pyrene	8	42	ug/kg	08SS0090002	2/4	3.91 - 4.01	42	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	17600 J	24500 J	mg/kg	08SS0060002	4/4	---	24500	5020 - 17400	**7600 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	5.8 J	8 J	mg/kg	08SS0060002	4/4	---	8	1.1 - 10.2	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	65.3 J	130 J	mg/kg	08SS0060002	4/4	---	130	24.8 - 155	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	0.53 J	0.89 J	mg/kg	08SS0060002	4/4	---	0.89	0.3 - 0.82	15 N	680	IDEM	No	BSL
	7440-43-9	Cadmium	0.46 J	0.67 J	mg/kg	08SS0090002	2/4	0.21 - 0.35	0.67	0.05 - 3.6	3.7 N	12	IDEM	No	BSL
	7440-70-2	Calcium	1550 J	15700 J	mg/kg	08SS0090002	4/4	---	15700	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	Chromium	17.9 J	21.4 J	mg/kg	08SS0090002	4/4	---	21.4	7.7 - 30.6	210 C[11]	430[12]	IDEM	No	BSL
	7440-48-4	Cobalt	6.8 J	11.5 J	mg/kg	08SS0060002	4/4	---	11.5	1.8 - 27.1	140 N[13]	NA	NA	No	BSL
	7440-50-8	Copper	11.7 J	27.9 J	mg/kg	08SS0090002	4/4	---	27.9	3.5 - 23.8	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	16700 J	24300 J	mg/kg	08SS0060002	4/4	---	24300	7140 - 40800	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	12.8 J	87.7 J	mg/kg	08SS0090002	4/4	---	87.7	6.4 - 21.5	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	1650 J	2290 J	mg/kg	08SS0060002	4/4	---	2290	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	201 J	412 J	mg/kg	08SS0060002	4/4	---	412	23.2 - 3040	**180 N**	NA	NA	**Yes**	ASL
	7439-97-6	Mercury	0.017 J	0.029 J	mg/kg	08SS0070002	4/4	---	0.029	0.04 - 0.14	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	12.6 J	15.4 J	mg/kg	08SS0080002	4/4	---	15.4	4.6 - 23.7	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	1190 J	1700 J	mg/kg	08SS0060002	4/4	---	1700	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	81.3 J	81.3 J	mg/kg	08SS0080002	1/4	48.6 - 51.3	81.3	3.7 - 205	NA	NA	NA	No	NUT
	7440-62-2	**Vanadium**	28.6 J	36.8 J	mg/kg	08SS0060002	4/4	---	36.8	14.1 - 48.5	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	36.9 J	68.5 J	mg/kg	08SS0090002	4/4	---	68.5	9.4 - 60.2	2300 N	100000	IDEM	No	BSL

TABLE 7-1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.
9 - The value for acenaphthene was used as a surrogate for acenaphthylene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The PRG for residential land use for total chromium is presented.
12 - Value is for hexavalent chromium.
13 - One-tenth of the noncarcinogenic PRG is less than the carcinogenic PRG; therefore, the one-tenth noncarcinogenic PRG is presented.

Associated Samples
08SB006
08SB007
08SB008
08SB009

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
PRG = Preliminary Remediation Goal

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

TABLE 7-2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Generic SSL for Soil to Air[5]	U.S. EPA Generic SSL for Migration to Groundwater[5]	IDEM SSL for Migration to Groundwater[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 near Building 106 Pond	**Volatile Organic Compounds**														
	67-64-1	Acetone	2 J	5 J	ug/kg	08SS0080002	2/4	0.993 - 1.06	5	NA	NA	6600	28000	No	BSL
	Semivolatile Organic Compounds														
	208-96-8	Acenaphthylene	22	22	ug/kg	08SS0090002	1/4	3.76 - 4.01	22	NA	NA	NA	18000	No	BSL
	120-12-7	Anthracene	7 J	7 J	ug/kg	08SS0090002	1/4	3.76 - 4.01	7	NA	NA	650000	51000	No	BSL
	56-55-3	Benzo(a)anthracene	4 J	44	ug/kg	08SS0090002	3/4	4.01	44	NA	NA	160	19000	No	BSL
	50-32-8	Benzo(a)pyrene	6 J	91	ug/kg	08SS0090002	3/4	4.01	91	NA	NA	410	8200	No	BSL
	205-99-2	Benzo(b)fluoranthene	7 J	94	ug/kg	08SS0090002	3/4	4.01	94	NA	NA	490	57000	No	BSL
	191-24-2	Benzo(g,h,i)perylene	16 J	140 J	ug/kg	08SS0090002	2/4	3.76 - 4.01	140	NA	NA	NA	NA	No	NTX
	207-08-9	Benzo(k)fluoranthene	8	55	ug/kg	08SS0090002	2/4	3.76 - 4.01	55	NA	NA	490	39000	No	BSL
	218-01-9	Chrysene	6 J	65	ug/kg	08SS0090002	3/4	4.01	65	NA	NA	160	25000	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	37 J	37 J	ug/kg	08SS0090002	1/4	3.76 - 4.01	37	NA	NA	1500	18000	No	BSL
	206-44-0	Fluoranthene	9	29	ug/kg	08SS0090002	2/4	3.91 - 4.01	29	NA	NA	310000	880000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	10 J	91 J	ug/kg	08SS0090002	2/4	3.76 - 4.01	91	NA	NA	1400	3100	No	BSL
	85-01-8	Phenanthrene	8	16	ug/kg	08SS0090002	2/4	3.91 - 4.01	16	NA	NA	NA	13000	No	BSL
	129-00-0	Pyrene	8	42	ug/kg	08SS0090002	2/4	3.91 - 4.01	42	NA	NA	230000	570000	No	BSL
	Inorganics														
	7429-90-5	Aluminum	17600 J	24500 J	mg/kg	08SS0060002	4/4	---	24500	5020 - 17400	686000 N	NA	NA	No	NTX
	7440-38-2	**Arsenic**	5.8 J	8 J	mg/kg	08SS0060002	4/4	---	8	1.1 - 10.2	745 C	**0.29**	**5.8**	**Yes**	ASL
	7440-39-3	**Barium**	65.3 J	130 J	mg/kg	08SS0060002	4/4	---	130	24.8 - 155	68600 N	**82**	1600	**Yes**	ASL
	7440-41-7	Beryllium	0.53 J	0.89 J	mg/kg	08SS0060002	4/4	---	0.89	0.3 - 0.82	1330 C	3.2	63	No	BSL
	7440-43-9	**Cadmium**	0.46 J	0.67 J	mg/kg	08SS0090002	2/4	0.21 - 0.35	0.67	0.05 - 3.6	1780 C	**0.38**	7.5	**Yes**	ASL
	7440-70-2	Calcium	1550 J	15700 J	mg/kg	08SS0090002	4/4	---	15700	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	17.9 J	21.4 J	mg/kg	08SS0090002	4/4	---	21.4	7.7 - 30.6	267 C	**2.1**	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	6.8 J	11.5 J	mg/kg	08SS0060002	4/4	---	11.5	1.8 - 27.1	1140 C	**0.17**	NA	**Yes**	ASL
	7440-50-8	Copper	11.7 J	27.9 J	mg/kg	08SS0090002	4/4	---	27.9	3.5 - 23.8	NA	560	920	No	BSL
	7439-89-6	Iron	16700 J	24300 J	mg/kg	08SS0060002	4/4	---	24300	7140 - 40800	NA	NA	NA	No	NTX
	7439-92-1	**Lead**	12.8 J	87.7 J	mg/kg	08SS0090002	4/4	---	87.7	6.4 - 21.5	NA	NA	**81**	**Yes**	ASL
	7439-95-4	Magnesium	1650 J	2290 J	mg/kg	08SS0060002	4/4	---	2290	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	201 J	412 J	mg/kg	08SS0060002	4/4	---	412	23.2 - 3040	6860 N	**110**	NA	**Yes**	ASL
	7439-97-6	Mercury	0.017 J	0.029 J	mg/kg	08SS0070002	4/4	---	0.029	0.04 - 0.14	NA	NA	2.1	No	BSL
	7440-02-0	**Nickel**	12.6 J	15.4 J	mg/kg	08SS0080002	4/4	---	15.4	4.6 - 23.7	NA	**14**	950	**Yes**	ASL
	7440-09-7	Potassium	1190 J	1700 J	mg/kg	08SS0060002	4/4	---	1700	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	81.3 J	81.3 J	mg/kg	08SS0080002	1/4	48.6 - 51.3	81.3	3.7 - 205	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	28.6 J	36.8 J	mg/kg	08SS0060002	4/4	---	36.8	14.1 - 48.5	NA	260	NA	No	BSL
	7440-66-6	Zinc	36.9 J	68.5 J	mg/kg	08SS0090002	4/4	---	68.5	9.4 - 60.2	NA	680	14000	No	BSL

TABLE 7-2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels (SSLs). U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm (soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples
08SB006
08SB007
08SB008
08SB009

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
SSL = Soil Screening Level

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

TABLE 7-3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 near Building 106 Pond	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	15	23 J	ug/kg	08SB0071013	2/9	0.886 - 0.974	23	NA	1200000 sat	5000000	IDEM	No	BSL
	75-34-3	1,1-Dichloroethane	35	210 J	ug/kg	08SB0071013	2/9	0.886 - 0.974	210	NA	51000 N	1300000	IDEM	No	BSL
	107-06-2	1,2-Dichloroethane	6 J	6 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	6	NA	280 C	3700	IDEM	No	BSL
	78-93-3	2-Butanone	100 J	100 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	100	NA	2200000 N	44000000	IDEM	No	BSL
	67-64-1	Acetone	2 J	140 J	ug/kg	08SB0071013	9/9	---	140	NA	1400000 N	35000000	IDEM	No	BSL
	75-00-3	Chloroethane	380	380	ug/kg	08SB0071013	1/9	0.886 - 0.974	380	NA	3000 C	80000	IDEM	No	BSL
	156-59-2	cis-1,2-Dichloroethene	2 J	3 J	ug/kg	08SB0071013	3/9	0.886 - 0.974	3	NA	4300 N	110000	IDEM	No	BSL
	100-41-4	Ethylbenzene	2 J	2 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	2	NA	400000 sat	4600000	IDEM	No	BSL
	75-09-2	Methylene Chloride	2 J	67 J	ug/kg	08SB0071013	8/9	0.94	67	NA	9100 C	120000	IDEM	No	BSL
	108-88-3	Toluene	120 J	120 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	120	NA	520000 sat	8800000	IDEM	No	BSL
	1330-20-7	Total Xylenes	13 J	13 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	13	NA	27000 N	690000	IDEM	No	BSL
	156-60-5	trans-1,2-Dichloroethene	5 J	5 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	5	NA	6900 N	180000	IDEM	No	BSL
	79-01-6	Trichloroethene	1 J	36	ug/kg	08SB0060610	4/9	0.886 - 0.974	36	NA	2900 C	710	IDEM	No	BSL
	75-69-4	Trichlorofluoromethane	1 J	4 J	ug/kg	08SB0071013	5/9	0.894 - 0.947	4	NA	39000 N	NA	NA	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	4 J	4 J	ug/kg	08SB0070206	1/9	3.61 - 4.04	4	NA	5600 N[8]	630000	IDEM	No	BSL
	208-96-8	Acenaphthylene	17	23	ug/kg	08SB0071013	2/9	3.61 - 4	23	NA	370000 N[9]	1100000	IDEM	No	BSL
	120-12-7	Anthracene	12	15	ug/kg	08SB0070206	2/9	3.61 - 4	15	NA	2200000 N	47000000	IDEM	No	BSL
	56-55-3	Benzo(a)anthracene	10	89	ug/kg	08SB0071013	3/9	3.61 - 4	89	NA	620 C	5000	IDEM	No	BSL
	50-32-8	**Benzo(a)pyrene**	8	110	ug/kg	8SB0070206, 08SB007101	3/9	3.61 - 4	110	NA	**62 C**	500	IDEM	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	11	200	ug/kg	08SB0071013	3/9	3.61 - 4	200	NA	620 C	5000	IDEM	No	BSL
	191-24-2	Benzo(g,h,i)perylene	13 J	170 J	ug/kg	08SB0071013	3/9	3.61 - 4	170	NA	230000 N[10]	NA	IDEM	No	BSL
	207-08-9	Benzo(k)fluoranthene	7 J	88	ug/kg	08SB0071013	3/9	3.61 - 4	88	NA	6200 C	50000	IDEM	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	180 J	180 J	ug/kg	08SB0080206	1/9	73.3 - 82	180	NA	35000 C	300000	IDEM	No	BSL
	218-01-9	Chrysene	12	190	ug/kg	08SB0071013	3/9	3.61 - 4	190	NA	62000 C	500000	IDEM	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	29 J	60 J	ug/kg	08SB0071013	2/9	3.61 - 4	60	NA	62 C	500	IDEM	No	BSL
	206-44-0	Fluoranthene	11	83	ug/kg	08SB0070206	3/9	3.61 - 4	83	NA	230000 N	6300000	IDEM	No	BSL
	86-73-7	Fluorene	6 J	8 J	ug/kg	08SB0071013	2/9	3.61 - 4	8	NA	270000 N	6300000	IDEM	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	9 J	120 J	ug/kg	08SB0071013	3/9	3.61 - 4	120	NA	620 C	5000	IDEM	No	BSL
	91-20-3	Naphthalene	4 J	8	ug/kg	08SB0070206	3/9	3.61 - 4	8	NA	5600 N	3200000	IDEM	No	BSL
	85-01-8	Phenanthrene	37	67	ug/kg	08SB0071013	3/9	3.61 - 4	67	NA	230000 N[10]	470000	IDEM	No	BSL
	129-00-0	Pyrene	11	120	ug/kg	08SB0070206	3/9	3.61 - 4	120	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	6140 J	23700 J	mg/kg	08SB0070610	9/9	---	23700	5020 - 17400	**7600 N**	NA	NA	**Yes**	ASL
	7440-36-0	**Antimony**	13.3 J	13.3 J	mg/kg	08SB0070610	1/9	0.07 - 0.49	13.3	0.49 - 11.3	**3.1 N**	140	IDEM	**Yes**	ASL
	7440-38-2	**Arsenic**	3 J	8.4 J	mg/kg	08SB0071013	9/9	---	8.4	1.1 - 10.2	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	20.9 J	96.7 J	mg/kg	08SB0070206	9/9	---	96.7	24.8 - 155	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	0.57 J	0.75 J	mg/kg	08SB0070206	5/9	0.32 - 0.39	0.75	0.3 - 0.82	15 N	680	IDEM	No	BSL
	7440-43-9	Cadmium	0.51 J	0.79 J	mg/kg	08SB0070610	3/9	0.1 - 0.22	0.79	0.05 - 3.6	3.7 N	12	IDEM	No	BSL
	7440-70-2	Calcium	94.9 J	21100 J	mg/kg	08SB0070610	9/9	---	21100	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	Chromium	12.2 J	43.4 J	mg/kg	08SB0071013	9/9	---	43.4	7.7 - 30.6	210 C[11]	430[12]	IDEM	No	BSL
	7440-48-4	Cobalt	1 J	11.3 J	mg/kg	08SB0070206	9/9	---	11.3	1.8 - 27.1	140 N[13]	NA	NA	No	BSL
	7440-50-8	Copper	4 J	24.4 J	mg/kg	08SB0070610	9/9	---	24.4	3.5 - 23.8	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	4610 J	21800 J	mg/kg	08SB0071013	9/9	---	21800	7140 - 40800	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	6.1 J	234 J	mg/kg	08SB0070610	9/9	---	234	6.4 - 21.5	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	344 J	2370 J	mg/kg	08SB0070610	9/9	---	2370	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	18.9 J	451 J	mg/kg	08SB0080206	9/9	---	451	23.2 - 3040	**180 N**	NA	NA	**Yes**	ASL

TABLE 7-3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	U.S. EPA Region 9 PRG (Residential)(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
Inorganics (continued)	7439-97-6	Mercury	0.008 J	0.049 J	mg/kg	08SB0070206	8/9	0.006	0.049	0.04 - 0.14	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	3.2 J	17.6 J	mg/kg	08SB0070206	9/9	---	17.6	4.6 - 23.7	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	866 J	1720 J	mg/kg	08SB0070206	9/9	---	1720	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	67.6 J	1350 J	mg/kg	08SB0071013	4/9	32.6 - 58.3	1350	3.7 - 205	NA	NA	NA	No	NUT
	7440-31-5	Tin	18.7 J	3010 J	mg/kg	08SB0070610	2/9	0.22 - 3	3010	NA	4700 N	NA	NA	No	BSL
	7440-62-2	**Vanadium**	13.5 J	37.1 J	mg/kg	08SB0070206	9/9	---	37.1	14.1 - 48.5	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	9.9 J	63.2 J	mg/kg	08SB0071013	9/9	---	63.2	9.4 - 60.2	2300 N	100000	IDEM	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.
8 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
9 - The value for acenaphthene was used as a surrogate for acenaphthylene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The PRG for residential land use for total chromium is presented.
12 - Value is for hexavalent chromium.
13 - One-tenth of the noncarcinogenic PRG is less than the carcinogenic PRG; therefore, the one-tenth noncarcinogenic PRG is presented.

Associated Samples

08SB0060206	08SB0080206
08SB0060610	08SB0080610
08SB0070206	08SB0090206
08SB0070610	08SB0090610
08SB0071013	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
PRG = Preliminary Remediation Goal
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

TABLE 7-4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	U.S. EPA Generic SSL for Soil to Air(5)	U.S. EPA Generic SSL for Migration to Groundwater(5)	IDEM SSL for Migration to Groundwater(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
SWMU 08 near Building 106 Pond	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	15	23 J	ug/kg	08SB0071013	2/9	0.886 - 0.974	23	NA	1200000 sat	97	1900	No	BSL
	75-34-3	1,1-Dichloroethane	35	210 J	ug/kg	08SB0071013	2/9	0.886 - 0.974	210	NA	130000 N	2100	5600	No	BSL
	107-06-2	**1,2-Dichloroethane**	6 J	6 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	6	NA	360 C	**1.2**	24	**Yes**	ASL
	78-93-3	2-Butanone	100 J	100 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	100	NA	24000000 sat	4400	35000	No	BSL
	67-64-1	Acetone	2 J	140 J	ug/kg	08SB0071013	9/9	---	140	NA	NA	6600	28000	No	BSL
	75-00-3	Chloroethane	380	380	ug/kg	08SB0071013	1/9	0.886 - 0.974	380	NA	1200000 sat	NA	650	No	BSL
	156-59-2	cis-1,2-Dichloroethene	2 J	3 J	ug/kg	08SB0071013	3/9	0.886 - 0.974	3	NA	NA	20	400	No	BSL
	100-41-4	Ethylbenzene	2 J	2 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	2	NA	400000 sat	670	13000	No	BSL
	75-09-2	**Methylene Chloride**	2 J	67 J	ug/kg	08SB0071013	8/9	0.94	67	NA	13000 C	**1.2**	**23**	**Yes**	ASL
	108-88-3	Toluene	120 J	120 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	120	NA	650000 sat	590	12000	No	BSL
	1330-20-7	Total Xylenes	13 J	13 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	13	NA	71000 N	7100	210000	No	BSL
	156-60-5	trans-1,2-Dichloroethene	5 J	5 J	ug/kg	08SB0071013	1/9	0.886 - 0.974	5	NA	NA	34	680	No	BSL
	79-01-6	**Trichloroethene**	1 J	36	ug/kg	08SB0060610	4/9	0.886 - 0.974	36	NA	71 C	**2.8**	57	**Yes**	ASL
	75-69-4	Trichlorofluoromethane	1 J	4 J	ug/kg	08SB0071013	5/9	0.894 - 0.947	4	NA	110000 N	8000	NA	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	4 J	4 J	ug/kg	08SB0070206	1/9	3.61 - 4.04	4	NA	NA	NA	3100	No	BSL
	208-96-8	Acenaphthylene	17	23	ug/kg	08SB0071013	2/9	3.61 - 4	23	NA	NA	NA	18000	No	BSL
	120-12-7	Anthracene	12	15	ug/kg	08SB0070206	2/9	3.61 - 4	15	NA	NA	650000	51000	No	BSL
	56-55-3	Benzo(a)anthracene	10	89	ug/kg	08SB0071013	3/9	3.61 - 4	89	NA	NA	160	19000	No	BSL
	50-32-8	Benzo(a)pyrene	8	110	ug/kg	8SB0070206, 08SB007101	3/9	3.61 - 4	110	NA	NA	410	8200	No	BSL
	205-99-2	Benzo(b)fluoranthene	11	200	ug/kg	08SB0071013	3/9	3.61 - 4	200	NA	NA	490	57000	No	BSL
	191-24-2	Benzo(g,h,i)perylene	13 J	170 J	ug/kg	08SB0071013	3/9	3.61 - 4	170	NA	NA	NA	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	7 J	88	ug/kg	08SB0071013	3/9	3.61 - 4	88	NA	NA	490	39000	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	180 J	180 J	ug/kg	08SB0080206	1/9	73.3 - 82	180	NA	NA	180000	3600000	No	BSL
	218-01-9	**Chrysene**	12	190	ug/kg	08SB0071013	3/9	3.61 - 4	190	NA	NA	**160**	25000	**Yes**	ASL
	53-70-3	Dibenzo(a,h)anthracene	29 J	60 J	ug/kg	08SB0071013	2/9	3.61 - 4	60	NA	NA	1500	18000	No	BSL
	206-44-0	Fluoranthene	11	83	ug/kg	08SB0070206	3/9	3.61 - 4	83	NA	NA	310000	880000	No	BSL
	86-73-7	Fluorene	6 J	8 J	ug/kg	08SB0071013	2/9	3.61 - 4	8	NA	NA	41000	170000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	9 J	120 J	ug/kg	08SB0071013	3/9	3.61 - 4	120	NA	NA	1400	3100	No	BSL
	91-20-3	Naphthalene	4 J	8	ug/kg	08SB0070206	3/9	3.61 - 4	8	NA	17000 N	3100	700	No	BSL
	85-01-8	Phenanthrene	37	67	ug/kg	08SB0071013	3/9	3.61 - 4	67	NA	NA	NA	13000	No	BSL
	129-00-0	Pyrene	11	120	ug/kg	08SB0070206	3/9	3.61 - 4	120	NA	NA	230000	570000	No	BSL
	Inorganics														
	7429-90-5	Aluminum	6140 J	23700 J	mg/kg	08SB0070610	9/9	---	23700	5020 - 17400	686000 N	NA	NA	No	NTX
	7440-36-0	**Antimony**	13.3 J	13.3 J	mg/kg	08SB0070610	1/9	0.07 - 0.49	13.3	0.49 - 11.3	NA	**0.27**	**5.4**	**Yes**	ASL
	7440-38-2	**Arsenic**	3 J	8.4 J	mg/kg	08SB0071013	9/9	---	8.4	1.1 - 10.2	745 C	**0.29**	**5.8**	**Yes**	ASL
	7440-39-3	**Barium**	20.9 J	96.7 J	mg/kg	08SB0070206	9/9	---	96.7	24.8 - 155	68600 N	**82**	1600	**Yes**	ASL
	7440-41-7	Beryllium	0.57 J	0.75 J	mg/kg	08SB0070206	5/9	0.32 - 0.39	0.75	0.3 - 0.82	1330 C	3.2	63	No	BSL
	7440-43-9	**Cadmium**	0.51 J	0.79 J	mg/kg	08SB0070610	3/9	0.1 - 0.22	0.79	0.05 - 3.6	1780 C	**0.38**	7.5	**Yes**	ASL
	7440-70-2	Calcium	94.9 J	21100 J	mg/kg	08SB0070610	9/9	---	21100	53.6 - 35300	NA	NA	NA	No	N UT
	7440-47-3	**Chromium**	12.2 J	43.4 J	mg/kg	08SB0071013	9/9	---	43.4	7.7 - 30.6	267 C	**2.1**	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	1 J	11.3 J	mg/kg	08SB0070206	9/9	---	11.3	1.8 - 27.1	1140 C	**0.17**	NA	**Yes**	ASL
	7440-50-8	Copper	4 J	24.4 J	mg/kg	08SB0070610	9/9	---	24.4	3.5 - 23.8	NA	560	920	No	BSL
	7439-89-6	Iron	4610 J	21800 J	mg/kg	08SB0071013	9/9	---	21800	7140 - 40800	NA	NA	NA	No	NTX
	7439-92-1	**Lead**	6.1 J	234 J	mg/kg	08SB0070610	9/9	---	234	6.4 - 21.5	NA	NA	**81**	**Yes**	ASL
	7439-95-4	Magnesium	344 J	2370 J	mg/kg	08SB0070610	9/9	---	2370	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	18.9 J	451 J	mg/kg	08SB0080206	9/9	---	451	23.2 - 3040	6860 N	**110**	NA	**Yes**	ASL
	7439-97-6	Mercury	0.008 J	0.049 J	mg/kg	08SB0070206	8/9	0.006	0.049	0.04 - 0.14	2.9 sat	0.1	2.1	No	BSL
	7440-02-0	**Nickel**	3.2 J	17.6 J	mg/kg	08SB0070206	9/9	---	17.6	4.6 - 23.7	NA	**14**	950	**Yes**	ASL
	7440-09-7	Potassium	866 J	1720 J	mg/kg	08SB0070206	9/9	---	1720	280 - 1650	NA	NA	NA	No	NUT

TABLE 7-4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL IN THE VICINITY OF THE BUILDING 106 POND
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Generic SSL for Soil to Air[5]	U.S. EPA Generic SSL for Migration to Groundwater[5]	IDEM SSL for Migration to Groundwater[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 near Building 106 Pond (Continued)	**Inorganics (Continued)**														
	7440-23-5	Sodium	67.6 J	1350 J	mg/kg	08SB0071013	4/9	32.6 - 58.3	1350	3.7 - 205	NA	NA	NA	No	NUT
	7440-31-5	Tin	18.7 J	3010 J	mg/kg	08SB0070610	2/9	0.22 - 3	3010	NA	NA	NA	NA	No	NTX
	7440-62-2	Vanadium	13.5 J	37.1 J	mg/kg	08SB0070206	9/9	---	37.1	14.1 - 48.5	NA	260	NA	No	BSL
	7440-66-6	Zinc	9.9 J	63.2 J	mg/kg	08SB0071013	9/9	---	63.2	9.4 - 60.2	NA	680	14000	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, Naval Surface Warfare Center Crane, (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels (SSLs). U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.shtml (soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08SB0060206	08SB0080206
08SB0060610	08SB0080610
08SB0070206	08SB0090206
08SB0070610	08SB0090610
08SB0071013	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not Applicable/Not Available
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 7-5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U. S. EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Grass and Gravel Areas	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	2 J	4 J	ug/kg	08SS0390002	4/23	0.899 - 1.32	4	NA	2200000 N	44000000	IDEM	No	BSL
	67-64-1	Acetone	1 J	64 J	ug/kg	08SS0320002	5/16	0.899 - 27	64	NA	1400000 N	35000000	IDEM	No	BSL
	75-09-2	Methylene Chloride	1 J	4 J	ug/kg	08SS0180002	3/23	0.899 - 1.32	4	NA	9100 C	120000	IDEM	No	BSL
	Semivolatile Organic Compounds														
	208-96-8	Acenaphthylene	100	100	ug/kg	08SS0050002	1/8	3.78 - 3.98	100	NA	370000 N[8]	1100000	IDEM	No	BSL
	120-12-7	Anthracene	33	33	ug/kg	08SS0050002	1/8	3.78 - 3.98	33	NA	2200000 N	47000000	IDEM	No	BSL
	56-55-3	Benzo(a)anthracene	4 J	480	ug/kg	08SS0050002	2/8	3.78 - 3.98	480	NA	620 C	5000	IDEM	No	BSL
	50-32-8	**Benzo(a)pyrene**	560	560	ug/kg	08SS0050002	1/8	3.78 - 3.98	560	NA	**62 C**	**500**	IDEM	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	640	640	ug/kg	08SS0050002	1/8	3.78 - 3.98	640	NA	**620 C**	5000	IDEM	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	560	560	ug/kg	08SS0050002	1/8	3.78 - 3.98	560	NA	230000 N[9]	50000	IDEM	No	BSL
	207-08-9	Benzo(k)fluoranthene	430	430	ug/kg	08SS0050002	1/8	3.78 - 3.98	430	NA	6200 C	50000	IDEM	No	BSL
	218-01-9	Chrysene	5 J	640	ug/kg	08SS0050002	2/8	3.78 - 3.98	640	NA	62000 C	500000	IDEM	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	170	170	ug/kg	08SS0050002	1/8	3.78 - 3.98	170	NA	**62 C**	500	IDEM	**Yes**	ASL
	206-44-0	Fluoranthene	6 J	540	ug/kg	08SS0050002	2/8	3.78 - 3.98	540	NA	230000 N	6300000	IDEM	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	430	430	ug/kg	08SS0050002	1/8	3.78 - 3.98	430	NA	620 C	5000	IDEM	No	BSL
	91-20-3	Naphthalene	9	9	ug/kg	08SS0050002	1/8	3.78 - 3.98	9	NA	5600 N	3200000	IDEM	No	BSL
	85-01-8	Phenanthrene	18	91	ug/kg	08SS0050002	2/8	3.78 - 3.98	91	NA	230000 N[9]	470000	IDEM	No	BSL
	129-00-0	Pyrene	5 J	690	ug/kg	08SS0050002	3/8	3.8 - 3.98	690	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	19200 J	28200 J	mg/kg	08SS0110002	8/8	---	28200	5020 - 17400	**7600 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	3.8 J	7.9 J	mg/kg	08SS0030002	8/8	---	7.9	1.1 - 10.2	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	56.9 J	123 J	mg/kg	08SS0120002	8/8	---	123	24.8 - 155	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	0.55 J	0.78 J	mg/kg	08SS0030002	6/8	0.46 - 0.52	0.78	0.3 - 0.82	15 N	680	IDEM	No	BSL
	7440-43-9	Cadmium	0.47 J	0.55 J	mg/kg	08SS0030002	2/8	0.19 - 0.41	0.55	0.05 - 3.6	3.7 N	12	IDEM	No	BSL
	7440-70-2	Calcium	1180 J	5090 J	mg/kg	08SS0050002	8/8	---	5090	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	Chromium	19 J	24.7 J	mg/kg	08SS0030002	8/8	---	24.7	7.7 - 30.6	210 C[10]	430[11]	IDEM	No	BSL
	7440-48-4	Cobalt	3.9 J	7.7 J	mg/kg	08SS0020002 08SS0050002	8/8	---	7.7	1.8 - 27.1	140 N[12]	NA	NA	No	BSL
	7440-50-8	Copper	5.5 J	13.2 J	mg/kg	08SS0130002	8/8	---	13.2	3.5 - 23.8	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	15700 J	32400 J	mg/kg	08SS0030002	8/8	---	32400	7140 - 40800	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	8.5 J	31.1 J	mg/kg	08SS0010002	8/8	---	31.1	6.4 - 21.5	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	1690 J	2970 J	mg/kg	08SS0130002	8/8	---	2970	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	64.1 J	522 J	mg/kg	08SS0020002	8/8	---	522	23.2 - 3040	**180 N**	NA	NA	**Yes**	ASL
	7439-97-6	Mercury	0.007 J	0.033 J	mg/kg	08SS0130002	6/8	0.007	0.033	0.04 - 0.14	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	7.6 J	11.3 J	mg/kg	08SS0030002	8/8	---	11.3	4.6 - 23.7	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	985 J	1990 J	mg/kg	08SS0130002	8/8	---	1990	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	61.1 J	124 J	mg/kg	08SS0130002	6/8	56.8 - 60.8	124	3.7 - 205	NA	NA	NA	No	NUT
	7440-31-5	Tin	0.2 J	0.45 J	mg/kg	08SS0130002	5/8	0.35 - 0.92	0.45	NA	4700 N	NA	NA	No	BSL
	7440-62-2	**Vanadium**	29.4 J	40.5 J	mg/kg	08SS0130002	8/8	---	40.5	14.1 - 48.5	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	19.4 J	128 J	mg/kg	08SS0010002	8/8	---	128	9.4 - 60.2	2300 N	100000	IDEM	No	BSL

TABLE 7-5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, Naval Surface Warfare Center Crane, Crane, Indiana (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available

7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level. Chemicals selected as COPCs are indicated by shaded chemical names.
8 - The value for acenaphthene was used as a surrogate for acenaphthylene.
9 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 - The PRG for residential land use for total chromium is presented.
11 - Value is for hexavalent chromium.
12 - One-tenth of the noncarcinogenic PRG is less than the carcinogenic PRG; therefore, the one-tenth noncarcinogenic PRG is presented.

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient

Associated Samples

08SS0010002	08SS0120002	08SS0180002	08SS0350002
08SS0020002	08SS0130002	08SS0200002	08SS0360002
08SS0030002	08SS0140002	08SS0210002	08SS0370002
08SS0050002	08SS0150002	08SS0240002	08SS0380002
08SS0100002	08SS0160002	08SS0320002	08SS0390002
08SS0110002	08SS0170002	08SS0330002	08SS0400002

TABLE 7-6

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Generic SSL for Soil to Air[5]	U.S. EPA Generic SSL for Migration to Groundwater[5]	IDEM SSL for Migration to Groundwater[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Grass and Gravel Areas	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	2 J	4 J	ug/kg	08SS0390002	4/23	0.899 - 1.32	4	NA	24000000 sat	4400	35000	No	BSL
	67-64-1	Acetone	1 J	64 J	ug/kg	08SS0320002	5/16	0.899 - 27	64	NA	NA	6600	28000	No	BSL
	75-09-2	**Methylene Chloride**	1 J	4 J	ug/kg	08SS0180002	3/23	0.899 - 1.32	4	NA	13000 C	**1.2**	23	**Yes**	ASL
	Semivolatile Organic Compounds														
	208-96-8	Acenaphthylene	100	100	ug/kg	08SS0050002	1/8	3.78 - 3.98	100	NA	NA	NA	18000	No	BSL
	120-12-7	Anthracene	33	33	ug/kg	08SS0050002	1/8	3.78 - 3.98	33	NA	NA	650000	51000	No	BSL
	56-55-3	**Benzo(a)anthracene**	4 J	480	ug/kg	08SS0050002	2/8	3.78 - 3.98	480	NA	NA	**160**	19000	**Yes**	ASL
	50-32-8	**Benzo(a)pyrene**	560	560	ug/kg	08SS0050002	1/8	3.78 - 3.98	560	NA	NA	**410**	8200	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	640	640	ug/kg	08SS0050002	1/8	3.78 - 3.98	640	NA	NA	**490**	57000	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	560	560	ug/kg	08SS0050002	1/8	3.78 - 3.98	560	NA	NA	NA	16000	No	BSL
	207-08-9	Benzo(k)fluoranthene	430	430	ug/kg	08SS0050002	1/8	3.78 - 3.98	430	NA	NA	490	39000	No	BSL
	218-01-9	**Chrysene**	5 J	640	ug/kg	08SS0050002	2/8	3.78 - 3.98	640	NA	NA	**160**	25000	**Yes**	ASL
	53-70-3	Dibenzo(a,h)anthracene	170	170	ug/kg	08SS0050002	1/8	3.78 - 3.98	170	NA	NA	1500	18000	No	BSL
	206-44-0	Fluoranthene	6 J	540	ug/kg	08SS0050002	2/8	3.78 - 3.98	540	NA	NA	310000	880000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	430	430	ug/kg	08SS0050002	1/8	3.78 - 3.98	430	NA	NA	1400	3100	No	BSL
	91-20-3	Naphthalene	9	9	ug/kg	08SS0050002	1/8	3.78 - 3.98	9	NA	17000 N	3100	700	No	BSL
	85-01-8	Phenanthrene	18	91	ug/kg	08SS0050002	2/8	3.78 - 3.98	91	NA	NA	NA	13000	No	BSL
	129-00-0	Pyrene	5 J	690	ug/kg	08SS0050002	3/8	3.8 - 3.98	690	NA	NA	230000	570000	No	BSL
	Inorganics														
	7429-90-5	Aluminum	19200 J	28200 J	mg/kg	08SS0110002	8/8	---	28200	5020 - 17400	686000 N	NA	NA	No	NTX
	7440-38-2	**Arsenic**	3.8 J	7.9 J	mg/kg	08SS0030002	8/8	---	7.9	1.1 - 10.2	745 C	**0.29**	**5.8**	**Yes**	ASL
	7440-39-3	**Barium**	56.9 J	123 J	mg/kg	08SS0120002	8/8	---	123	24.8 - 155	68600 N	**82**	1600	**Yes**	ASL
	7440-41-7	Beryllium	0.55 J	0.78 J	mg/kg	08SS0030002	6/8	0.46 - 0.52	0.78	0.3 - 0.82	1330 C	3.2	63	No	BSL
	7440-43-9	**Cadmium**	0.47 J	0.55 J	mg/kg	08SS0030002	2/8	0.19 - 0.41	0.55	0.05 - 3.6	1780 C	**0.38**	7.5	**Yes**	ASL
	7440-70-2	Calcium	1180 J	5090 J	mg/kg	08SS0050002	8/8	---	5090	53.6 - 35300	NA	NA	NA	No	N UT
	7440-47-3	**Chromium**	19 J	24.7 J	mg/kg	08SS0030002	8/8	---	24.7	7.7 - 30.6	267 C	**2.1**	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	3.9 J	7.7 J	mg/kg	08SS0020002, 08SS0050002	8/8	---	7.7	1.8 - 27.1	1140 C	**0.17**	NA	**Yes**	ASL
	7440-50-8	Copper	5.5 J	13.2 J	mg/kg	08SS0130002	8/8	---	13.2	3.5 - 23.8	NA	560	920	No	BSL
	7439-89-6	Iron	15700 J	32400 J	mg/kg	08SS0030002	8/8	---	32400	7140 - 40800	NA	NA	NA	No	NTX
	7439-92-1	Lead	8.5 J	31.1 J	mg/kg	08SS0010002	8/8	---	31.1	6.4 - 21.5	NA	NA	81	No	BSL
	7439-95-4	Magnesium	1690 J	2970 J	mg/kg	08SS0130002	8/8	---	2970	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	64.1 J	522 J	mg/kg	08SS0020002	8/8	---	522	23.2 - 3040	6860 N	**110**	NA	**Yes**	ASL
	7439-97-6	Mercury	0.007 J	0.033 J	mg/kg	08SS0130002	6/8	0.007	0.033	0.04 - 0.14	NA	0.1	2.1	No	BSL
	7440-02-0	Nickel	7.6 J	11.3 J	mg/kg	08SS0030002	8/8	---	11.3	4.6 - 23.7	NA	14	950	No	BSL
	7440-09-7	Potassium	985 J	1990 J	mg/kg	08SS0130002	8/8	---	1990	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	61.1 J	124 J	mg/kg	08SS0130002	6/8	56.8 - 60.8	124	3.7 - 205	NA	NA	NA	No	NUT
	7440-31-5	Tin	0.2 J	0.45 J	mg/kg	08SS0130002	5/8	0.35 - 0.92	0.45	NA	NA	NA	NA	No	NTX
	7440-62-2	Vanadium	29.4 J	40.5 J	mg/kg	08SS0130002	8/8	---	40.5	14.1 - 48.5	NA	260	NA	No	BSL
	7440-66-6	Zinc	19.4 J	128 J	mg/kg	08SS0010002	8/8	---	128	9.4 - 60.2	NA	680	14000	No	BSL

TABLE 7-6

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels. U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.shtml (soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
sat = Soil Saturation Limit

Associated Samples

08SS0010002	08SS0120002	08SS0180002	08SS0350002
08SS0020002	08SS0130002	08SS0200002	08SS0360002
08SS0030002	08SS0140002	08SS0210002	08SS0370002
08SS0050002	08SS0150002	08SS0240002	08SS0380002
08SS0100002	08SS0160002	08SS0320002	08SS0390002
08SS0110002	08SS0170002	08SS0330002	08SS0400002

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 7-7

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non Detects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	U.S. EPA Region 9 PRG (Residential)(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
SWMU 08 Grass and Gravel Areas	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	1.8 J	1.8 J	ug/kg	08SB590709	1/37	0.88 - 1.2	1.8	NA	1200000 sat	5000000	IDEM	No	BSL
	75-34-3	1,1-Dichloroethane	3.2	21	ug/kg	08SB550709	3/37	0.88 - 1.2	21	NA	51000 N	1300000	IDEM	No	BSL
	75-35-4	1,1-Dichloroethene	2.6 J	15	ug/kg	08SB0131013	3/37	0.88 - 1.2	15	NA	12000 N	310000	IDEM	No	BSL
	78-93-3	2-Butanone	2 J	31	ug/kg	08SB0131013	9/37	0.88 - 1.2	31	NA	2200000 N	44000000	IDEM	No	BSL
	67-64-1	Acetone	1 J	130 J	ug/kg	08SB0131013	26/32	0.964 - 29	130	NA	1400000 N	35000000	IDEM	No	BSL
	71-43-2	Benzene	1.5 J	2 J	ug/kg	08SB0131013	2/37	0.88 - 1.2	2	NA	640 C	8400	IDEM	No	BSL
	75-15-0	Carbon Disulfide	1 J	1 J	ug/kg	08SB0120610	1/37	0.88 - 1.2	1	NA	36000 N	900000	IDEM	No	BSL
	75-00-3	Chloroethane	7	7	ug/kg	08SB0131013	1/37	0.88 - 1.2	7	NA	3000 C	80000	IDEM	No	BSL
	156-59-2	cis-1,2-Dichloroethene	1 J	6	ug/kg	08SB0101013	6/37	0.88 - 1.2	6	NA	4300 N	110000	IDEM	No	BSL
	100-41-4	Ethylbenzene	3 J	440 J	ug/kg	08SB510204	2/37	0.88 - 1.2	440	NA	400000 sat	4600000	IDEM	No	BSL
	75-09-2	Methylene Chloride	12 J	44 J	ug/kg	08SB0131013	5/37	0.907 - 12	44	NA	9100 C	120000	IDEM	No	BSL
	108-88-3	Toluene	19	23 J	ug/kg	08SB510204	2/37	0.88 - 1.2	23	NA	520000 sat	8800000	IDEM	No	BSL
	1330-20-7	Total Xylenes	1 J	3900 J	ug/kg	08SB510204	4/37	0.88 - 1.2	3900	NA	27000 N	690000	IDEM	No	BSL
	79-01-6	Trichloroethene	2 J	2 J	ug/kg	08SB0131013	1/37	0.88 - 1.2	2	NA	2900 C(8)	710	IDEM	No	BSL
	75-69-4	Trichlorofluoromethane	1 J	4	ug/kg	08SB0131013	5/37	0.88 - 1.2	4	NA	39000 N	NA	NA	No	BSL
	75-01-4	Vinyl Chloride	2 J	2 J	ug/kg	08SB0101013, 08SB0100610	2/37	0.88 - 1.2	2	NA	79 C	1500	IDEM	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	7 J	7 J	ug/kg	08SB0110206, 08SB0120206	2/5	3.84 - 4.05	7	NA	5600 N(9)	630000	IDEM	No	BSL
	91-20-3	Naphthalene	10	38	ug/kg	08SB0110206	3/5	3.84 - 3.91	38	NA	5600 N	3200000	IDEM	No	BSL
	85-01-8	Phenanthrene	5 J	5 J	ug/kg	08SB0120206	1/5	3.84 - 4.05	5	NA	230000 N(10)	470000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	22500 J	31500 J	mg/kg	08SB0050206	5/5	---	31500	5020 - 17400	**7600 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	5.4 J	9.7 J	mg/kg	08SB0120206	5/5	---	9.7	1.1 - 10.2	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	49.3 J	125 J	mg/kg	08SB0130206	5/5	---	125	24.8 - 155	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	0.66 J	0.89 J	mg/kg	08SB0100206	4/5	0.49	0.89	0.3 - 0.82	15 N	680	IDEM	No	BSL
	7440-70-2	Calcium	633 J	22600 J	mg/kg	08SB0110206	5/5	---	22600	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	Chromium	21.9 J	25 J	mg/kg	08SB0050206	5/5	---	25	7.7 - 30.6	210 C(11)	430(12)	IDEM	No	BSL
	7440-48-4	Cobalt	3.4 J	7.4 J	mg/kg	08SB0130206	5/5	---	7.4	1.8 - 27.1	140 N(13)	NA	NA	No	BSL
	7440-50-8	Copper	8.1 J	14.4 J	mg/kg	08SB0110206	5/5	---	14.4	3.5 - 23.8	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	19200 J	25400 J	mg/kg	08SB0130206	5/5	---	25400	7140 - 40800	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	8.3 J	33.3 J	mg/kg	08SB0120206	5/5	---	33.3	6.4 - 21.5	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	1590 J	3710 J	mg/kg	08SB0110206	5/5	---	3710	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	33.5 J	616 J	mg/kg	08SB0130206	5/5	---	616	23.2 - 3040	**180 N**	NA	NA	**Yes**	ASL
	7439-97-6	Mercury	0.035 J	0.039 J	mg/kg	08SB0130206	3/5	0.007	0.039	0.04 - 0.14	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	8.6 J	12.6 J	mg/kg	08SB0120206	5/5	---	12.6	4.6 - 23.7	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	1260 J	2010 J	mg/kg	08SB0110206	5/5	---	2010	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	101 J	129 J	mg/kg	08SB0110206	4/5	60.9	129	3.7 - 205	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	0.4 J	0.76 J	mg/kg	08SB0120206	2/5	0.29 - 0.32	0.76	0.05 - 0.31	**0.52 N**	24	IDEM	**Yes**	ASL
	7440-31-5	Tin	0.33 J	0.5 J	mg/kg	08SB0110206	4/5	0.39	0.5	NA	4700 N	NA	NA	No	BSL
	7440-62-2	**Vanadium**	36.2 J	44.8 J	mg/kg	08SB0120206	5/5	---	44.8	14.1 - 48.5	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	20.5 J	55.2 J	mg/kg	08SB0110206	5/5	---	55.2	9.4 - 60.2	2300 N	100000	IDEM	No	BSL

TABLE 7-7

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2004).

7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level. Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The PRG for residential land use for total chromium is presented.
12 - Value is for hexavalent chromium.
13 - One-tenth of the noncarcinogenic PRG is less than the carcinogenic PRG; therefore, the one-tenth noncarcinogenic PRG is presented.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient

Associated Samples

08SB0050206	08SB0131013	08SB0350305	08SB530507
08SB0100206	08SB0150406	08SB0400204	08SB540204
08SB0100610	08SB0160203	08SB460608	08SB550709
08SB0101013	08SB0180204	08SB470608	08SB560709
08SB0110206	08SB0200204	08SB480507	08SB570608
08SB0120206	08SB0210204	08SB490507	08SB590709
08SB0120610	08SB0240203	08SB500608	08SB600709
08SB0121018	08SB0320607	08SB510204	08SB610507
08SB0130206	08SB0330406	08SB520103	08SB620406
08SB0130610			

TABLE 7-8

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	U.S. EPA Generic SSL for Soil to Air(5)	U.S. EPA Generic SSL for Migration to Groundwater(5)	IDEM SSL for Migration to Groundwater(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
SWMU 08 Grass and Gravel Areas	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	1.8 J	1.8 J	ug/kg	08SB590709	1/37	0.88 - 1.2	1.8	NA	1200000 sat	97	1900	No	BSL
	75-34-3	1,1-Dichloroethane	3.2	21	ug/kg	08SB550709	3/37	0.88 - 1.2	21	NA	130000 N	2100	5600	No	BSL
	75-35-4	**1,1-Dichloroethene**	2.6 J	15	ug/kg	08SB0131013	3/37	0.88 - 1.2	15	NA	30000 N	**2.9**	58	**Yes**	ASL
	78-93-3	2-Butanone	2 J	31	ug/kg	08SB0131013	9/37	0.88 - 1.2	31	NA	24000000 sat	4400	35000	No	BSL
	67-64-1	Acetone	1 J	130 J	ug/kg	08SB0131013	26/32	0.964 - 29	130	NA	NA	6600	28000	No	BSL
	71-43-2	**Benzene**	1.5 J	2 J	ug/kg	08SB0131013	2/37	0.88 - 1.2	2	NA	840 C	**1.7**	34	**Yes**	ASL
	75-15-0	Carbon Disulfide	1 J	1 J	ug/kg	08SB0120610	1/37	0.88 - 1.2	1	NA	720000 sat	1500	10000	No	BSL
	75-00-3	Chloroethane	7	7	ug/kg	08SB0131013	1/37	0.88 - 1.2	7	NA	1200000 sat	NA	650	No	BSL
	156-59-2	cis-1,2-Dichloroethene	1 J	6	ug/kg	08SB0101013	6/37	0.88 - 1.2	6	NA	NA	20	400	No	BSL
	100-41-4	Ethylbenzene	3 J	440 J	ug/kg	08SB510204	2/37	0.88 - 1.2	440	NA	400000 sat	670	13000	No	BSL
	75-09-2	**Methylene Chloride**	12 J	44 J	ug/kg	08SB0131013	5/37	0.907 - 12	44	NA	13000 C	**1.2**	**23**	**Yes**	ASL
	108-88-3	Toluene	19	23 J	ug/kg	08SB510204	2/37	0.88 - 1.2	23	NA	650000 sat	590	12000	No	BSL
	1330-20-7	Total Xylenes	1 J	3900 J	ug/kg	08SB510204	4/37	0.88 - 1.2	3900	NA	71000 N	7100	210000	No	BSL
	79-01-6	Trichloroethene	2 J	2 J	ug/kg	08SB0131013	1/37	0.88 - 1.2	2	NA	71 C	2.8	57	No	BSL
	75-69-4	Trichlorofluoromethane	1 J	4	ug/kg	08SB0131013	5/37	0.88 - 1.2	4	NA	110000 N	8000	NA	No	BSL
	75-01-4	**Vinyl Chloride**	2 J	2 J	ug/kg	08SB0101013, 08SB0100610	2/37	0.88 - 1.2	2	NA	280 C	**0.67**	13	**Yes**	ASL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	7 J	7 J	ug/kg	08SB0110206, 08SB0120206	2/5	3.84 - 4.05	7	NA	NA	NA	3100	No	BSL
	91-20-3	Naphthalene	10	38	ug/kg	08SB0110206	3/5	3.84 - 3.91	38	NA	17000 N	3100	700	No	BSL
	85-01-8	Phenanthrene	5 J	5 J	ug/kg	08SB0120206	1/5	3.84 - 4.05	5	NA	NA	NA	13000	No	BSL
	Inorganics														
	7429-90-5	Aluminum	22500 J	31500 J	mg/kg	08SB0050206	5/5	---	31500	5020 - 17400	686000 N	NA	NA	No	NTX
	7440-38-2	**Arsenic**	5.4 J	9.7 J	mg/kg	08SB0120206	5/5	---	9.7	1.1 - 10.2	745 C	**0.29**	**5.8**	**Yes**	ASL
	7440-39-3	**Barium**	49.3 J	125 J	mg/kg	08SB0130206	5/5	---	125	24.8 - 155	68600 N	**82**	1600	**Yes**	ASL
	7440-41-7	Beryllium	0.66 J	0.89 J	mg/kg	08SB0100206	4/5	0.49	0.89	0.3 - 0.82	1330 C	3.2	63	No	BSL
	7440-70-2	Calcium	633 J	22600 J	mg/kg	08SB0110206	5/5	---	22600	53.6 - 35300	NA	NA	NA	No	N UT
	7440-47-3	**Chromium**	21.9 J	25 J	mg/kg	08SB0050206	5/5	---	25	7.7 - 30.6	267 C	**2.1**	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	3.4 J	7.4 J	mg/kg	08SB0130206	5/5	---	7.4	1.8 - 27.1	1140 C	**0.17**	NA	**Yes**	ASL
	7440-50-8	Copper	8.1 J	14.4 J	mg/kg	08SB0110206	5/5	---	14.4	3.5 - 23.8	NA	560	920	No	BSL
	7439-89-6	Iron	19200 J	25400 J	mg/kg	08SB0130206	5/5	---	25400	7140 - 40800	NA	NA	NA	No	NTX
	7439-92-1	Lead	8.3 J	33.3 J	mg/kg	08SB0120206	5/5	---	33.3	6.4 - 21.5	NA	NA	81	No	BSL
	7439-95-4	Magnesium	1590 J	3710 J	mg/kg	08SB0110206	5/5	---	3710	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	33.5 J	616 J	mg/kg	08SB0130206	5/5	---	616	23.2 - 3040	6860 N	**110**	NA	**Yes**	ASL
	7439-97-6	Mercury	0.035 J	0.039 J	mg/kg	08SB0130206	3/5	0.007	0.039	0.04 - 0.14	NA	0.1	2.1	No	BSL
	7440-02-0	Nickel	8.6 J	12.6 J	mg/kg	08SB0120206	5/5	---	12.6	4.6 - 23.7	NA	14	950	No	BSL
	7440-09-7	Potassium	1260 J	2010 J	mg/kg	08SB0110206	5/5	---	2010	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	101 J	129 J	mg/kg	08SB0110206	4/5	60.9	129	3.7 - 205	NA	NA	NA	No	NUT
	7440-28-0	**Thallium**	0.4 J	0.76 J	mg/kg	08SB0120206	2/5	0.29 - 0.32	0.76	4.6 - 23.7	NA	**0.056**	2.8	**Yes**	ASL
	7440-31-5	Tin	0.33 J	0.5 J	mg/kg	08SB0110206	4/5	0.39	0.5	NA	NA	NA	NA	No	NTX
	7440-62-2	Vanadium	36.2 J	44.8 J	mg/kg	08SB0120206	5/5	---	44.8	14.1 - 48.5	NA	260	NA	No	BSL
	7440-66-6	Zinc	20.5 J	55.2 J	mg/kg	08SB0110206	5/5	---	55.2	9.4 - 60.2	NA	680	14000	No	BSL

TABLE 7-8

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL - GRASS AND GRAVEL AREAS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels (SSLs). U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.shtml (soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08SB0050206	08SB0131013	08SB0350305	08SB530507
08SB0100206	08SB0150406	08SB0400204	08SB540204
08SB0100610	08SB0160203	08SB460608	08SB550709
08SB0101013	08SB0180204	08SB470608	08SB560709
08SB0110206	08SB0200204	08SB480507	08SB570608
08SB0120206	08SB0210204	08SB490507	08SB590709
08SB0120610	08SB0240203	08SB500608	08SB600709
08SB0121018	08SB0320607	08SB510204	08SB610507
08SB0130206	08SB0330406	08SB520103	08SB620406
08SB0130610			

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 7-9

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL UNDER BUILDING 106 AND UNDER PAVEMENT AROUND BUILDING 106
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 under Building 106 and Surrounding Pavement	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	2 J	2 J	ug/kg	08SS0300002	1/11	0.913 - 1.15	2	NA	1200000 sat	5000000	IDEM	No	BSL
	78-93-3	2-Butanone	2 J	5 J	ug/kg	08SS0300002	5/11	0.913 - 1.15	5	NA	2200000 N	44000000	IDEM	No	BSL
	67-64-1	Acetone	5 J	48 J	ug/kg	08SS0300002	4/11	3 - 7	48	NA	1400000 N	35000000	IDEM	No	BSL
	75-15-0	Carbon Disulfide	1.04 J	1.04 J	ug/kg	08SS0250002	1/11	0.913 - 1.22	1.04	NA	36000 N	900000	IDEM	No	BSL
	75-09-2	Methylene Chloride	6 J	6 J	ug/kg	08SS0040002	1/11	0.913 - 1.22	6	NA	9100 C	120000	IDEM	No	BSL
	79-01-6	Trichloroethene	6	26	ug/kg	08SS0300002	4/11	0.913 - 1.15	26	NA	2900 C[8]	710	IDEM	No	BSL
	Semivolatile Organic Compounds														
	208-96-8	Acenaphthylene	31	31	ug/kg	08SS0040002	1/1	---	31	NA	370000 N[9]	1100000	IDEM	No	BSL
	120-12-7	Anthracene	14	14	ug/kg	08SS0040002	1/1	---	14	NA	2200000 N	47000000	IDEM	No	BSL
	56-55-3	Benzo(a)anthracene	170	170	ug/kg	08SS0040002	1/1	---	170	NA	620 C	5000	IDEM	No	BSL
	50-32-8	**Benzo(a)pyrene**	230	230	ug/kg	08SS0040002	1/1	---	230	NA	**62 C**	500	IDEM	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	280	280	ug/kg	08SS0040002	1/1	---	280	NA	620 C	5000	IDEM	No	BSL
	191-24-2	Benzo(g,h,i)perylene	230 J	230 J	ug/kg	08SS0040002	1/1	---	230	NA	230000 N[10]	NA	IDEM	No	BSL
	207-08-9	Benzo(k)fluoranthene	120	120	ug/kg	08SS0040002	1/1	---	120	NA	6200 C	50000	IDEM	No	BSL
	218-01-9	Chrysene	230	230	ug/kg	08SS0040002	1/1	---	230	NA	62000 C	500000	IDEM	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	69 J	69 J	ug/kg	08SS0040002	1/1	---	69	NA	**62 C**	500	IDEM	**Yes**	ASL
	206-44-0	Fluoranthene	130	130	ug/kg	08SS0040002	1/1	---	130	NA	230000 N	6300000	IDEM	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	180 J	180 J	ug/kg	08SS0040002	1/1	---	180	NA	620 C	5000	IDEM	No	BSL
	91-20-3	Naphthalene	4 J	4 J	ug/kg	08SS0040002	1/1	---	4	NA	5600 N	3200000	IDEM	No	BSL
	85-01-8	Phenanthrene	18	18	ug/kg	08SS0040002	1/1	---	18	NA	230000 N[10]	470000	IDEM	No	BSL
	129-00-0	Pyrene	210	210	ug/kg	08SS0040002	1/1	---	210	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	20900 J	20900 J	mg/kg	08SS0040002	1/1	---	20900	5020 - 17400	**7600 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	4.9 J	4.9 J	mg/kg	08SS0040002	1/1	---	4.9	1.1 - 10.2	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	86.1 J	86.1 J	mg/kg	08SS0040002	1/1	---	86.1	24.8 - 155	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	0.53 J	0.53 J	mg/kg	08SS0040002	1/1	---	0.53	0.3 - 0.82	15 N	680	IDEM	No	BSL
	7440-70-2	Calcium	2070 J	2070 J	mg/kg	08SS0040002	1/1	---	2070	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	Chromium	17.9 J	17.9 J	mg/kg	08SS0040002	1/1	---	17.9	7.7 - 30.6	210 C[11]	430[12]	IDEM	No	BSL
	7440-48-4	Cobalt	7.1 J	7.1 J	mg/kg	08SS0040002	1/1	---	7.1	1.8 - 27.1	140 N[13]	NA	NA	No	BSL
	7440-50-8	Copper	6.1 J	6.1 J	mg/kg	08SS0040002	1/1	---	6.1	3.5 - 23.8	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	18300 J	18300 J	mg/kg	08SS0040002	1/1	---	18300	7140 - 40800	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	11.7 J	11.7 J	mg/kg	08SS0040002	1/1	---	11.7	6.4 - 21.5	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	1730 J	1730 J	mg/kg	08SS0040002	1/1	---	1730	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	Manganese	130 J	130 J	mg/kg	08SS0040002	1/1	---	130	23.2 - 3040	180 N	NA	NA	No	BSL
	7440-02-0	Nickel	8.5 J	8.5 J	mg/kg	08SS0040002	1/1	---	8.5	4.6 - 23.7	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	975 J	975 J	mg/kg	08SS0040002	1/1	---	975	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	201 J	201 J	mg/kg	08SS0040002	1/1	---	201	3.7 - 205	NA	NA	NA	No	NUT
	7440-62-2	**Vanadium**	29.4 J	29.4 J	mg/kg	08SS0040002	1/1	---	29.4	14.1 - 48.5	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	21.7 J	21.7 J	mg/kg	08SS0040002	1/1	---	21.7	9.4 - 60.2	2300 N	100000	IDEM	No	BSL

TABLE 7-9

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL UNDER BUILDING 106 AND UNDER PAVEMENT AROUND BUILDING 106
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).

7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level. Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - The value for acenaphthene was used as a surrogate for acenaphthylene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The PRG for residential land use for total chromium is presented.
12 - Value is for hexavalent chromium.
13 - One-tenth of the noncarcinogenic PRG is less than the carcinogenic PRG; therefore, the one-tenth noncarcinogenic PRG is presented.

Associated Samples

08SS0040002	08SS0270002
08SS0190002	08SS0280002
08SS0220002	08SS0290002
08SS0230002	08SS0300002
08SS0250002	08SS0310002
08SS0260002	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

TABLE 7-10

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL UNDER BUILDING 106 AND UNDER PAVEMENT AROUND BUILDING 106
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Generic SSL for Soil to Air[5]	U.S. EPA Generic SSL for Migration to Groundwater[5]	IDEM SSL for Migration to Groundwater[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 under Building 106 and Surrounding Pavement	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	2 J	2 J	ug/kg	08SS0300002	1/11	0.913 - 1.15	2	NA	1200000 sat	97	1900	No	BSL
	78-93-3	2-Butanone	2 J	5 J	ug/kg	08SS0300002	5/11	0.913 - 1.15	5	NA	24000000 sat	4400	35000	No	BSL
	67-64-1	Acetone	5 J	48 J	ug/kg	08SS0300002	4/11	3 - 7	48	NA	NA	6600	28000	No	BSL
	75-15-0	Carbon Disulfide	1.04 J	1.04 J	ug/kg	08SS0250002	1/11	0.913 - 1.22	1.04	NA	720000 sat	1500	10000	No	BSL
	75-09-2	**Methylene Chloride**	6 J	6 J	ug/kg	08SS0040002	1/11	0.913 - 1.22	6	NA	13000 C	**1.2**	23	**Yes**	ASL
	79-01-6	**Trichloroethene**	6	26	ug/kg	08SS0300002	4/11	0.913 - 1.15	26	NA	71 C	**2.8**	57	**Yes**	ASL
	Semivolatile Organic Compounds														
	208-96-8	Acenaphthylene	31	31	ug/kg	08SS0040002	1/1	---	31	NA	NA	NA	18000	No	BSL
	120-12-7	Anthracene	14	14	ug/kg	08SS0040002	1/1	---	14	NA	NA	650000	51000	No	BSL
	56-55-3	**Benzo(a)anthracene**	170	170	ug/kg	08SS0040002	1/1	---	170	NA	NA	**160**	19000	**Yes**	ASL
	50-32-8	Benzo(a)pyrene	230	230	ug/kg	08SS0040002	1/1	---	230	NA	NA	410	8200	No	BSL
	205-99-2	Benzo(b)fluoranthene	280	280	ug/kg	08SS0040002	1/1	---	280	NA	NA	490	57000	No	BSL
	191-24-2	Benzo(g,h,i)perylene	230 J	230 J	ug/kg	08SS0040002	1/1	---	230	NA	NA	NA	16000	No	BSL
	207-08-9	Benzo(k)fluoranthene	120	120	ug/kg	08SS0040002	1/1	---	120	NA	NA	490	39000	No	BSL
	218-01-9	**Chrysene**	230	230	ug/kg	08SS0040002	1/1	---	230	NA	NA	**160**	25000	**Yes**	ASL
	53-70-3	Dibenzo(a,h)anthracene	69 J	69 J	ug/kg	08SS0040002	1/1	---	69	NA	NA	1500	18000	No	BSL
	206-44-0	Fluoranthene	130	130	ug/kg	08SS0040002	1/1	---	130	NA	NA	310000	880000	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	180 J	180 J	ug/kg	08SS0040002	1/1	---	180	NA	NA	1400	3100	No	BSL
	91-20-3	Naphthalene	4 J	4 J	ug/kg	08SS0040002	1/1	---	4	NA	17000 N	3100	700	No	BSL
	85-01-8	Phenanthrene	18	18	ug/kg	08SS0040002	1/1	---	18	NA	NA	NA	13000	No	BSL
	129-00-0	Pyrene	210	210	ug/kg	08SS0040002	1/1	---	210	NA	NA	230000	570000	No	BSL
	Inorganics														
	7429-90-5	Aluminum	20900 J	20900 J	mg/kg	08SS0040002	1/1	---	20900	5020 - 17400	686000 N	NA	NA	No	NTX
	7440-38-2	**Arsenic**	4.9 J	4.9 J	mg/kg	08SS0040002	1/1	---	4.9	1.1 - 10.2	745 C	**0.29**	5.8	**Yes**	ASL
	7440-39-3	**Barium**	86.1 J	86.1 J	mg/kg	08SS0040002	1/1	---	86.1	24.8 - 155	68600 N	**82**	1600	**Yes**	ASL
	7440-41-7	Beryllium	0.53 J	0.53 J	mg/kg	08SS0040002	1/1	---	0.53	0.3 - 0.82	1330 C	3.2	63	No	BSL
	7440-70-2	Calcium	2070 J	2070 J	mg/kg	08SS0040002	1/1	---	2070	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	17.9 J	17.9 J	mg/kg	08SS0040002	1/1	---	17.9	7.7 - 30.6	267 C	**2.1**	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	7.1 J	7.1 J	mg/kg	08SS0040002	1/1	---	7.1	1.8 - 27.1	1140 C	**0.17**	NA	**Yes**	ASL
	7440-50-8	Copper	6.1 J	6.1 J	mg/kg	08SS0040002	1/1	---	6.1	3.5 - 23.8	NA	560	920	No	BSL
	7439-89-6	Iron	18300 J	18300 J	mg/kg	08SS0040002	1/1	---	18300	7140 - 40800	NA	NA	NA	No	NTX
	7439-92-1	Lead	11.7 J	11.7 J	mg/kg	08SS0040002	1/1	---	11.7	6.4 - 21.5	NA	NA	81	No	BSL
	7439-95-4	Magnesium	1730 J	1730 J	mg/kg	08SS0040002	1/1	---	1730	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	130 J	130 J	mg/kg	08SS0040002	1/1	---	130	23.2 - 3040	6860 N	**110**	NA	**Yes**	ASL
	7440-02-0	Nickel	8.5 J	8.5 J	mg/kg	08SS0040002	1/1	---	8.5	4.6 - 23.7	NA	14	950	No	BSL
	7440-09-7	Potassium	975 J	975 J	mg/kg	08SS0040002	1/1	---	975	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	201 J	201 J	mg/kg	08SS0040002	1/1	---	201	3.7 - 205	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	29.4 J	29.4 J	mg/kg	08SS0040002	1/1	---	29.4	14.1 - 48.5	NA	260	NA	No	BSL
	7440-66-6	Zinc	21.7 J	21.7 J	mg/kg	08SS0040002	1/1	---	21.7	9.4 - 60.2	NA	680	14000	No	BSL

TABLE 7-10

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL UNDER BUILDING 106 AND UNDER PAVEMENT AROUND BUILDING 106
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels (SSLs). U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm (soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08SS0040002	08SS0270002
08SS0190002	08SS0280002
08SS0220002	08SS0290002
08SS0230002	08SS0300002
08SS0250002	08SS0310002
08SS0260002	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 7-11

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL UNDER BUILDING 106 AND UNDER PAVEMENT AROUND BUILDING 106
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	U.S. EPA Region 9 PRG (Residential)(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
SWMU 08 under Building 106 and Surrounding Pavement	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	1.14 J	11 J	ug/kg	08SB0250608	5/9	0.965 - 1.18	11	NA	2200000 N	44000000	IDEM	No	BSL
	67-64-1	Acetone	19 J	43 J	ug/kg	08SB0220608	2/9	5 - 19	43	NA	1400000 N	35000000	IDEM	No	BSL
	75-15-0	Carbon Disulfide	2 J	2 J	ug/kg	08SB0290406	1/9	0.965 - 1.18	2	NA	36000 N	900000	IDEM	No	BSL
	75-09-2	Methylene Chloride	21 J	21 J	ug/kg	08SB0040206	1/9	0.965 - 1.18	21	NA	9100 C	120000	IDEM	No	BSL
	79-01-6	Trichloroethene	5	36	ug/kg	08SB0290406	3/9	1.01 - 1.18	36	NA	2900 C(8)	710	IDEM	No	BSL
	75-69-4	Trichlorofluoromethane	1.1 J	1.1 J	ug/kg	08SB0040206	1/9	0.965 - 1.18	1.1	NA	39000 N	NA	NA	No	BSL
	Semivolatile Organic Compounds														
	56-55-3	Benzo(a)anthracene	5 J	5 J	ug/kg	08SB0040206	1/1	---	5	NA	620 C	5000	IDEM	No	BSL
	218-01-9	Chrysene	6 J	6 J	ug/kg	08SB0040206	1/1	---	6	NA	62000 C	500000	IDEM	No	BSL
	85-01-8	Phenanthrene	7 J	7 J	ug/kg	08SB0040206	1/1	---	7	NA	230000 N(9)	470000	IDEM	No	BSL
	129-00-0	Pyrene	20	20	ug/kg	08SB0040206	1/1	---	20	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	22100 J	22100 J	mg/kg	08SB0040206	1/1	---	22100	5020 - 17400	**7600 N**	NA	NA	**Yes**	ASL
	7440-38-2	**Arsenic**	5.5 J	5.5 J	mg/kg	08SB0040206	1/1	---	5.5	1.1 - 10.2	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	85.3 J	85.3 J	mg/kg	08SB0040206	1/1	---	85.3	24.8 - 155	540 N	63000	IDEM	No	BSL
	7440-70-2	Calcium	1420 J	1420 J	mg/kg	08SB0040206	1/1	---	1420	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	Chromium	20.1 J	20.1 J	mg/kg	08SB0040206	1/1	---	20.1	7.7 - 30.6	210 C(10)	430(11)	IDEM	No	BSL
	7440-48-4	Cobalt	6.6 J	6.6 J	mg/kg	08SB0040206	1/1	---	6.6	1.8 - 27.1	140 N(12)	NA	NA	No	BSL
	7440-50-8	Copper	7.9 J	7.9 J	mg/kg	08SB0040206	1/1	---	7.9	3.5 - 23.8	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	20000 J	20000 J	mg/kg	08SB0040206	1/1	---	20000	7140 - 40800	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	12.3 J	12.3 J	mg/kg	08SB0040206	1/1	---	12.3	6.4 - 21.5	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	1770 J	1770 J	mg/kg	08SB0040206	1/1	---	1770	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	Manganese	146 J	146 J	mg/kg	08SB0040206	1/1	---	146	23.2 - 3040	180 N	NA	NA	No	BSL
	7439-97-6	Mercury	0.018 J	0.018 J	mg/kg	08SB0040206	1/1	---	0.018	0.04 - 0.14	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	9.2 J	9.2 J	mg/kg	08SB0040206	1/1	---	9.2	4.6 - 23.7	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	1200 J	1200 J	mg/kg	08SB0040206	1/1	---	1200	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	143 J	143 J	mg/kg	08SB0040206	1/1	---	143	3.7 - 205	NA	NA	NA	No	NUT
	7440-62-2	**Vanadium**	33.5 J	33.5 J	mg/kg	08SB0040206	1/1	---	33.5	14.1 - 48.5	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	22.9 J	22.9 J	mg/kg	08SB0040206	1/1	---	22.9	9.4 - 60.2	2300 N	100000	IDEM	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 - The PRG for residential land use for total chromium is presented.
11 - Value is for hexavalent chromium.
12 - One-tenth of the noncarcinogenic PRG is less than the carcinogenic PRG; therefore, the one-tenth noncarcinogenic PRG is presented.

Associated Samples
08SB0040206 08SB0250206 08SB0260406 08SB0280406 08SB0310406

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

TABLE 7-12

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL UNDER BUILDING 106 AND UNDER PAVEMENT AROUND BUILDING 10
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Generic SSL for Soil to Air[5]	U.S. EPA Generic SSL for Migration to Groundwater[5]	IDEM SSL for Migration to Groundwater[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 under Building 106 and Surrounding Pavement	**Volatile Organic Compounds**														
	78-93-3	2-Butanone	1.14 J	11 J	ug/kg	08SB0250608	5/9	0.965 - 1.18	11	NA	24000000 sat	4400	35000	No	BSL
	67-64-1	Acetone	19 J	43 J	ug/kg	08SB0220608	2/9	5 - 19	43	NA	NA	6600	28000	No	BSL
	75-15-0	Carbon Disulfide	2 J	2 J	ug/kg	08SB0290406	1/9	0.965 - 1.18	2	NA	720000 sat	1500	10000	No	BSL
	75-09-2	**Methylene Chloride**	21 J	21 J	ug/kg	08SB0040206	1/9	0.965 - 1.18	21	NA	13000 C	**1.2**	23	**Yes**	ASL
	79-01-6	**Trichloroethene**	5	36	ug/kg	08SB0290406	3/9	1.01 - 1.18	36	NA	71 C	**2.8**	57	**Yes**	ASL
	75-69-4	Trichlorofluoromethane	1.1 J	1.1 J	ug/kg	08SB0040206	1/9	0.965 - 1.18	1.1	NA	110000 N	8000	NA	No	BSL
	Semivolatile Organic Compounds														
	56-55-3	Benzo(a)anthracene	5 J	5 J	ug/kg	08SB0040206	1/1	---	5	NA	NA	160	19000	No	BSL
	218-01-9	Chrysene	6 J	6 J	ug/kg	08SB0040206	1/1	---	6	NA	NA	160	25000	No	BSL
	85-01-8	Phenanthrene	7 J	7 J	ug/kg	08SB0040206	1/1	---	7	NA	NA	NA	13000	No	BSL
	129-00-0	Pyrene	20	20	ug/kg	08SB0040206	1/1	---	20	NA	NA	230000	570000	No	BSL
	Inorganics														
	7429-90-5	Aluminum	22100 J	22100 J	mg/kg	08SB0040206	1/1	---	22100	5020 - 17400	686000 N	NA	NA	No	NTX
	7440-38-2	**Arsenic**	5.5 J	5.5 J	mg/kg	08SB0040206	1/1	---	5.5	1.1 - 10.2	745 C	**0.29**	5.8	**Yes**	ASL
	7440-39-3	**Barium**	85.3 J	85.3 J	mg/kg	08SB0040206	1/1	---	85.3	24.8 - 155	68600 N	**82**	1600	**Yes**	ASL
	7440-70-2	Calcium	1420 J	1420 J	mg/kg	08SB0040206	1/1	---	1420	53.6 - 35300	NA	NA	NA	No	NUT
	7440-47-3	**Chromium**	20.1 J	20.1 J	mg/kg	08SB0040206	1/1	---	20.1	7.7 - 30.6	267 C	**2.1**	NA	**Yes**	ASL
	7440-48-4	**Cobalt**	6.6 J	6.6 J	mg/kg	08SB0040206	1/1	---	6.6	1.8 - 27.1	1140 C	**0.17**	NA	**Yes**	ASL
	7440-50-8	Copper	7.9 J	7.9 J	mg/kg	08SB0040206	1/1	---	7.9	3.5 - 23.8	NA	560	920	No	BSL
	7439-89-6	Iron	20000 J	20000 J	mg/kg	08SB0040206	1/1	---	20000	7140 - 40800	NA	NA	NA	No	NTX
	7439-92-1	Lead	12.3 J	12.3 J	mg/kg	08SB0040206	1/1	---	12.3	6.4 - 21.5	NA	NA	81	No	BSL
	7439-95-4	Magnesium	1770 J	1770 J	mg/kg	08SB0040206	1/1	---	1770	496 - 2870	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	146 J	146 J	mg/kg	08SB0040206	1/1	---	146	23.2 - 3040	6860 N	**110**	NA	**Yes**	ASL
	7439-97-6	Mercury	0.018 J	0.018 J	mg/kg	08SB0040206	1/1	---	0.018	0.04 - 0.14	NA	0.1	2.1	No	BSL
	7440-02-0	Nickel	9.2 J	9.2 J	mg/kg	08SB0040206	1/1	---	9.2	4.6 - 23.7	NA	14	950	No	BSL
	7440-09-7	Potassium	1200 J	1200 J	mg/kg	08SB0040206	1/1	---	1200	280 - 1650	NA	NA	NA	No	NUT
	7440-23-5	Sodium	143 J	143 J	mg/kg	08SB0040206	1/1	---	143	3.7 - 205	NA	NA	NA	No	NUT
	7440-62-2	Vanadium	33.5 J	33.5 J	mg/kg	08SB0040206	1/1	---	33.5	14.1 - 48.5	NA	260	NA	No	BSL
	7440-66-6	Zinc	22.9 J	22.9 J	mg/kg	08SB0040206	1/1	---	22.9	9.4 - 60.2	NA	680	14000	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels (SSLs). U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm (soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08SB0040206	08SB0250206	08SB0260406	08SB0280406	08SB0310406
08SB0220608	08SB0250608	08SB0270406	08SB0290406	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level
For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 7-13

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL UNDER BUILDING 107 AND UNDER PAVEMENT AROUND BUILDING 107
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	U.S. EPA Region 9 PRG (Residential)(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
SWMU 08 under Building 107 and Surrounding Pavement	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	5	5	ug/kg	08SS0410002	1/6	0.915 - 1.01	5	NA	1200000 sat	5000000	IDEM	No	BSL
	79-00-5	1,1,2-Trichloroethane	2 J	2 J	ug/kg	08SS0410002	1/6	0.915 - 1.01	2	NA	730 C	9400	IDEM	No	BSL
	75-35-4	1,1-Dichloroethene	1 J	4	ug/kg	08SS0410002	2/6	0.915 - 1.01	4	NA	12000 N	310000	IDEM	No	BSL
	591-78-6	2-Hexanone	1 J	1 J	ug/kg	08SS0420002 08SS0430002	2/6	0.915 - 1.01	1	NA	NA	NA	NA	No	NTX
	67-64-1	Acetone	2 J	4 J	ug/kg	08SS0440002	4/6	0.943 - 1.01	4	NA	1400000 N	35000000	IDEM	No	BSL
	156-59-2	cis-1,2-Dichloroethene	3 J	4	ug/kg	08SS0410002	2/6	0.915 - 1.01	4	NA	4300 N	110000	IDEM	No	BSL
	79-01-6	Trichloroethene	55	430 J	ug/kg	08SS0410002	2/6	0.915 - 1.01	430	NA	2900 C(8)	710	IDEM	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.

Associated Samples

08SS0340002	08SS0430002
08SS0410002	08SS0440002
08SS0420002	08SS0450002

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

TABLE 7-14

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SURFACE SOIL UNDER BUILDING 107 AND UNDER PAVEMENT AROUND BUILDING 107
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Generic SSL for Soil to Air[5]	U.S. EPA Generic SSL for Migration to Groundwater[5]	IDEM SSL for Migration to Groundwater[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 under Building 107 and Surrounding Pavement	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	5	5	ug/kg	08SS0410002	1/6	0.915 - 1.01	5	NA	1200000 sat	97	1900	No	BSL
	79-00-5	**1,1,2-Trichloroethane**	2 J	2 J	ug/kg	08SS0410002	1/6	0.915 - 1.01	2	NA	980 C	**0.91**	30	**Yes**	ASL
	75-35-4	**1,1-Dichloroethene**	1 J	4	ug/kg	08SS0410002	2/6	0.915 - 1.01	4	NA	30000 N	**2.9**	58	**Yes**	ASL
	591-78-6	2-Hexanone	1 J	1 J	ug/kg	08SS0420002, 08SS0430002	2/6	0.915 - 1.01	1	NA	NA	NA	NA	No	NTX
	67-64-1	Acetone	2 J	4 J	ug/kg	08SS0440002	4/6	0.943 - 1.01	4	NA	NA	6600	28000	No	BSL
	156-59-2	cis-1,2-Dichloroethene	3 J	4	ug/kg	08SS0410002	2/6	0.915 - 1.01	4	NA	NA	20	400	No	BSL
	79-01-6	**Trichloroethene**	55	430 J	ug/kg	08SS0410002	2/6	0.915 - 1.01	430	NA	**71 C**	**2.8**	**57**	**Yes**	ASL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels (SSLs). U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm (soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08SS0340002	08SS0430002
08SS0410002	08SS0440002
08SS0420002	08SS0450002

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 7-15

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL UNDER BUILDING 107 AND UNDER PAVEMENT AROUND BUILDING 107
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 under Building 107 and Surrounding Pavement	**Volatile Organic Compounds**														
	591-78-6	2-Hexanone	1.01 J	1.11 J	ug/kg	08SB0340406, 08SB0410406	3/6	0.982 - 1.2	1.11	NA	NA	NA	NA	No	NTX
	67-64-1	Acetone	1 J	7 J	ug/kg	08SB0410406	4/6	1.01 - 1.11	7	NA	1400000 N	35000000	IDEM	No	BSL
	156-59-2	cis-1,2-Dichloroethene	1.11 J	1.11 J	ug/kg	08SB0410406	1/6	0.982 - 1.2	1.11	NA	4300 N	110000	IDEM	No	BSL
	75-09-2	Methylene Chloride	2 J	2 J	ug/kg	08SB0420406	1/6	0.982 - 1.2	2	NA	9100 C	120000	IDEM	No	BSL
	79-01-6	Trichloroethene	19	71	ug/kg	08SB0410406	2/6	0.982 - 1.2	71	NA	2900 C[8]	710	IDEM	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.

Associated Samples

08SB0340406	08SB0430305
08SB0410406	08SB0440204
08SB0420406	08SB0450204

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
PRG = Preliminary Remediation Goal

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

TABLE 7-16

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION FROM SUBSURFACE SOIL UNDER BUILDING 107 AND UNDER PAVEMENT AROUND BUILDING 107
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Generic SSL for Soil to Air[5]	U.S. EPA Generic SSL for Migration to Groundwater[5]	IDEM SSL for Migration to Groundwater[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 under Building 107 and Surrounding Pavement	**Volatile Organic Compounds**														
	591-78-6	2-Hexanone	1.01 J	1.11 J	ug/kg	08SB0340406, 08SB0410406	3/6	0.982 - 1.2	1.11	NA	NA	NA	NA	No	NTX
	67-64-1	Acetone	1 J	7 J	ug/kg	08SB0410406	4/6	1.01 - 1.11	7	NA	NA	6600	28000	No	BSL
	156-59-2	cis-1,2-Dichloroethene	1.11 J	1.11 J	ug/kg	08SB0410406	1/6	0.982 - 1.2	1.11	NA	NA	20	400	No	BSL
	75-09-2	**Methylene Chloride**	2 J	2 J	ug/kg	08SB0420406	1/6	0.982 - 1.2	2	NA	13000 C	**1.2**	23	**Yes**	ASL
	79-01-6	**Trichloroethene**	19	71	ug/kg	08SB0410406	2/6	0.982 - 1.2	71	NA	71 C	**2.8**	**57**	**Yes**	ASL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Taken from Table 4-1 of the Final Basewide Background Soil Investigation Report, (TtNUS, 2001).
5 - U.S. EPA Soil Screening Levels (SSLs). U.S. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.htm (Soil to air SSLs for noncarcinogens are divided by 10).
The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08SB0340406	08SB0430305
08SB0410406	08SB0440204
08SB0420406	08SB0450204

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
SSL = Soil Screening Level
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient
NTX = No Toxicity Data

TABLE 7-17

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - SHALLOW BEDROCK AND OVERBURDEN
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Shallow Groundwater	**Volatile Organics (ug/L)**														
	71-55-6	**1,1,1-Trichloroethane**	1.2	850	ug/L	08GWTW002	6/13	0.3	850	NA	**320** N	**200** **200**	FED-MCL IDEM	**Yes**	**ASL**
	79-00-5	**1,1,2-Trichloroethane**	4.1	4.1	ug/L	08GWTW002	1/13	0.3	4.1	NA	**0.2** C	5 5	FED-MCL IDEM	**Yes**	**ASL**
	75-34-3	**1,1-Dichloroethane**	1.3	2500	ug/L	08GWTW002	10/13	0.3	2500	NA	**81** N	NA **990**	FED-MCL IDEM	**Yes**	**ASL**
	75-35-4	**1,1-Dichloroethene**	3.8	200	ug/L	08GWTW002	6/13	0.3	200	NA	**34** N	**7** **7**	FED-MCL IDEM	**Yes**	**ASL**
	107-06-2	**1,2-Dichloroethane**	7.8	7.8	ug/L	08GWTW002	1/13	0.3	7.8	NA	**0.12** C	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
	78-93-3	2-Butanone	81	81	ug/L	08GWTW002	1/13	0.5	81	NA	700 N	NA 8400	FED-MCL IDEM	No	BSL
	591-78-6	2-Hexanone	1.8 J	1.8 J	ug/L	08GWTW002	1/13	0.5	1.8	NA	NA	NA NA	FED-MCL IDEM	No	NTX
	67-64-1	Acetone	2.3 J	69 J	ug/L	08GWTW002	2/13	0.5 - 4.2	69	NA	550 N	NA 6900	FED-MCL IDEM	No	BSL
	71-43-2	**Benzene**	0.6 J	1.3	ug/L	08GWTW002	3/13	0.3	1.3	NA	**0.35** C	5 5	FED-MCL IDEM	**Yes**	**ASL**
	75-00-3	**Chloroethane**	1.1	5900	ug/L	08GWTW002	8/13	0.5	5900	NA	**4.6** C	NA **62**	FED-MCL IDEM	**Yes**	**ASL**
	156-59-2	**cis-1,2-Dichloroethene**	0.9 J	380	ug/L	08GWTW002	10/13	0.3	380	NA	**6.1** N	**70** **70**	FED-MCL IDEM	**Yes**	**ASL**
	100-41-4	Ethylbenzene	0.8 J	0.8 J	ug/L	08GWTW002	1/13	0.3	0.8	NA	130 N	700 700	FED-MCL IDEM	No	BSL
	108-88-3	**Toluene**	87	87	ug/L	08GWTW002	1/13	0.3	87	NA	**72** N	1000 1000	FED-MCL IDEM	**Yes**	**ASL**
	1330-20-7	Total Xylenes	4.4	4.4	ug/L	08GWTW002	1/13	0.3	4.4	NA	21 N	10000 10000	FED-MCL IDEM	No	BSL
	156-60-5	**trans-1,2-Dichloroethene**	0.9 J	15	ug/L	08GWTW002	2/13	0.3	15	NA	**12** N	100 100	FED-MCL IDEM	**Yes**	**ASL**
	79-01-6	**Trichloroethene**	0.7 J	180	ug/L	08GWTW006	10/13	0.3	180	NA	**1.4** C[8]	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
	75-01-4	**Vinyl Chloride**	1.4	120	ug/L	08GWTW002	6/13	0.3	120	NA	**0.02** C	**2** **2**	FED-MCL IDEM	**Yes**	**ASL**
	Semivolatile Organics (ug/L)														
	123-91-1	**1,4-Dioxane**	3 J	64 J	ug/L	08GWTW002	10/13	0.95 - 1.06	64	NA	**6.1** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	105-67-9	2,4-Dimethylphenol	2 J	2 J	ug/L	08GWTW002	1/4	0.95 - 0.97	2	NA	73 N	NA 730	FED-MCL IDEM	No	BSL
	91-57-6	2-Methylnaphthalene	0.08 J	0.08 J	ug/L	08GWTW002	1/4	0.052 - 0.06	0.08	NA	0.62 N	NA 31	FED-MCL IDEM	No	BSL
	NA	**3&4-Methylphenol**	22	22	ug/L	08GWTW002	1/4	0.95 - 0.97	22	NA	**18** N[9]	NA 180	FED-MCL IDEM	**Yes**	**ASL**
	206-44-0	Fluoranthene	0.07 J	0.07 J	ug/L	08GWTW004	1/4	0.052 - 0.06	0.07	NA	150 N	NA 210	FED-MCL IDEM	No	BSL
	86-73-7	Fluorene	0.11	0.11	ug/L	08GWTW002	1/4	0.052 - 0.06	0.11	NA	24 N	NA 310	FED-MCL IDEM	No	BSL

TABLE 7-17

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - SHALLOW BEDROCK AND OVERBURDEN
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
(continued)	85-01-8	Phenanthrene	0.08 J	0.17	ug/L	08GWTW002	2/4	0.052 - 0.06	0.17	NA	18 N	NA 23	FED-MCL IDEM	No	BSL
	108-95-2	Phenol	2 J	2 J	ug/L	08GWTW002	1/4	0.95 - 0.97	2	NA	1100 N	NA 11000	FED-MCL IDEM	No	BSL
	129-00-0	Pyrene	0.11 J	0.11 J	ug/L	08GWTW004	1/4	0.052 - 0.06	0.11	NA	18 N	NA 140	FED-MCL IDEM	No	BSL
	Energetics (ug/L)														
	19406-51-0	4-Amino-2,6-Dinitrotoluene	0.58 J	0.58 J	ug/L	08GWTW002	1/4	0.25 - 0.26	0.58	NA	0.73 N[10]	NA NA	FED-MCL IDEM	No	BSL
	2691-41-0	HMX	3.9 J	3.9 J	ug/L	08GWTW002	1/4	0.25 - 0.26	3.9	NA	180 N	NA NA	FED-MCL IDEM	No	BSL
	Total Metals														
	7429-90-5	**Aluminum**	63.4 J	68200 J	ug/L	08GWT00601	5/8	21.7 - 33.8	68200	463	**3600** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-36-0	**Antimony**	1.9 J	1.9 J	ug/L	08GWTW002	1/8	0.085 - 0.27	1.9	ND	**1.5** N	6 6	FED-MCL IDEM	**Yes**	**ASL**
	7440-38-2	**Arsenic**	3.7 J	26.4 J	ug/L	08GWT00601	6/8	0.34 - 0.46	26.4	ND	**0.045** C	**10** **10**	FED-MCL IDEM	**Yes**	**ASL**
	7440-39-3	**Barium**	46 J	589 J	ug/L	08GWT00601	8/8	---	589	19.5	**260** N	2000 2000	FED-MCL IDEM	**Yes**	**ASL**
	7440-41-7	**Beryllium**	0.29 J	6.1 J	ug/L	08GWT00601	2/8	0.02 - 0.23	6.1	ND	7.3 N	**4** **4**	FED-MCL IDEM	**Yes**	**ASL**
	7440-43-9	**Cadmium**	0.06 J	4.9 J	ug/L	08GWTW004	7/8	0.16	4.9	0.08	**1.8** N	5 5	FED-MCL IDEM	**Yes**	**ASL**
	7440-70-2	Calcium	16900 J	97500 J	ug/L	08GWT00601	8/8	---	97500	9640	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	**Chromium**	0.23 J	34.9	ug/L	08GWT00601	7/8	0.94	34.9	0.58	**11** N[11]	100 100	FED-MCL IDEM[9]	**Yes**	**ASL**
	7440-48-4	**Cobalt**	2.3 J	80 J	ug/L	08GWTW004	8/8	---	80	5.3	**73** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	7440-50-8	Copper	0.64 J	41.7 J	ug/L	08GWT00601	5/8	1.9 - 2.5	41.7	ND	150 N	1300 1300	FED-MCL[12] IDEM	No	BSL
	7439-89-6	**Iron**	48.5 J	45600	ug/L	08GWT00601	8/8	---	45600	681	**1100** N	**300** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-92-1	**Lead**	0.18 J	112 J	ug/L	08GWTW002	5/8	0.069 - 0.09	112	0.54	NA	**15** **15**	FED-MCL[12] IDEM	**Yes**	**ASL**
	7439-95-4	Magnesium	3430 J	22400	ug/L	08GWT00801	8/8	---	22400	6750	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese**	73.6 J	4120 J	ug/L	08GWTW004	8/8	---	4120	93.9	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-97-6	Mercury	0.049 J	0.071 J	ug/L	08GWTW001	2/8	0.03	0.071	ND	1.1 N	2 2	FED-MCL IDEM	No	BSL
	7440-02-0	Nickel	3.9 J	41.3	ug/L	08GWT00601	7/8	0.1	41.3	7.8	73 N	NA 730	NA IDEM	No	BSL
	7440-09-7	Potassium	922	5590 J	ug/L	08GWT00201	8/8	---	5590	518	NA	NA NA	FED-MCL IDEM	No	NUT

TABLE 7-17

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - SHALLOW BEDROCK AND OVERBURDEN
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
(continued)	7782-49-2	Selenium	0.18 J	2.3	ug/L	08GWTW004	6/8	0.094 - 0.2	2.3	0.33	18 N	50 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium	1570 J	304000 J	ug/L	08GWTW002	8/8	---	304000	36500	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-28-0	**Thallium**	0.18 J	0.58 J	ug/L	08GWT00601	4/8	0.043 - 0.23	0.58	ND	**0.24** N	2 2	FED-MCL IDEM	**Yes**	**ASL**
	7440-31-5	Tin	0.43 J	6.8 J	ug/L	08GWTW002	4/8	0.048 - 0.53	6.8	ND	2200 N	NA NA	FED-MCL IDEM	No	BSL
	7440-62-2	**Vanadium**	11.2 J	38.3	ug/L	08GWT00601	4/8	1.14	38.3	ND	**3.6** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	7440-66-6	Zinc	6.4 J	871 J	ug/L	08GWT00601	6/8	1.7 - 4	871	12.4	1100 N	5000 11000	FED-SMCL IDEM	No	BSL
	Dissolved Metals														
	7440-36-0	**Antimony**	1.8 J	1.8 J	ug/L	08GWTW002-F	1/4	0.16 - 0.5	1.8	ND	**1.5** N	6 6	FED-MCL IDEM	**Yes**	**ASL**
	7440-38-2	**Arsenic**	1.5 J	11 J	ug/L	08GWTW002-F	2/4	0.047 - 0.46	11	ND	**0.045** C	**10** **10**	FED-MCL IDEM	**Yes**	**ASL**
	7440-39-3	Barium	23.1 J	121 J	ug/L	08GWT00601-F	4/4	---	121	19.8	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-43-9	**Cadmium**	0.68 J	3.1 J	ug/L	08GWTW004-F	2/4	0.25 - 0.28	3.1	0.1	**1.8** N	5 5	FED-MCL IDEM	**Yes**	**ASL**
	7440-70-2	Calcium	16100	69300 J	ug/L	08GWT00601-F	4/4	---	69300	9620	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	**Chromium**	0.17 J	11.7 J	ug/L	08GWTW002-F	2/4	0.95 - 0.96	11.7	0.11	**11** N[11]	100 100	FED-MCL IDEM[11]	**Yes**	**ASL**
	7440-48-4	Cobalt	0.28 J	35.9 J	ug/L	08GWTW004-F	4/4	---	35.9	5.1	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	Copper	0.61 J	8.4 J	ug/L	08GWTW002-F	3/4	1.9	8.4	ND	150 N	1300 1300	FED-MCL[12] IDEM	No	BSL
	7439-89-6	**Iron**	57.2	6380 J	ug/L	08GWTW004-F	4/4	---	6380	ND	**1100** N	**300** NA	FED-SMCL NA	**Yes**	**ASL**
	7439-92-1	Lead	0.16 J	2.5 J	ug/L	08GWTW002-F	2/4	0.11 - 0.12	2.5	0.15	NA	15 15	FED-MCL[12] IDEM	No	BSL
	7439-95-4	Magnesium	4240 J	8590 J	ug/L	08GWTW001-F	4/4	---	8590	6510	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese**	9.7 J	2380 J	ug/L	08GWTW004-F	4/4	---	2380	91.2	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-02-0	Nickel	3.6 J	15.8 J	ug/L	08GWTW004-F	4/4	---	15.8	7.4	73 N	NA 730	FED-MCL IDEM	No	BSL
	7440-09-7	Potassium	705 J	4610 J	ug/L	08GWTW001-F	4/4	---	4610	388	NA	NA NA	FED-MCL IDEM	No	NUT
	7782-49-2	Selenium	0.27 J	3.1	ug/L	08GWT00601-F	4/4	---	3.1	0.31	18 N	NA 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium	6500 J	316000 J	ug/L	08GWTW002-F	3/4	2490	316000	36300	NA	NA NA	FED-MCL IDEM	No	NUT

TABLE 7-17

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - SHALLOW BEDROCK AND OVERBURDEN
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
(continued)	7440-28-0	Thallium	0.06 J	0.06 J	ug/L	08GWTW004-F	1/4	0.043 - 0.14	0.06	ND	0.24 N	2 2	FED-MCL IDEM	No	BSL
	7440-31-5	Tin	1.1 J	1.1 J	ug/L	08GWTW002-F	1/4	0.05 - 0.12	1.1	ND	2200 N	NA NA	FED-MCL IDEM	No	BSL
	7440-62-2	Vanadium	1.8 J	1.8 J	ug/L	08GWTW002-F	1/4	1.14	1.8	ND	3.6 N	NA NA	FED-MCL IDEM	No	BSL
	7440-66-6	Zinc	24.6 J	486 J	ug/L	08GWTW004-F	2/4	4 - 4.4	486	10.1	1100 N	5000 11000	FED-SMCL IDEM	No	BSL
	Miscellaneous Parameters														
	NA	Fecal Coliform	0.3	5	cfu/L	08GWTW001	2/4	0.1- 1	5	NA	NA	NA NA	FED-SMCL IDEM	No	NTX

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening. A discussion of metals concentrations in groundwater relative to background is presented in Section 5.5.
5 - The U.S. EPA Region 9 tap water screening level is presented. Value represents the U.S. EPA Region 9 risk-based tap water PRG divided by 10 to correspond to a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag), or an incremental cancer risk of 1.0E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA Region 9, October 2004).
6 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Winter 2004). Indiana Department of Environmental Management Risk Integrated System of Closure (RISC) residential closure levels for groundwater (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - Value for 4-methylphenol is used.
10 - Value is for aminodinitrotoluene.
11 - Value is for hexavalent chromium.
12 - The MCL for this parameter is actually a treatment technique. The SDWA Action Level (at the tap) is presented.

Associated Samples

08GWT00201	08GWT00601-F	08GWTW002-F
08GWT00202	08GWT00801	08GWTW003
08GWT00401	08GWT00802	08GWTW004
08GWT00402	08GWTW001	08GWTW004-F
08GWT00601	08GWTW001-F	08GWTW006
08GWT00602	08GWTW002	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
MCL = Maximum Contaminant Level
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected.
PRG = Preliminary Remediation Goal
SMCL = Secondary Maximum Contaminant Level
SDWA = Safe Drinking Water Act

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and Site Background.

For elimination as a COPC:
BSL = Below Screening Level
FREQ = Frequency of occurrence less than 5 percent (1 of 20 samples)
NUT = Essential Nutrient

TABLE 7-18

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - SHALLOW BEDROCK AND OVERBURDEN - VAPOR INTRUSION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Upgradient Concentrations[4]	Screening Toxicity Value[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
SWMU 08 Shallow Groundwater	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	1.2	850	ug/L	08GWTW002	6/13	0.3	850	NA	3100	NA	NA	No	BSL
	79-00-5	1,1,2-Trichloroethane	4.1	4.1	ug/L	08GWTW002	1/13	0.3	4.1	NA	5	NA	NA	No	BSL
	75-34-3	**1,1-Dichloroethane**	1.3	2500	ug/L	08GWTW002	10/13	0.3	2500	NA	**2200**	NA	NA	**Yes**	ASL
	75-35-4	**1,1-Dichloroethene**	3.8	200	ug/L	08GWTW002	6/13	0.3	200	NA	**190**	NA	NA	**Yes**	ASL
	107-06-2	**1,2-Dichloroethane**	7.8	7.8	ug/L	08GWTW002	1/13	0.3	7.8	NA	**5**	NA	NA	**Yes**	ASL
	78-93-3	2-Butanone	81	81	ug/L	08GWTW002	1/13	0.5	81	NA	440000	NA	NA	No	BSL
	591-78-6	2-Hexanone	1.8 J	1.8 J	ug/L	08GWTW002	1/13	0.5	1.8	NA	NA	NA	NA	No	NTX
	67-64-1	Acetone	2.3 J	69 J	ug/L	08GWTW002	2/13	0.5 - 4.2	69	NA	220000	NA	NA	No	BSL
	71-43-2	Benzene	0.6 J	1.3	ug/L	08GWTW002	3/13	0.3	1.3	NA	5	NA	NA	No	BSL
	75-00-3	Chloroethane	1.1	5900	ug/L	08GWTW002	8/13	0.5	5900	NA	28000	NA	NA	No	BSL
	156-59-2	**cis-1,2-Dichloroethene**	0.9 J	380	ug/L	08GWTW002	10/13	0.3	380	NA	**210**	NA	NA	**Yes**	ASL
	100-41-4	Ethylbenzene	0.8 J	0.8 J	ug/L	08GWTW002	1/13	0.3	0.8	NA	700	NA	NA	No	BSL
	108-88-3	Toluene	87	87	ug/L	08GWTW002	1/13	0.3	87	NA	1500	NA	NA	No	BSL
	1330-20-7	Total Xylenes	4.4	4.4	ug/L	08GWTW002	1/13	0.3	4.4	NA	22000	NA	NA	No	BSL
	156-60-5	Trans-1,2-Dichloroethene	0.9 J	15	ug/L	08GWTW002	2/13	0.3	15	NA	180	NA	NA	No	BSL
	79-01-6	**Trichloroethene**	0.7 J	180	ug/L	08GWTW006	10/13	0.3	180	NA	**5**	NA	NA	**Yes**	ASL
	75-01-4	**Vinyl Chloride**	1.4	120	ug/L	08GWTW002	6/13	0.3	120	NA	**2**	NA	NA	**Yes**	ASL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening.
5 - Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, (U.S. EPA 2002b)
Values are from Table 2c and correspond to a target cancer risk level of 1E-6 or HI =1 and an attenuation factor of 0.001.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and its respective site background value.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08GWT00201	08GWT00601-F	08GWTW002-F
08GWT00202	08GWT00801	08GWTW003
08GWT00401	08GWT00802	08GWTW004
08GWT00402	08GWTW001	08GWTW004-F
08GWT00601	08GWTW001-F	08GWTW006
08GWT00602	08GWTW002	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected
µg/L = Microgram per liter

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and Site Background.

For elimination as a COPC:
BKG = Below Background
BSL = Below Screening Level
NTX = No Toxicity Data

TABLE 7-19

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - INTERMEDIATE ZONE
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Intermediate Groundwater	**Volatile Organics (ug/L)**														
	71-55-6	**1,1,1-Trichloroethane**	7.5	3900	ug/L	08GWT00502	9/9	---	3900	NA	**320** N	**200** **200**	FED-MCL IDEM	**Yes**	**ASL**
	79-00-5	**1,1,2-Trichloroethane**	2.4	9.9	ug/L	08GWT00501	6/9	0.3	9.9	NA	**0.2** C	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
	75-34-3	**1,1-Dichloroethane**	4	450	ug/L	08GWT00102	8/9	0.3	450	NA	**81** N	NA 990	FED-MCL IDEM	**Yes**	**ASL**
	75-35-4	**1,1-Dichloroethene**	1.6	2600	ug/L	08GWT00502	9/9	---	2600	NA	**34** N	**7** **7**	FED-MCL IDEM	**Yes**	**ASL**
	107-06-2	**1,2-Dichloroethane**	0.9 J	3.3	ug/L	08GWT00502	6/9	0.3	3.3	NA	**0.12** C	5 5	FED-MCL IDEM	**Yes**	**ASL**
	67-64-1	Acetone	2.9 J	2.9 J	ug/L	08GWT00502	1/9	0.5	2.9	NA	550 N	NA 6900	FED-MCL IDEM	No	BSL
	75-00-3	Chloroethane	1.8	4.2	ug/L	08GWT00102	6/9	0.5	4.2	NA	4.6 C	NA NA	FED-MCL IDEM	No	BSL
	67-66-3	**Chloroform**	0.8 J	2	ug/L	08GWT00101	6/9	0.3	2	NA	**0.17** C	80 80	FED-MCL IDEM	**Yes**	**ASL**
	156-59-2	**cis-1,2-Dichloroethene**	8.1	300	ug/L	08GWT00102	6/9	0.3	300	NA	**6.1** N	**70** **70**	FED-MCL IDEM	**Yes**	**ASL**
	127-18-4	**Tetrachloroethene**	0.8 J	1.4	ug/L	08GWT00502	2/9	0.3	1.4	NA	**0.1** C	5 5	FED-MCL IDEM	**Yes**	**ASL**
	108-88-3	Toluene	0.5 J	0.5 J	ug/L	08GWT00301	1/9	0.3	0.5	NA	72 N	1000 1000	FED-MCL IDEM	No	BSL
	156-60-5	**trans-1,2-Dichloroethene**	1.4	14	ug/L	08GWT00502	6/9	0.3	14	NA	**12** N	100 100	FED-MCL IDEM	**Yes**	**ASL**
	79-01-6	**Trichloroethene**	1.9	8200	ug/L	08GWT00102	6/9	0.3	8200	NA	**1.4** C[8]	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
	75-01-4	**Vinyl Chloride**	2	5	ug/L	08GWT00301	6/9	0.3	5	NA	**0.02** C	**2** **2**	FED-MCL IDEM	**Yes**	**ASL**
	Semivolatile Organics (ug/L)														
	123-91-1	**1,4-Dioxane**	3 J	150	ug/L	08GWT00301	7/9	0.99 - 1	150	NA	**6.1** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	Total Metals														
	7429-90-5	**Aluminum**	48.5 J	308 J	ug/L	08GWT00501	4/4	---	308	463	3600 N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-38-2	**Arsenic**	0.8 J	0.8 J	ug/L	08GWT00901	1/4	0.34 - 0.72	0.8	ND	**0.045** C	10 10	FED-MCL IDEM	**Yes**	**ASL**
	7440-39-3	Barium	30.3 J	44.4 J	ug/L	08GWT00901	4/4	---	44.4	19.5	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-41-7	Beryllium	0.2 J	0.28 J	ug/L	08GWT00901	2/4	0.02 - 0.04	0.28	ND	7.3 N	4 4	FED-MCL IDEM	No	BSL
	7440-43-9	Cadmium	0.12 J	0.9 J	ug/L	08GWT00501	4/4	---	0.9	0.08	1.8 N	5 5	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium	47600 J	103000 J	ug/L	08GWT00901	4/4	---	103000	9640	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	Chromium	0.4 J	2.5	ug/L	08GWT00101	4/4	---	2.5	0.58	11 N[9]	100 100	FED-MCL IDEM[9]	No	BSL
	7440-48-4	**Cobalt**	10.2 J	306 J	ug/L	08GWT00901	4/4	---	306	5.3	**73** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**

TABLE 7-19

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - INTERMEDIATE ZONE
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
(continued)	7440-50-8	Copper	3.4 J	3.4 J	ug/L	08GWT00501	1/4	1.8 - 2.7	3.4	ND	150 N	1300 1300	FED-MCL(10) IDEM	No	BSL
	7439-89-6	**Iron**	88 J	9510 J	ug/L	08GWT00901	4/4	---	9510	681	**1100** N	**300** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-92-1	Lead	0.19 J	0.56 J	ug/L	08GWT00501	3/4	0.12	0.56	0.54	NA	15 15	FED-MCL(10) IDEM	No	BSL
	7439-95-4	Magnesium	31300 J	64600 J	ug/L	08GWT00901	4/4	---	64600	6750	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese**	178 J	10700 J	ug/L	08GWT00901	4/4	---	10700	93.9	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-02-0	**Nickel**	15.3 J	820 J	ug/L	08GWT00901	4/4	---	820	7.8	**73** N	NA **730**	NA IDEM	**Yes**	**ASL**
	7440-09-7	Potassium	3140 J	8050 J	ug/L	08GWT00901	4/4	---	8050	518	NA	NA NA	FED-MCL IDEM	No	NUT
	7782-49-2	Selenium	0.28 J	1 J	ug/L	08GWT00901	2/4	0.1 - 0.13	1	0.33	18 N	50 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium	28600 J	48000 J	ug/L	08GWT00101	4/4	---	48000	36500	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-66-6	Zinc	8.9 J	310 J	ug/L	08GWT00901	4/4	---	310	12.4	1100 N	5000 11000	FED-SMCL IDEM	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening. A discussion of metal concentrations in groundwater relative to background is presented in Section 5.5.
5 - The U.S. EPA Region 9 tap water screening level is presented. Value represents the U.S. EPA Region 9 risk-based tap water PRG divided by 10 to correspond to a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag), or an incremental cancer risk of 1.0E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA Region 9, October 2004).
6 - U.S. EPA Primary Drinking Water Standard (Winter 2004). Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - Values are for hexavalent chromium.
10 - The MCL for this parameter is actually a treatment technique. The SDWA Action Level (at the tap) is presented.

Associated Samples

08GWT00101	08GWT00502
08GWT00102	08GWT00901
08GWT00301	08GWT00902
08GWT00302	08GWT01201
08GWT00501	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
MCL = Maximum Contaminant Level
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected.
PRG = Preliminary Remediation Goal
SMCL = Secondary Maximum Contaminant Level

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and site background.

For elimination as a COPC:
BSL = Below Screening Level
FREQ = Frequency of occurrence less than 5 percent (1 of 20 samples)
NUT = Essential Nutrient

TABLE 7-20

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - INTERMEDIATE ZONE - VAPOR INTRUSION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Upgradient Concentrations(4)	Screening Toxicity Value(5)	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
SWMU 08 Intermediate Groundwater	**Volatile Organic Compounds**														
	71-55-6	**1,1,1-Trichloroethane**	7.5	3900	ug/L	08GWT00502	9/9	---	3900	NA	**3100**	NA	NA	**Yes**	ASL
	79-00-5	**1,1,2-Trichloroethane**	2.4	9.9	ug/L	08GWT00501	6/9	0.3	9.9	NA	**5**	NA	NA	**Yes**	ASL
	75-34-3	1,1-Dichloroethane	4	450	ug/L	08GWT00102	8/9	0.3	450	NA	2200	NA	NA	No	BSL
	75-35-4	**1,1-Dichloroethene**	1.6	2600	ug/L	08GWT00502	9/9	---	2600	NA	**190**	NA	NA	**Yes**	ASL
	107-06-2	1,2-Dichloroethane	0.9 J	3.3	ug/L	08GWT00502	6/9	0.3	3.3	NA	5	NA	NA	No	BSL
	67-64-1	Acetone	2.9 J	2.9 J	ug/L	08GWT00502	1/9	0.5	2.9	NA	220000	NA	NA	No	BSL
	75-00-3	Chloroethane	1.8	4.2	ug/L	08GWT00102	6/9	0.5	4.2	NA	28000	NA	NA	No	BSL
	67-66-3	Chloroform	0.8 J	2	ug/L	08GWT00101	6/9	0.3	2	NA	80	NA	NA	No	BSL
	156-59-2	**cis-1,2-Dichloroethene**	8.1	300	ug/L	08GWT00102	6/9	0.3	300	NA	**210**	NA	NA	**Yes**	ASL
	127-18-4	Tetrachloroethene	0.8 J	1.4	ug/L	08GWT00502	2/9	0.3	1.4	NA	5	NA	NA	No	BSL
	108-88-3	Toluene	0.5 J	0.5 J	ug/L	08GWT00301	1/9	0.3	0.5	NA	1500	NA	NA	No	BSL
	156-60-5	Trans-1,2-Dichloroethene	1.4	14	ug/L	08GWT00502	6/9	0.3	14	NA	180	NA	NA	No	BSL
	79-01-6	**Trichloroethene**	1.9	8200	ug/L	08GWT00102	6/9	0.3	8200	NA	**5**	NA	NA	**Yes**	ASL
	75-01-4	**Vinyl Chloride**	2	5	ug/L	08GWT00301	6/9	0.3	5	NA	**2**	NA	NA	**Yes**	ASL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening.
5 - Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, (U.S. EPA, 2002b).
Values are from Table 2c and correspond to a target cancer risk level of 1E-6 or HI =1 and an attenuation factor of 0.001.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and its respective site background value.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08GWT00101	08GWT00502
08GWT00102	08GWT00901
08GWT00301	08GWT00902
08GWT00302	08GWT01201
08GWT00501	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected
µg/L = Microgram per liter

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and Site Background.

For elimination as a COPC:
BKG = Below Background
BSL = Below Screening Level

TABLE 7-21

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - DEEP ZONE
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Deep Groundwater	**Volatile Organics (ug/L)**														
	71-55-6	1,1,1-Trichloroethane	1.5	1.5	ug/L	08GWT01401	1/6	0.3	1.5	NA	320 N	200 200	FED-MCL IDEM	No	BSL
	75-34-3	1,1-Dichloroethane	0.9 J	0.9 J	ug/L	08GWT01401	1/6	0.3	0.9	NA	81 N	NA 990	FED-MCL IDEM	No	BSL
	75-35-4	1,1-Dichloroethene	0.8 J	0.8 J	ug/L	08GWT01401	1/6	0.3	0.8	NA	34 N	7 7	FED-MCL IDEM	No	BSL
	67-64-1	Acetone	5 J	12 J	ug/L	08GWT01301	2/6	0.5	12	NA	550 N	NA 6900	FED-MCL IDEM	No	BSL
	Semivolatile Organics (ug/L)														
	123-91-1	**1,4-Dioxane**	32	44	ug/L	08GWT01101	2/6	0.971 - 4.04	44	NA	**6.1** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	Total Metals														
	7429-90-5	**Aluminum**	5210 J	5210 J	ug/L	08GWT01101	1/2	14.4	5210	463	**3600** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-38-2	**Arsenic**	3.8 J	4.5 J	ug/L	08GWT01101	2/2	---	4.5	ND	**0.045** C	10 10	FED-MCL IDEM	**Yes**	**ASL**
	7440-39-3	Barium	38.5 J	89.1 J	ug/L	08GWT01101	2/2	---	89.1	19.5	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-41-7	Beryllium	0.44 J	0.44 J	ug/L	08GWT01101	1/2	0.02	0.44	ND	7.3 N	4 4	FED-MCL IDEM	No	BSL
	7440-43-9	Cadmium	0.06 J	0.13 J	ug/L	08GWT01101	2/2	---	0.13	0.08	1.8 N	5 5	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium	12000 J	93000 J	ug/L	08GWT01001	2/2	---	93000	9640	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	Chromium	0.27 J	10.3	ug/L	08GWT01101	2/2	---	10.3	0.58	11 N[8]	100 100	FED-MCL IDEM[9]	No	BSL
	7440-48-4	Cobalt	1.4	10.2	ug/L	08GWT01101	2/2	---	10.2	5.3	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	Copper	7.1 J	7.1 J	ug/L	08GWT01101	1/2	1.5	7.1	ND	150 N	1300 1300	FED-MCL[9] IDEM	No	BSL
	7439-89-6	**Iron**	400	13400	ug/L	08GWT01101	2/2	---	13400	681	**1100** N	**300** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-92-1	Lead	0.13 J	6	ug/L	08GWT01101	2/2	---	6	0.54	NA	15 15	FED-MCL[9] IDEM	No	BSL
	7439-95-4	Magnesium	6100	27900	ug/L	08GWT01001	2/2	---	27900	6750	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese**	110	533	ug/L	08GWT01101	2/2	---	533	93.9	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-97-6	Mercury	0.07 J	0.07 J	ug/L	08GWT01101	1/2	0.03	0.07	ND	1.1 N	2 2	FED-MCL IDEM	No	BSL
	7440-02-0	Nickel	7.7	22.8	ug/L	08GWT01101	2/2	---	22.8	7.8	73 N	NA 730	NA IDEM	No	BSL
	7440-09-7	Potassium	2690	3270	ug/L	08GWT01101	2/2	---	3270	518	NA	NA NA	FED-MCL IDEM	No	NUT

TABLE 7-21

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - DEEP ZONE
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
(continued)	7782-49-2	Selenium	0.31 J	0.76 J	ug/L	08GWT01101	2/2	---	0.76	0.33	18 N	50 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium	34300 J	43000 J	ug/L	08GWT01001	2/2	---	43000	36500	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-31-5	Tin	0.4 J	0.4 J	ug/L	08GWT01101	1/2	0.1	0.4	ND	2200 N	NA NA	FED-MCL IDEM	No	BSL
	7440-62-2	**Vanadium**	10.9	10.9	ug/L	08GWT01101	1/2	1.14	10.9	ND	**3.6** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	7440-66-6	Zinc	23.4 J	23.4 J	ug/L	08GWT01101	1/2	2.8	23.4	12.4	1100 N	5000 11000	FED-SMCL IDEM	No	BSL
	Dissolved Metals														
	7429-90-5	Aluminum, Filtered	15.1 J	15.1 J	ug/L	08GWT01101-F	1/1	---	15.1	463	3600 N	50 NA	FED-SMCL IDEM	No	BSL
	7440-39-3	Barium, Filtered	55.1 J	55.1 J	ug/L	08GWT01101-F	1/1	---	55.1	19.8	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium, Filtered	12600 J	12600 J	ug/L	08GWT01101-F	1/1	---	12600	9620	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	Chromium, Filtered	0.18 J	0.18 J	ug/L	08GWT01101-F	1/1	---	0.18	0.11	11 N[8]	100 100	FED-MCL IDEM[8]	No	BSL
	7440-48-4	Cobalt, Filtered	5.8	5.8	ug/L	08GWT01101-F	1/1	---	5.8	5.1	73 N	NA NA	FED-MCL IDEM	No	BSL
	7439-89-6	Iron, Filtered	24.3 J	24.3 J	ug/L	08GWT01101-F	1/1	---	24.3	ND	1100 N	300 NA	FED-SMCL NA	No	BSL
	7439-95-4	Magnesium, Filtered	5520	5520	ug/L	08GWT01101-F	1/1	---	5520	6510	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese, Filtered**	370	370	ug/L	08GWT01101-F	1/1	---	370	91.2	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-02-0	Nickel, Filtered	13.1	13.1	ug/L	08GWT01101-F	1/1	---	13.1	7.4	73 N	NA 730	FED-MCL IDEM	No	BSL
	7440-09-7	Potassium, Filtered	2300	2300	ug/L	08GWT01101-F	1/1	---	2300	388	NA	NA NA	FED-MCL IDEM	No	NUT
	7782-49-2	Selenium, Filtered	0.84 J	0.84 J	ug/L	08GWT01101-F	1/1	---	0.84	0.31	18 N	NA 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium, Filtered	36700 J	36700 J	ug/L	08GWT01101-F	1/1	---	36700	36300	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-66-6	Zinc, Filtered	2.6 J	2.6 J	ug/L	08GWT01101-F	1/1	---	2.6	10.1	1100 N	5000 11000	FED-SMCL IDEM	No	BSL

TABLE 7-21

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - DEEP ZONE
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening. A discussion of metal concentrations in groundwater relative to background is presented in Section 5.5.
5 - The U.S. EPA Region 9 tap water screening level is presented. Value represents the U.S. EPA Region 9 risk-based tap water PRG divided by 10 to correspond to a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag), or an incremental cancer risk of 1.0E-6 for carcinogens (denoted with a "C" flag) (USEPA Region 9, October 2004).
6 - U.S. EPA Primary Drinking Water Standard (Winter 2004). Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Values are for hexavalent chromium.
9 - The MCL for this parameter is actually a treatment technique. The SDWA Action Level (at the tap) is presented.

Associated Samples

08GWT01001	08GWT01102
08GWT01002	08GWT01301
08GWT01101	08GWT01401
08GWT01101-F	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
MCL = Maximum Contaminant Level
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected.
PRG = Preliminary Remediation Goal
SMCL = Secondary Maximum Contaminant Level
SWDA = Safe Drinking Water Act

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and site background.

For elimination as a COPC:
BSL = Below Screening Level
FREQ = Frequency of occurrence less than 5 percent (1 of 20 samples)
NUT = Essential Nutrient

TABLE 7-22

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER - DEEP ZONE - VAPOR INTRUSION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Upgradient Concentrations[4]	Screening Toxicity Value[5]	Potential ARAR/TBC	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection[6]
SWMU 08 Deep Groundwater	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	1.5	1.5	ug/L	08GWT01401	1/6	0.3	1.5	NA	3100	NA	NA	No	BSL
	75-34-3	1,1-Dichloroethane	0.9 J	0.9 J	ug/L	08GWT01401	1/6	0.3	0.9	NA	2200	NA	NA	No	BSL
	75-35-4	1,1-Dichloroethene	0.8 J	0.8 J	ug/L	08GWT01401	1/6	0.3	0.8	NA	190	NA	NA	No	BSL
	67-64-1	Acetone	5 J	12 J	ug/L	08GWT01301	2/6	0.5	12	NA	220000	NA	NA	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening.
5 - Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, (U.S. EPA 2002b).
Values are from Table 2c and correspond to a target cancer risk level of 1E-6 or HI =1 and an attenuation factor of 0.001.
6 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and its respective site background value.
Chemicals selected as COPCs are indicated by shaded chemical names.

Associated Samples

08GWT01001	08GWT01102
08GWT01002	08GWT01301
08GWT01101	08GWT01401
08GWT01101-F	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected
µg/L = Microgram per liter

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and Site Background.

For elimination as a COPC:
BKG = Below Background
BSL = Below Screening Level

TABLE 7-23

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - POND SURFACE WATER
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Pond Surface Water	**Volatile Organics (ug/L)**														
	71-55-6	1,1,1-Trichloroethane	13	200	ug/L	08SW00402	5/6	0.3	200	NA	320 N	200 200	FED-MCL IDEM	No	BSL
	75-34-3	**1,1-Dichloroethane**	1.9	99	ug/L	08SW00402	6/6	---	99	NA	**81** N	NA 990	FED-MCL IDEM	**Yes**	**ASL**
	75-35-4	**1,1-Dichloroethene**	1.4	7.7	ug/L	08SW00402	3/6	0.3	7.7	NA	34 N	**7** **7**	FED-MCL IDEM	**Yes**	**ASL**
	78-93-3	**2-Butanone**	1.6 J	7200	ug/L	08SW01201	2/6	0.5	7200	NA	**700** N	NA 8400	FED-MCL IDEM	**Yes**	**ASL**
	591-78-6	2-Hexanone	0.9 J	0.9 J	ug/L	08SW01201	1/6	0.5	0.9	NA	NA	NA NA	FED-MCL IDEM	No	BSL
	108-10-1	**4-Methyl-2-Pentanone**	530	530	ug/L	08SW01201	1/6	0.5	530	NA	**200** N	NA 2200	FED-MCL IDEM	**Yes**	**ASL**
	67-64-1	Acetone	1.5 J	440 J	ug/L	08SW01201	5/6	0.5	440	NA	550 N	NA 6900	FED-MCL IDEM	No	BSL
	75-00-3	**Chloroethane**	1.6	89	ug/L	08SW00402	6/6	---	89	NA	**4.6** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	156-59-2	**cis-1,2-Dichloroethene**	6.3	140	ug/L	08SW00402	6/6	---	140	NA	**6.1** N	**70** **70**	FED-MCL IDEM	**Yes**	**ASL**
	100-41-4	Ethylbenzene	11	11	ug/L	08SW01201	1/6	0.3	11	NA	130 N	700 700	FED-MCL IDEM	No	BSL
	108-88-3	**Toluene**	3	110	ug/L	08SW01201	2/6	0.3	110	NA	**72** N	1000 1000	FED-MCL IDEM	**Yes**	**ASL**
	1330-20-7	**Total Xylenes**	57	57	ug/L	08SW01201	1/6	0.3	57	NA	**21** N	10000 10000	FED-MCL IDEM	**Yes**	**ASL**
	156-60-5	trans-1,2-Dichloroethene	0.5 J	4.4	ug/L	08SW00402	2/6	0.3	4.4	NA	12 N	100 100	FED-MCL IDEM	No	BSL
	79-01-6	**Trichloroethene**	4.7	590	ug/L	08SW00402	5/6	0.3	590	NA	**1.4** C[8]	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
	75-01-4	**Vinyl Chloride**	0.7 J	40	ug/L	08SW00402	6/6	---	40	NA	**0.02** C	**2** **2**	FED-MCL IDEM	**Yes**	**ASL**
	Semivolatile Organics (ug/L)														
	123-91-1	1,4-Dioxane	4 J	5	ug/L	08SW00401, 08SW00402, 08SW00502	4/5	1	5	NA	6.1 C	NA NA	FED-MCL IDEM	No	BSL
	91-57-6	**2-Methylnaphthalene**	0.9	0.9	ug/L	08SW00402	1/4	0.05 - 0.052	0.9	NA	**0.62** N[9]	NA 31	FED-MCL IDEM	**Yes**	**ASL**
	95-48-7	2-Methylphenol	4 J	4 J	ug/L	08SW01201	1/2	0.98	4	NA	180 N	NA 1800	FED-MCL IDEM	No	BSL
	TTNUS042	3&4-Methylphenol	7	7	ug/L	08SW01201	1/2	0.98	7	NA	18 N[10]	NA 180	FED-MCL IDEM	No	BSL
	83-32-9	Acenaphthene	0.37 J	0.37 J	ug/L	08SW00402	1/4	0.05 - 0.052	0.37	NA	37 N	NA 460	FED-MCL IDEM	No	BSL
	98-86-2	Acetophenone	7	7	ug/L	08SW01201	1/5	0.971 - 1.08	7	NA	61 N[11]	NA NA	FED-MCL IDEM	No	BSL
	100-51-6	Benzyl Alcohol	3 J	3 J	ug/L	08SW01201	1/5	0.971 - 1.08	3	NA	1100 N	NA NA	FED-MCL IDEM	No	BSL
	117-81-7	bis(2-Ethylhexyl)Phthalate	1 J	2 J	ug/L	08SW01201	2/5	0.971 - 1.08	2	NA	4.8 C	6 6	FED-MCL IDEM	No	BSL

TABLE 7-23

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - POND SURFACE WATER
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples [4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
(continued)	91-20-3	Naphthalene	0.34 J	0.34 J	ug/L	08SW00402	1/4	0.05 - 0.052	0.34	NA	0.62 N	NA 8.3	FED-MCL IDEM	No	BSL
	85-01-8	Phenanthrene	1.42 J	1.42 J	ug/L	08SW00402	1/4	0.05 - 0.052	1.42	NA	18 N[12]	NA 23	FED-MCL IDEM	No	BSL
	108-95-2	Phenol	7	7	ug/L	08SW01201	1/2	0.98	7	NA	1100 C	NA 11000	FED-MCL IDEM	No	BSL
	Total Metals														
	7429-90-5	**Aluminum**	328 J	6780 J	ug/L	08SW01201	5/5	---	6780	NA	**3600** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-36-0	**Antimony**	3.1 J	3.1 J	ug/L	08SW01201	1/5	0.29 - 0.46	3.1	NA	**1.5** N	6 6	FED-MCL IDEM	**Yes**	**ASL**
	7440-38-2	**Arsenic**	20.6 J	20.6 J	ug/L	08SW01201	1/5	0.59 - 0.68	20.6	NA	**0.045** C	**10** **10**	FED-MCL IDEM	**Yes**	**ASL**
	7440-39-3	**Barium**	94.8 J	450 J	ug/L	08SW01201	5/5	---	450	NA	**260** N	2000 2000	FED-MCL IDEM	**Yes**	**ASL**
	7440-41-7	Beryllium	0.32 J	0.32 J	ug/L	08SW01201	1/5	0.02	0.32	NA	7.3 N	4 4	FED-MCL IDEM	No	BSL
	7440-43-9	**Cadmium**	2.4 J	9.5	ug/L	08SW01201	2/5	0.15 - 0.37	9.5	NA	**1.8** N	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
	7440-70-2	Calcium	61600 J	240000 J	ug/L	08SW01201	5/5	---	240000	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	**Chromium**	1.1 J	73.4	ug/L	08SW01201	5/5	---	73.4	NA	**11** N[13]	100 100	FED-MCL IDEM[13]	**Yes**	**ASL**
	7440-48-4	Cobalt	0.48 J	24.8	ug/L	08SW01201	5/5	---	24.8	NA	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	**Copper**	2 J	184 J	ug/L	08SW01201	5/5	---	184	NA	**150** N	1300 1300	FED-MCL[14] IDEM	**Yes**	**ASL**
	7439-89-6	**Iron**	938 J	31100	ug/L	08SW01201	5/5	---	31100	NA	**1100** N	**300** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-92-1	**Lead**	1.2 J	171	ug/L	08SW01201	5/5	---	171	NA	NA	**15** **15**	FED-MCL[14] IDEM	**Yes**	**ASL**
	7439-95-4	Magnesium	8490 J	12400	ug/L	08SW01201	5/5	---	12400	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese**	158 J	4310	ug/L	08SW01201	5/5	---	4310	NA	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-02-0	Nickel	1.3	22.9	ug/L	08SW01201	5/5	---	22.9	NA	73 N	NA 730	NA IDEM	No	BSL
	7440-09-7	Potassium	3470 J	6900	ug/L	08SW01201	5/5	---	6900	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7782-49-2	Selenium	0.63 J	0.63 J	ug/L	08SW01201	1/5	0.19 - 0.22	0.63	NA	18 N	50 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium	25200 J	52900 J	ug/L	08SW01201	5/5	---	52900	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-31-5	Tin	31.2 J	31.2 J	ug/L	08SW01201	1/1	---	31.2	NA	2200 N	NA NA	FED-MCL IDEM	No	BSL
	7440-62-2	**Vanadium**	12.8	12.8	ug/L	08SW01201	1/5	1.14	12.8	NA	**3.6** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	7440-66-6	**Zinc**	93 J	1700 J	ug/L	08SW01201	2/5	12.2 - 16.6	1700	NA	**1100** N	5000 11000	FED-SMCL IDEM	**Yes**	**ASL**

TABLE 7-23

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - POND SURFACE WATER
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
	Dissolved Metals														
	7429-90-5	Aluminum	113 J	113 J	ug/L	08SW00401-F	1/5	8.35 - 50.8	113	NA	3600 N	50 NA	FED-SMCL IDEM	Yes	ASL
	7440-38-2	Arsenic	5.8 J	5.8 J	ug/L	08SW01201-F	1/5	0.3 - 0.48	5.8	NA	0.045 C	10 10	FED-MCL IDEM	Yes	ASL
	7440-39-3	Barium	81.1 J	234 J	ug/L	08SW01201-F	5/5	---	234	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-43-9	Cadmium	0.15 J	0.61 J	ug/L	08SW00402-F	4/5	0.05	0.61	NA	1.8 N	5 5	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium	57300	106000 J	ug/L	08SW01201-F	5/5	---	106000	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	Chromium	0.73 J	4.5 J	ug/L	08SW00402-F	2/5	0.54 - 1.7	4.5	NA	11 N(13)	100 100	FED-MCL IDEM(13)	No	BSL
	7440-48-4	Cobalt	0.41 J	8.3	ug/L	08SW01201-F	5/5	---	8.3	NA	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	Copper	1.1 J	2.3 J	ug/L	08SW00402-F	4/5	1.4	2.3	NA	150 N	1300 1300	FED-MCL(14) IDEM	No	BSL
	7439-89-6	Iron	452 J	7000	ug/L	08SW01201-F	5/5	---	7000	NA	1100 N	300 NA	FED-SMCL NA	Yes	ASL
	7439-92-1	Lead	0.14 J	5.5 J	ug/L	08SW00402-F	5/5	---	5.5	NA	NA	15 15	FED-MCL(14) IDEM	No	BSL
	7439-95-4	Magnesium	8040 J	11600	ug/L	08SW01201-F	5/5	---	11600	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	Manganese	88.2 J	2960	ug/L	08SW01201-F	5/5	---	2960	NA	88 N	50 NA	FED-SMCL IDEM	Yes	ASL
	7440-02-0	Nickel	4.7 J	6	ug/L	08SW01201-F	5/5	---	6	NA	73 N	NA 730	FED-MCL IDEM	No	BSL
	7440-09-7	Potassium	2870 J	4730	ug/L	08SW01201-F	5/5	---	4730	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7782-49-2	Selenium	0.15 J	0.15 J	ug/L	08SW01201-F	1/5	0.29 - 0.41	0.15	NA	18 N	NA 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium	19300 J	57400 J	ug/L	08SW01201-F	5/5	---	57400	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-28-0	Thallium	0.1 J	0.11 J	ug/L	8SW00402-F, , 08SW00502	4/5	0.19	0.11	NA	0.24 N	2 2	FED-MCL IDEM	No	BSL
	7440-31-5	Tin	1.1 J	1.1 J	ug/L	08SW01201-F	1/1	---	1.1	NA	2200 N	NA NA	FED-MCL IDEM	No	BSL
	7440-66-6	Zinc	4.2 J	22 J	ug/L	08SW00402-F	4/5	3.5	22	NA	1100 N	5000 11000	FED-SMCL IDEM	No	BSL

TABLE 7-23

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - POND SURFACE WATER
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening. A discussion of metal concentrations in surface water relative to background is presented in Section 5.3.
5 - The U.S. EPA Region 9 tap water screening level is presented. Value represents the U.S. EPA Region 9 risk-based tap water PRG divided by 10 to correspond to a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag), or an incremental cancer risk of 1.0E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA Region 9, October 2004).
6 - U.S. EPA Primary Drinking Water Standard (Winter 2004). Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
10 - Value for 4-methylphenol is used.
11 - The screening level for acetophenone is based on the U.S. EPA Region 3 RBC (October 2005).
12 - The value for pyrene is used as a surrogate for phenanthrene.
13 - Values are for hexavalent chromium.
14 - The MCL for this parameter is actually a treatment technique. The SDWA Action Level (at the tap) is presented.

Associated Samples

08SW00401	08SW00501-F
08SW00401-F	08SW00502
08SW00402	08SW00502-F
08SW00402-F	08SW01201
08SW00403	08SW01201-F
08SW00501	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
MCL = Maximum Contaminant Level
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected
PRG = Preliminary Remediation Goal
SMCL = Secondary Maximum Contaminant Level
SDWA = Safe Drinking Water Act

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and Site Background.

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient

TABLE 7-24

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER IN TRIBUTARIES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples[4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Tributary Surface Water	**Volatile Organics (ug/L)**														
	71-55-6	1,1,1-Trichloroethane	0.9 J	13	ug/L	08SW00601	4/17	0.3	13	NA	320 N	200 200	FED-MCL IDEM	No	BSL
	75-34-3	1,1-Dichloroethane	1.4	30	ug/L	08SP00202	4/17	0.3	30	NA	81 N	NA 990	FED-MCL IDEM	No	BSL
	75-35-4	1,1-Dichloroethene	1.1	5.6	ug/L	08SP00201	3/17	0.3	5.6	NA	34 N	7 7	FED-MCL IDEM	No	BSL
	78-93-3	2-Butanone	0.9 J	10	ug/L	08SW00302	3/17	0.5	10	NA	700 N	NA 8400	FED-MCL IDEM	No	BSL
	108-10-1	4-Methyl-2-Pentanone	0.6 J	0.6 J	ug/L	08SW00302	1/17	0.5	0.6	NA	200 N	NA 2200	FED-MCL IDEM	No	BSL
	67-64-1	Acetone	2.6 J	52 J	ug/L	08SW00302	4/17	0.5	52	NA	550 N	NA 6900	FED-MCL IDEM	No	BSL
	156-59-2	**cis-1,2-Dichloroethene**	1.4	7.9	ug/L	08SW00601	6/17	0.3	7.9	NA	**6.1** N	70 70	FED-MCL IDEM	**Yes**	**ASL**
	79-01-6	**Trichloroethene**	0.6 J	34	ug/L	08SW00601	8/17	0.3	34	NA	**1.4** C[8]	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
	75-01-4	**Vinyl Chloride**	0.8 J	0.8 J	ug/L	08SW00302	1/17	0.3	0.8	NA	**0.02** C	2 2	FED-MCL IDEM	**Yes**	**ASL**
	Semivolatile Organics (ug/L)														
	123-91-1	1,4-Dioxane	3 J	6	ug/L	08SW00302, 08SW00702	4/8	0.962 - 1.02	6	NA	6.1 C	NA NA	FED-MCL IDEM	No	BSL
	117-81-7	bis(2-Ethylhexyl)Phthalate	1 J	1 J	ug/L	08SW01501	1/7	0.962 - 1.02	1	NA	4.8 C	6 6	FED-MCL IDEM	No	BSL
	Total Metals														
	7429-90-5	**Aluminum**	282 J	25800 J	ug/L	08SP00201	7/8	21.9	25800	NA	**3600** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-38-2	**Arsenic**	2.5 J	7.5 J	ug/L	08SP00201	2/8	0.22 - 0.55	7.5	NA	**0.045** C	10 10	FED-MCL IDEM	**Yes**	**ASL**
	7440-39-3	Barium	48 J	207 J	ug/L	08SP00201	8/8	---	207	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-41-7	Beryllium	1.1 J	1.1 J	ug/L	08SP00201	1/8	0.02 - 0.04	1.1	NA	7.3 N	4 4	FED-MCL IDEM	No	BSL
	7440-43-9	Cadmium	0.07 J	1.1	ug/L	08SP00201	4/8	0.06 - 0.19	1.1	NA	1.8 N	5 5	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium	24700 J	96000 J	ug/L	08SP00201	8/8	---	96000	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	**Chromium**	0.32 J	23.8	ug/L	08SP00201	8/8	---	23.8	NA	**11** N[9]	100 100	FED-MCL IDEM[9]	**Yes**	**ASL**
	7440-48-4	Cobalt	0.13 J	52.4	ug/L	08SP00201	8/8	---	52.4	NA	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	Copper	2.1 J	28.4 J	ug/L	08SP00201	5/8	1.9 - 4.8	28.4	NA	150 N	1300 1300	FED-MCL[10] IDEM	No	BSL
	7439-89-6	**Iron**	93.2	29000	ug/L	08SP00201	8/8	---	29000	NA	**1100** N	**300** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-92-1	**Lead**	0.43 J	29.8	ug/L	08SP00201	5/8	0.069 - 0.499	29.8	NA	NA	**15** **15**	FED-MCL[10] IDEM	**Yes**	**ASL**
	7439-95-4	Magnesium	4850 J	23600	ug/L	08SW00302	8/8	---	23600	NA	NA	NA NA	FED-MCL IDEM	No	NUT

TABLE 7-24

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER IN TRIBUTARIES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentrations in Upgradient Samples[4]	Screening Toxicity Value[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
	7439-96-5	**Manganese**	6.2 J	6200	ug/L	08SP00201	8/8	---	6200	NA	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-97-6	Mercury	0.068 J	0.068 J	ug/L	08SP00201	1/8	0.03	0.068	ND	1.1 N	2 2	FED-MCL IDEM	No	BSL
	7440-02-0	Nickel	0.79 J	47.3	ug/L	08SP00201	8/8	---	47.3	NA	73 N	NA 730	NA IDEM	No	BSL
	7440-09-7	Potassium	976	3110	ug/L	08SP00201	8/8	---	3110	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7782-49-2	Selenium	0.2 J	0.58 J	ug/L	08SP00201	2/8	0.094 - 0.48	0.58	NA	18 N	50 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium	7210 J	70200 J	ug/L	08SW00302	8/8	---	70200	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-28-0	**Thallium**	0.46 J	0.46 J	ug/L	08SP00201	1/8	0.043 - 0.24	0.46	ND	**0.24** N	2 2	FED-MCL IDEM	**Yes**	**ASL**
	7440-31-5	Tin	0.41 J	0.41 J	ug/L	08SP00201	1/4	0.048 - 0.13	0.41	NA	2200 N	NA NA	FED-MCL IDEM	No	BSL
	7440-62-2	**Vanadium**	1.9 J	39.8	ug/L	08SP00201	3/8	1.14	39.8	NA	**3.6** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
	7440-66-6	Zinc	9.7 J	79.8 J	ug/L	08SP00201	5/8	6.4 - 21	79.8	NA	1100 N	5000 11000	FED-SMCL IDEM	No	BSL
	Dissolved Metals														
	7429-90-5	**Aluminum, Filtered**	186	213	ug/L	08SP00201-F	2/8	8.35 - 62.7	213	NA	3600 N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-38-2	**Arsenic, Filtered**	1.9 J	1.9 J	ug/L	08SW00302-F	1/8	0.12 - 0.42	1.9	NA	**0.045** C	10 50	FED-MCL IDEM	**Yes**	**ASL**
	7440-39-3	Barium, Filtered	40 J	131 J	ug/L	08SW00302-F	8/8	---	131	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-43-9	Cadmium, Filtered	0.05 J	0.28 J	ug/L	08SW00301-F	4/8	0.06 - 0.11	0.28	NA	1.8 N	5 5	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium, Filtered	22700	104000 J	ug/L	08SP00201-F	8/8	---	104000	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	Chromium, Filtered	0.22 J	0.58 J	ug/L	08SW00302-F	4/8	0.52 - 0.7	0.58	NA	11 N[9]	100 100	FED-MCL IDEM[9]	No	BSL
	7440-48-4	Cobalt, Filtered	0.12 J	7.4	ug/L	08SP00201-F	8/8	---	7.4	NA	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	Copper, Filtered	1.6 J	1.9 J	ug/L	08SW00601-F	4/8	1.2 - 2	1.9	NA	150 N	1300 1300	FED-MCL[10] IDEM	No	BSL
	7439-89-6	**Iron, Filtered**	30.7 J	798	ug/L	08SW00302-F	8/8	---	798	NA	1100 N	**300** NA	FED-SMCL NA	**Yes**	**ASL**
	7439-92-1	Lead, Filtered	0.13 J	0.66 J	ug/L	08SW00302-F	6/8	0.069	0.66	NA	NA	15 15	FED-MCL[10] IDEM	No	BSL
	7439-95-4	Magnesium, Filtered	4590 J	24500	ug/L	08SW00302-F	8/8	---	24500	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese, Filtered**	0.88 J	3190	ug/L	08SP00201-F	8/8	---	3190	NA	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-02-0	Nickel, Filtered	0.38 J	15.5 J	ug/L	08SW00301-F	8/8	---	15.5	NA	73 N	NA 730	FED-MCL IDEM	No	BSL
	7440-09-7	Potassium, Filtered	941	1920	ug/L	08SW00302-F	8/8	---	1920	NA	NA	NA NA	FED-MCL IDEM	No	NUT

TABLE 7-24

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER IN TRIBUTARIES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
	7782-49-2	Selenium, Filtered	0.13 J	0.14 J	ug/L	08SP00201-F	2/8	0.094 - 0.64	0.14	NA	18 N	NA 50	FED-MCL IDEM	No	BSL
	7440-23-5	Sodium, Filtered	6020 J	73000 J	ug/L	08SW00302-F	8/8	---	73000	NA	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-28-0	Thallium, Filtered	0.05 J	0.16 J	ug/L	08SW00301-F	4/8	0.09 - 0.27	0.16	NA	0.24 N	2 2	FED-MCL IDEM	No	BSL
	7440-66-6	Zinc, Filtered	4.6 J	22.6 J	ug/L	08SW00301-F	8/8	---	22.6	NA	1100 N	5000 11000	FED-SMCL IDEM	No	BSL
	Miscellaneous Parameters														
	NA	Fecal Coliform	>2419.2	>2419.2	cfu/L	08SP00201	1/1	---	>2419.2	NA	NA	NA NA	FED-MCL IDEM	No	NTX

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening. A discussion of metal concentrations in surface water relative to background is presented in Section 5.3.
5 - The U.S. EPA Region 9 tap water screening level is presented. Value represents the U.S. EPA Region 9 risk-based tap water PRG divided by 10 to correspond to a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag), or an incremental cancer risk of 1.0E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA Region 9, October 2004).
6 - U.S. EPA Primary Drinking Water Standard (Winter 2004). Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - Values are for hexavalent chromium.
10 - The MCL for this parameter is actually a treatment technique. The SDWA Action Level (at the tap) has been presented.

Associated Samples

08SP00201	08SW00302	08SW01101
08SP00201-F	08SW00302-F	08SW01501
08SP00202	08SW00303	08SW01501-F
08SW00101	08SW00601	08SW01502
08SW00101-F	08SW00601-F	08SW01701
08SW00102	08SW00701	08SW01801
08SW00201	08SW00701-F	08SW02001
08SW00301	08SW00702	
08SW00301-F	08SW00702-F	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
MCL = Maximum Contaminant Level
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected.
PRG = Preliminary Remediation Goal
SMCL = Secondary Maximum Contaminant Level
SWDA = Safe Water Drinking Act

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and Site Background.

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient

TABLE 7-25

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MAIN STREAM SURFACE WATEF
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
SWMU 08 Mainstream Surface Water	**Volatile Organics (ug/L)**														
	67-64-1	Acetone	1.1 J	2.4 J	ug/L	08SW02101	2/9	0.5	2.4	NA	550 N	NA 6900	FED-MCL IDEM	No	BSL
	Total Metals														
	7429-90-5	**Aluminum**	56.7 J	710 J	ug/L	08SW00901	3/5	23.7 - 41.8	710	517	3600 N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-39-3	Barium	35.6 J	69.1 J	ug/L	08SW00802	5/5	---	69.1	53.2	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-43-9	Cadmium	0.06 J	0.07 J	ug/L	08SW00902	3/5	0.05	0.07	0.06	1.8 N	5 5	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium	32200 J	59400 J	ug/L	08SW00902	5/5	---	59400	42800	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	Chromium	0.39 J	0.97 J	ug/L	08SW00801	5/5	---	0.97	0.88	11 N(8)	100 100	FED-MCL IDEM(8)	No	BSL
	7440-48-4	Cobalt	0.12 J	0.27 J	ug/L	08SW00902	4/5	0.088	0.27	0.62	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	Copper	0.99 J	1 J	ug/L	08SW00801	2/5	1.6 - 2.2	1	ND	150 N	1300 1300	FED-MCL(9) IDEM	No	BSL
	7439-89-6	**Iron**	28.4 J	588 J	ug/L	08SW00901	5/5	---	588	637	1100 N	**300** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7439-92-1	Lead	0.07 J	0.13 J	ug/L	08SW00802	3/5	0.407 - 0.492	0.13	0.48	NA	15 15	FED-MCL(9) IDEM	No	BSL
	7439-95-4	Magnesium	6210 J	11400	ug/L	08SW00802	5/5	---	11400	6420	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese**	7.3 J	156	ug/L	08SW00902	5/5	---	156	178	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-02-0	Nickel	0.26 J	1.3	ug/L	08SW00901	5/5	---	1.3	1.3	73 N	NA 730	NA IDEM	No	BSL
	7440-09-7	Potassium	1030 J	1430	ug/L	08SW00902	5/5	---	1430	1190	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-23-5	Sodium	14200 J	28700 J	ug/L	08SW00802	5/5	---	28700	14500	NA	NA NA	FED-MCL IDEM	No	NUT
	Dissolved Metals														
	7440-39-3	Barium, Filtered	31.5 J	65 J	ug/L	08SW00902-F	5/5	---	65	53.1	260 N	2000 2000	FED-MCL IDEM	No	BSL
	7440-43-9	Cadmium, Filtered	0.04 J	0.14 J	ug/L	08SW00801-F	2/5	0.05 - 0.06	0.14	ND	1.8 N	5 5	FED-MCL IDEM	No	BSL
	7440-70-2	Calcium, Filtered	31200	58700 J	ug/L	08SW00902-F	5/5	---	58700	46100	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-47-3	Chromium, Filtered	0.2 J	0.47 J	ug/L	08SW01401-F	3/5	0.46 - 0.49	0.47	0.21	11 N(8)	100 100	FED-MCL IDEM(8)	No	BSL
	7440-48-4	Cobalt, Filtered	0.14 J	0.21 J	ug/L	08SW00902-F	3/5	0.088	0.21	0.22	73 N	NA NA	FED-MCL IDEM	No	BSL
	7440-50-8	Copper, Filtered	0.74 J	0.84 J	ug/L	08SW00901-F	2/5	1.2 - 1.6	0.84	ND	150 N	1300 1300	FED-MCL(9) IDEM	No	BSL
	7439-89-6	Iron, Filtered	7.1 J	245 J	ug/L	08SW00901-F	4/5	6.15	245	56.7	1100 N	300 NA	FED-SMCL NA	No	BSL

TABLE 7-25

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MAIN STREAM SURFACE WATEF
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Location with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Concentrations in Upgradient Samples (4)	Screening Toxicity Value(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
	7439-92-1	Lead, Filtered	0.1 J	0.27 J	ug/L	08SW00902-F	5/5	---	0.27	0.19	NA	15 15	FED-MCL(9) IDEM	No	BSL
	7439-95-4	Magnesium, Filtered	6250 J	10900	ug/L	08SW00802-F	5/5	---	10900	6620	NA	NA NA	FED-MCL IDEM	No	NUT
	7439-96-5	**Manganese, Filtered**	1.8 J	137	ug/L	08SW00902-F	5/5	---	137	99.8	**88** N	**50** NA	FED-SMCL IDEM	**Yes**	**ASL**
	7440-02-0	Nickel, Filtered	0.36 J	2.7 J	ug/L	08SW00801-F, 08SW00901-F	5/5	---	2.7	0.8	73 N	NA 730	FED-MCL IDEM	No	BSL
	7440-09-7	Potassium, Filtered	770 J	1380	ug/L	08SW00902-F	5/5	---	1380	1180	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-23-5	Sodium, Filtered	12200 J	27900 J	ug/L	08SW00802-F	5/5	---	27900	15400	NA	NA NA	FED-MCL IDEM	No	NUT
	7440-28-0	Thallium, Filtered	0.11 J	0.12 J	ug/L	08SW00901-F	2/5	0.09 - 0.13	0.12	ND	0.24 N	2 2	FED-MCL IDEM	No	BSL
	7440-66-6	Zinc, Filtered	1.2 J	2.2 J	ug/L	08SW00902-F	3/5	1.8 - 2	2.2	2.2	1100 N	5000 11000	FED-SMCL IDEM	No	BSL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Concentrations at upgradient location 08SW/SD010. A discussion of concentrations in surface water relative to background is presented in Section 5.3.
5 - The U.S. EPA Region 9 tap water screening level is presented. Value represents the U.S. EPA Region 9 risk-based tap water PRG divided by 10 to correspond to a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag), or an incremental cancer risk of 1.0E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA Region 9, October 2004).
6 - U.S.EPA Primary Drinking Water Standard (Winter 2004). Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
8 - Values are for hexavalent chromium.
9 - The MCL for this parameter is actually a treatment technique. The SDWA Action Level (at the tap) has been presented.

Associated Samples

08SW00801	08SW00901	08SW01002
08SW00801-F	08SW00901-F	08SW01401
08SW00802	08SW00902	08SW01401-F
08SW00802-F	08SW00902-F	08SW01402
08SW00803	08SW00903	08SW02101

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements/To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
MCL = Maximum Contaminant Level
N = Noncarcinogen
NA = Not applicable/not available
ND = Not detected.
PRG = Preliminary Remediation Goal
SMCL = Secondary Maximum Contaminant Level
SWDA = Safe Drinking Water Act

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and Site Background.

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient

TABLE 7-26

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - POND SEDIMENT
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Range of Background Concentrations[4]	U.S. EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Pond Sediment	**Volatile Organic Compounds**														
	71-55-6	**1,1,1-Trichloroethane**	178 J	17300000 J	ug/kg	08SD004021224	3/5	1.73 - 13.7	17300000	NA	**1200000 sat**	**5000000**	IDEM	**Yes**	ASL
	75-34-3	**1,1-Dichloroethane**	5 J	1100000 J	ug/kg	08SD004021224	5/5	--	1100000	NA	**51000 N**	1300000	IDEM	**Yes**	ASL
	75-35-4	**1,1-Dichloroethene**	14 J	1500000 J	ug/kg	08SD004021224	4/5	1.73	1500000	NA	**12000 N**	**310000**	IDEM	**Yes**	ASL
	78-93-3	2-Butanone	870 J	870 J	ug/kg	08SD012010006	1/5	13.7 - 19960	870	NA	2200000 N	44000000	IDEM	No	BSL
	108-10-1	4-Methyl-2-Pentanone	40 J	40 J	ug/kg	08SD012010006	1/5	13.7 - 19960	40	NA	530000 N	12000000	IDEM	No	BSL
	67-64-1	Acetone	210 J	210 J	ug/kg	08SD012010006	1/5	59 - 19960	210	NA	1400000 N	35000000	IDEM	No	BSL
	75-15-0	Carbon Disulfide	14 J	14 J	ug/kg	08SD005021224	1/5	1.73 - 19960	14	NA	36000 N	900000	IDEM	No	BSL
	75-00-3	**Chloroethane**	220 J	59880 J	ug/kg	08SD004010012	3/5	13.7 - 59.3	59880	NA	**3000 C**	80000	IDEM	**Yes**	ASL
	156-59-2	**cis-1,2-Dichloroethene**	2300	390000 J	ug/kg	08SD004021224	4/5	1.73	390000	NA	**4300 N**	**110000**	IDEM	**Yes**	ASL
	100-41-4	Ethylbenzene	6 J	6 J	ug/kg	08SD012010006	1/5	13.7 - 19960	6	NA	400000 sat	4600000	IDEM	No	BSL
	108-88-3	Toluene	15 J	95000 J	ug/kg	08SD004021224	5/5	--	95000	NA	520000 sat	1700000	IDEM	No	BSL
	1330-20-7	Total Xylenes	15 J	550	ug/kg	08SD005010012	3/5	15015 - 19960	550	NA	27000 N	690000	IDEM	No	BSL
	156-60-5	**trans-1,2-Dichloroethene**	25 J	51000 J	ug/kg	08SD004021224	2/5	1.73 - 19960	51000	NA	**6900 N**	180000	IDEM	**Yes**	ASL
	79-01-6	**Trichloroethene**	2100 J	27800000 J	ug/kg	08SD004021224	4/5	1.73	27800000	NA	**2900 C(8)**	**710**	IDEM	**Yes**	ASL
	75-01-4	Vinyl Chloride	54	54	ug/kg	08SD005021224	1/5	1.73 - 19960	54	NA	79 C	1500	IDEM	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	14	230 J	ug/kg	08SD004010012, 08SD004021224	3/4	4.51	230	NA	5600 N[9]	630000	IDEM	No	BSL
	TTNUS042	3&4-Methylphenol	280 J	1200 J	ug/kg	08SD004021224	3/5	91.5 - 119	1200	NA	31000 N[10]	910000	IDEM	No	BSL
	83-32-9	Acenaphthene	6 J	120 J	ug/kg	08SD004021224	3/4	39.5	120	NA	370000 N	9500000	IDEM	No	BSL
	208-96-8	Acenaphthylene	25 J	25 J	ug/kg	08SD005010012	1/4	4.51 - 59.5	25	NA	370000 N[11]	1100000	IDEM	No	BSL
	56-55-3	Benzo(a)anthracene	21 J	74 J	ug/kg	08SD005010012	2/4	39.5 - 59.5	74	NA	620 C	5000	IDEM	No	BSL
	50-32-8	**Benzo(a)pyrene**	18	94	ug/kg	08SD005010012	2/4	39.5 - 59.5	94	NA	**62 C**	500	IDEM	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	100	100	ug/kg	08SD005010012	1/4	4.51 - 59.5	100	NA	620 C	5000	IDEM	No	BSL
	191-24-2	Benzo(g,h,i)perylene	28	160	ug/kg	08SD005010012	2/4	39.5 - 59.5	160	NA	230000 N[12]	50000	IDEM	No	BSL
	207-08-9	Benzo(k)fluoranthene	46	46	ug/kg	08SD005010012	1/4	4.51 - 59.5	46	NA	6200 C	50000	IDEM	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	170 J	35000 J	ug/kg	08SD004021224	5/5	--	35000	NA	35000 C	300000	IDEM	No	BSL
	85-68-7	Butyl benzyl phthalate	210 J	210 J	ug/kg	08SD005021224	1/5	118 - 401	210	NA	1200000 N	37000000	IDEM	No	BSL
	218-01-9	Chrysene	27 J	140 J	ug/kg	08SD005010012	2/4	39.5 - 59.5	140	NA	62000 C	500000	IDEM	No	BSL
	84-74-2	Di-n-butyl phthalate	180 J	590 J	ug/kg	08SD004021224	2/5	91.5 - 401	590	NA	610000 N	18000000	IDEM	No	BSL
	206-44-0	Fluoranthene	26 J	110 J	ug/kg	08SD005010012	2/4	39.5 - 59.5	110	NA	230000 N	6300000	IDEM	No	BSL
	86-73-7	Fluorene	5 J	130 J	ug/kg	08SD004021224	3/4	39.5	130	NA	270000 N	6300000	IDEM	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	18	110	ug/kg	08SD005010012	2/4	39.5 - 59.5	110	NA	620 C	5000	IDEM	No	BSL
	120-58-1	Isosafrole	250 J	250 J	ug/kg	08SD005010012	1/5	91.5 - 401	250	NA	NA	NA	IDEM	No	NTX
	91-20-3	Naphthalene	5 J	360 J	ug/kg	08SD004021224	4/4	--	360	NA	5600 N	3200000	IDEM	No	BSL
	85-01-8	Phenanthrene	33 J	2000 J	ug/kg	08SD004021224	4/4	--	2000	NA	230000 N[12]	470000	IDEM	No	BSL
	108-95-2	Phenol	650 J	650 J	ug/kg	08SD004021224	1/5	91.5 - 401	650	NA	1800000 N	44000000	IDEM	No	BSL
	129-00-0	Pyrene	35 J	180 J	ug/kg	08SD005010012	2/4	39.5 - 59.5	180	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	Aluminum	5630	5630	mg/kg	08SD012010006	1/1	--	5630	NA	7600 N	NA	NA	No	BSL
	7440-38-2	**Arsenic**	2.5 J	2.5 J	mg/kg	08SD012010006	1/1	--	2.5	NA	**0.39 C**	3.9	IDEM	**Yes**	ASL
	7440-39-3	Barium	49.1 J	49.1 J	mg/kg	08SD012010006	1/1	--	49.1	NA	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	0.2 J	0.2 J	mg/kg	08SD012010006	1/1	--	0.2	NA	15 N	680	IDEM	No	BSL
	7440-43-9	Cadmium	2	2	mg/kg	08SD012010006	1/1	--	2	NA	3.7 N	12	IDEM	No	BSL
	7440-70-2	Calcium	2550 J	2550 J	mg/kg	08SD012010006	1/1	--	2550	NA	NA	NA	NA	No	NUT
	7440-47-3	Chromium	26.5 J	26.5 J	mg/kg	08SD012010006	1/1	--	26.5	NA	210 C[13]	430[14]	IDEM	No	BSL
	7440-48-4	Cobalt	2.9 J	2.9 J	mg/kg	08SD012010006	1/1	--	2.9	NA	140 N[15]	NA	NA	No	BSL
	7440-50-8	Copper	32.8 J	32.8 J	mg/kg	08SD012010006	1/1	--	32.8	NA	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	8360 J	8360 J	mg/kg	08SD012010006	1/1	--	8360	NA	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	45.8 J	45.8 J	mg/kg	08SD012010006	1/1	--	45.8	NA	400	400	IDEM	No	BSL

TABLE 7-26

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - POND SEDIMENT
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects(2)	Concentration Used for Screening(3)	Range of Background Concentrations(4)	U.S. EPA Region 9 PRG (Residential)(5)	Potential ARAR/TBC(6)	Potential ARAR/TBC Source(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
SWMU 08 Pond Sediment (Continued)	**Inorganics (Continued)**														
	7439-95-4	Magnesium	743 J	743 J	mg/kg	08SD012010006	1/1	--	743	NA	NA	NA	NA	No	NUT
	7439-96-5	Manganese	79.6 J	79.6 J	mg/kg	08SD012010006	1/1	--	79.6	NA	180 N	NA	NA	No	BSL
	7439-97-6	Mercury	0.033 J	0.033 J	mg/kg	08SD012010006	1/1	--	0.033	NA	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	5 J	5 J	mg/kg	08SD012010006	1/1	--	5	NA	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	482 J	482 J	mg/kg	08SD012010006	1/1	--	482	NA	NA	NA	NA	No	NUT
	7440-31-5	Tin	3.9 J	3.9 J	mg/kg	08SD012010006	1/1	--	3.9	NA	4700 N	NA	NA	No	BSL
	7440-62-2	**Vanadium**	13.6 J	13.6 J	mg/kg	08SD012010006	1/1	--	13.6	NA	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	236 J	236 J	mg/kg	08SD012010006	1/1	--	236	NA	2300 N	100000	IDEM	No	BSL
	Miscellaneous Parameters														
	14797-73-0	**Perchlorate**	0.52	1.7 J	mg/kg	08SD004021224	4/4	--	1.7	14.1 - 48.5	**0.78 N**	NA	NA	**Yes**	ASL

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Background is not considered for COPC screening. A discussion of metal concentrations in sediment relative to background is presented in Section 5.4.
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level. Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
10 - Value for 4-methylphenol is used.
11 - The value for acenaphthene was used as a surrogate for acenaphthylene.
12 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
13 - The PRG for residential land use for total chromium is presented.
14 - Value is for hexavalent chromium.
15 - One tenth of the noncarcinogenic PRG is less than the carcinogenic PRG, therefore the one tenth noncarcinogenic PRG is presented.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
PRG = Preliminary Remediation Goal
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NTX = No Toxicity Data
NUT = Essential Nutrient

Associated Samples
08SD004010012
08SD004021224
08SD005010012
08SD005021224

TABLE 7-27

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT IN TRIBUTARIES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentration in Upgradient Sample[4]	EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Tributary Sediment	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	2 J	2 J	ug/kg	08SD007010006	1/7	1.15 - 1.5	2	NA	1200000 sat	5000000	IDEM	No	BSL
	79-01-6	Trichloroethene	2 J	4 J	ug/kg	08SD006010006	2/7	1.15 - 1.5	4	NA	2900 C[8]	710	IDEM	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	6 J	6 J	ug/kg	08SD001010006	1/5	3.95 - 4.25	6	NA	5600 N[9]	630000	IDEM	No	BSL
	208-96-8	Acenaphthylene	11	11	ug/kg	08SD001010006	1/5	3.95 - 4.25	11	NA	370000 N[10]	1100000	IDEM	No	BSL
	120-12-7	Anthracene	10	10	ug/kg	08SD001010006	1/5	3.95 - 4.25	10	NA	2200000 N	47000000	IDEM	No	BSL
	56-55-3	Benzo(a)anthracene	51 J	51 J	ug/kg	08SD001010006	1/5	3.95 - 4.25	51	NA	620 C	5000	IDEM	No	BSL
	50-32-8	**Benzo(a)pyrene**	69	69	ug/kg	08SD001010006	1/5	3.95 - 4.25	69	NA	**62 C**	500	IDEM	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	140	140	ug/kg	08SD001010006	1/5	3.95 - 4.25	140	NA	620 C	5000	IDEM	No	BSL
	191-24-2	Benzo(g,h,i)perylene	120	120	ug/kg	08SD001010006	1/5	3.95 - 4.25	120	NA	230000 N[11]	50000	IDEM	No	BSL
	207-08-9	Benzo(k)fluoranthene	67	67	ug/kg	08SD001010006	1/5	3.95 - 4.25	67	NA	6200 C	50000	IDEM	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	240 J	680	ug/kg	08SD001010006	4/12	80.1 - 87.8	680	NA	35000 C	300000	IDEM	No	BSL
	218-01-9	Chrysene	100 J	100 J	ug/kg	08SD001010006	1/5	3.95 - 4.25	100	NA	62000 C	500000	IDEM	No	BSL
	84-74-2	Di-n-butyl phthalate	130 J	130 J	ug/kg	08SD002020006	1/12	80.1 - 99.9	130	NA	610000 N	18000000	IDEM	No	BSL
	53-70-3	Dibenzo(a,h)anthracene	20	20	ug/kg	08SD001010006	1/5	3.95 - 4.25	20	NA	62 C	500	IDEM	No	BSL
	206-44-0	Fluoranthene	85	85	ug/kg	08SD001010006	1/5	3.95 - 4.25	85	NA	230000 N	6300000	IDEM	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	81	81	ug/kg	08SD001010006	1/5	3.95 - 4.25	81	NA	620 C	5000	IDEM	No	BSL
	91-20-3	Naphthalene	8 J	8 J	ug/kg	08SD001010006	1/5	3.95 - 4.25	8	NA	5600 N	3200000	IDEM	No	BSL
	85-01-8	Phenanthrene	10	36	ug/kg	08SD001010006	2/5	3.95 - 4.25	36	NA	230000 N[11]	470000	IDEM	No	BSL
	129-00-0	Pyrene	6 J	210 J	ug/kg	08SD001010006	4/5	4.12	210	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	12800	17800	mg/kg	08SD011010006	2/2	--	17800	8400	**7600 N**	NA	NA	**Yes**	ASL
	7440-36-0	Antimony	0.92 J	0.92 J	mg/kg	08SD015010006	1/2	0.29	0.92	0.59	3.1 N	140	NA	No	BSL
	7440-38-2	**Arsenic**	5.1 J	18.7 J	mg/kg	08SD015010006	2/2	--	18.7	4.4	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	58.9 J	133 J	mg/kg	08SD015010006	2/2	--	133	64.8	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	0.5	2.2	mg/kg	08SD015010006	2/2	--	2.2	0.27	15 N	680	IDEM	No	BSL
	7440-43-9	Cadmium	0.2 J	0.86	mg/kg	08SD015010006	2/2	--	0.86	1.8	3.7 N	12	IDEM	No	BSL
	7440-70-2	Calcium	1710 J	7450 J	mg/kg	08SD015010006	2/2	--	7450	189000	NA	NA	NA	No	NUT
	7440-47-3	Chromium	16.9 J	60.4 J	mg/kg	08SD015010006	2/2	--	60.4	22.7	210 C[12]	430[13]	IDEM	No	BSL
	7440-48-4	Cobalt	5.3 J	27.8 J	mg/kg	08SD015010006	2/2	--	27.8	4.4	140 N[14]	NA	NA	No	BSL
	7440-50-8	Copper	8.7 J	15.9 J	mg/kg	08SD015010006	2/2	--	15.9	16.3	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	18200 J	71900 J	mg/kg	08SD015010006	2/2	--	71900	11800	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	9.8 J	34.9 J	mg/kg	08SD015010006	2/2	--	34.9	263	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	1740 J	1880 J	mg/kg	08SD015010006	2/2	--	1880	11700	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	336 J	3130 J	mg/kg	08SD015010006	2/2	--	3130	290	**180 N**	NA	NA	**Yes**	ASL
	7439-97-6	Mercury	0.022 J	0.029 J	mg/kg	08SD011010006	2/2	--	0.029	0.1	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	11.3 J	17.1 J	mg/kg	08SD015010006	2/2	--	17.1	48.7	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	788 J	1410 J	mg/kg	08SD011010006	2/2	--	1410	889	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.22 J	0.75 J	mg/kg	08SD015010006	2/2	--	0.75	0.21	39 N	1700	NA	No	BSL
	7440-62-2	**Vanadium**	28.6 J	53.1 J	mg/kg	08SD015010006	2/2	--	53.1	56.4	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	26.3 J	93.3 J	mg/kg	08SD015010006	2/2	--	93.3	157	2300 N	100000	IDEM	No	BSL
	Miscellaneous Parameters														
	14797-73-0	Perchlorate	0.11 J	0.24	mg/kg	08SD003010006	2/5	0.099 - 0.118	0.24	14.1 - 48.5	0.78 N	NA	NA	No	BSL

TABLE 7-27

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT IN TRIBUTARIES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Concentrations at upgradient location 08SW/SD013. A discussion of concentrations in sediment relative to background is presented in Section 5.4.
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level. Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
10 - The value for acenaphthene was used as a surrogate for acenaphthylene.
11 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
12 - The PRG for residential land use for total chromium is presented.
13 - Value is for hexavalent chromium.
14 - One tenth of the noncarcinogenic PRG is less than the carcinogenic PRG, therefore the one tenth noncarcinogenic PRG is presented.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
PRG = Preliminary Remediation Goal
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient

Associated Samples

08SD001010006	08SD006010006
08SD001020006	08SD006020006
08SD002010006	08SD007010006
08SD002020006	08SD007020006
08SD003010006	08SD011010006
08SD003020006	08SD015010006

TABLE 7-28

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MAIN STREAM SEDIMENT
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample with Maximum Concentration	Frequency of Detection	Range of Non-Detects[2]	Concentration Used for Screening[3]	Concentration in Upgradient Sample[4]	U. S. EPA Region 9 PRG (Residential)[5]	Potential ARAR/TBC[6]	Potential ARAR/TBC Source[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
SWMU 08 Mainstream Sediment	**Volatile Organic Compounds**														
	71-55-6	1,1,1-Trichloroethane	2 J	2 J	ug/kg	08SD009010006	1/3	1.2 - 1.25	2	NA	1200000 sat	5000000	IDEM	No	BSL
	79-01-6	Trichloroethene	3 J	3 J	ug/kg	08SD008010006	1/3	1.24 - 1.25	3	NA	2900 C[8]	710	IDEM	No	BSL
	Semivolatile Organic Compounds														
	91-57-6	2-Methylnaphthalene	13	13	ug/kg	08SD009010006	1/2	3.97	13	NA	5600 N[9]	630000	IDEM	No	BSL
	56-55-3	Benzo(a)anthracene	9	12	ug/kg	08SD009010006	2/2	--	12	NA	620 C	5000	IDEM	No	BSL
	50-32-8	Benzo(a)pyrene	10	10	ug/kg	08SD008010006, 08SD009010006	2/2	--	10	NA	62 C	500	IDEM	No	BSL
	205-99-2	Benzo(b)fluoranthene	11	13	ug/kg	08SD009010006	2/2	--	13	NA	620 C	5000	IDEM	No	BSL
	191-24-2	Benzo(g,h,i)perylene	13	14	ug/kg	08SD008010006	2/2	--	14	NA	230000 N[10]	50000	IDEM	No	BSL
	207-08-9	Benzo(k)fluoranthene	9	10	ug/kg	08SD008010006	2/2	--	10	NA	6200 C	50000	IDEM	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	210 J	210 J	ug/kg	08SD009010006	1/5	80.6 - 95.7	210	NA	35000 C	300000	IDEM	No	BSL
	218-01-9	Chrysene	11	12	ug/kg	08SD009010006	2/2	--	12	NA	62000 C	500000	IDEM	No	BSL
	206-44-0	Fluoranthene	10	13	ug/kg	08SD008010006	2/2	--	13	NA	230000 N	6300000	IDEM	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	10	11	ug/kg	08SD009010006	2/2	--	11	NA	620 C	5000	IDEM	No	BSL
	91-20-3	Naphthalene	6 J	6 J	ug/kg	08SD009010006	1/2	3.97	6	NA	5600 N	3200000	IDEM	No	BSL
	85-01-8	Phenanthrene	14	14	ug/kg	08SD008010006	1/2	4.27	14	NA	230000 N[10]	470000	IDEM	No	BSL
	129-00-0	Pyrene	18 J	25 J	ug/kg	08SD008010006	2/2	--	25	NA	230000 N	4700000	IDEM	No	BSL
	Inorganics														
	7429-90-5	**Aluminum**	11800	11800	mg/kg	08SD014010006	1/1	--	11800	19600	**7600 N**	NA	NA	**Yes**	ASL
	7440-36-0	Antimony	1.4 J	1.4 J	mg/kg	08SD014010006	1/1	--	1.4	2.2	3.1 N	140	NA	No	BSL
	7440-38-2	**Arsenic**	19.7 J	19.7 J	mg/kg	08SD014010006	1/1	--	19.7	27.6	**0.39 C**	**3.9**	IDEM	**Yes**	ASL
	7440-39-3	Barium	83.3 J	83.3 J	mg/kg	08SD014010006	1/1	--	83.3	247	540 N	63000	IDEM	No	BSL
	7440-41-7	Beryllium	1.6	1.6	mg/kg	08SD014010006	1/1	--	1.6	3.1	15 N	680	IDEM	No	BSL
	7440-43-9	Cadmium	0.79	0.79	mg/kg	08SD014010006	1/1	--	0.79	0.62	3.7 N	12	IDEM	No	BSL
	7440-70-2	Calcium	1540 J	1540 J	mg/kg	08SD014010006	1/1	--	1540	2970	NA	NA	NA	No	NUT
	7440-47-3	Chromium	61.2 J	61.2 J	mg/kg	08SD014010006	1/1	--	61.2	132	210 C[11]	430[12]	IDEM	No	BSL
	7440-48-4	Cobalt	18.9 J	18.9 J	mg/kg	08SD014010006	1/1	--	18.9	71.2	140 N[13]	NA	NA	No	BSL
	7440-50-8	Copper	11.6 J	11.6 J	mg/kg	08SD014010006	1/1	--	11.6	12	310 N	14000	IDEM	No	BSL
	7439-89-6	**Iron**	71400 J	71400 J	mg/kg	08SD014010006	1/1	--	71400	120000	**2300 N**	NA	NA	**Yes**	ASL
	7439-92-1	Lead	27.6 J	27.6 J	mg/kg	08SD014010006	1/1	--	27.6	66.2	400	400	IDEM	No	BSL
	7439-95-4	Magnesium	855 J	855 J	mg/kg	08SD014010006	1/1	--	855	1580	NA	NA	NA	No	NUT
	7439-96-5	**Manganese**	1790 J	1790 J	mg/kg	08SD014010006	1/1	--	1790	7160	**180 N**	NA	NA	**Yes**	ASL
	7439-97-6	Mercury	0.04 J	0.04 J	mg/kg	08SD014010006	1/1	--	0.04	0.084	2.3 N	100	IDEM	No	BSL
	7440-02-0	Nickel	17.5 J	17.5 J	mg/kg	08SD014010006	1/1	--	17.5	42.6	160 N	6900	IDEM	No	BSL
	7440-09-7	Potassium	735 J	735 J	mg/kg	08SD014010006	1/1	--	735	1010	NA	NA	NA	No	NUT
	7782-49-2	Selenium	0.59 J	0.59 J	mg/kg	08SD014010006	1/1	--	0.59	1.3	39 N	1700	NA	No	BSL
	7440-62-2	**Vanadium**	54.3 J	54.3 J	mg/kg	08SD014010006	1/1	--	54.3	99.3	**7.8 N**	NA	NA	**Yes**	ASL
	7440-66-6	Zinc	59.3 J	59.3 J	mg/kg	08SD014010006	1/1	--	59.3	56.7	2300 N	100000	IDEM	No	BSL

TABLE 7-28

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MAIN STREAM SEDIMENT
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - Concentrations at upgradient location 08SW/SD010. A discussion of concentrations in sediment relative to background is presented in Section 5.4.
5 - U.S. EPA Region 9 Preliminary Remediation Goal (PRG). The noncarcinogenic values (denoted with a "N" flag) are the PRG divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (U.S. EPA Region 9, October 2004, Updated December 28, 2004).
6 - Indiana Department of Environmental Management (IDEM), Risk Integrated System of Closure (RISC) residential closure levels for soil (January 2004).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level.
Chemicals selected as COPCs are indicated by shaded chemical names.
8 - CAL Modified PRG is used as the screening level for TCE.
9 - The value for naphthalene was used as a surrogate for 2-methylnaphthalene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The PRG for residential land use for total chromium is presented.
12 - Value is for hexavalent chromium.
13 - One tenth of the noncarcinogenic PRG is less than the carcinogenic PRG, therefore the one tenth noncarcinogenic PRG is presented.

Associated Samples
08SD008010006
08SD008020006
08SD009010006
08SD009020006
08SD014010006

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirements To Be Considered
C = Carcinogen
COPC = Chemical of potential concern
J = Estimated value
N = Noncarcinogen
NA = Not applicable/not available
PRG = Preliminary Remediation Goal
sat = Soil Saturation Limit

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential Nutrient

TABLE 7-29

CHEMICALS RETAINED AS COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical	Surface Soil Near Building 106 Pond			Subsurface Soil Near Building 106 Pond			Surface Soil - Grass and Gravel Areas			Subsurface Soil - Grass and Gravel Areas			Surface Soil - Building 106			Subsurface Soil - Building 106		
	Direct Contact	Soil to Air	Soil to Groundwater	Direct Contact	Soil to Air	Soil to Groundwater	Direct Contact	Soil to Air	Soil to Groundwater	Direct Contact	Soil to Air	Soil to Groundwater	Direct Contact	Soil to Air	Soil to Groundwater	Direct Contact	Soil to Air	Soil to Groundwater
Volatile Organic Compounds																		
1,1,1-Trichloroethane																		
1,1,2-Trichloroethane																		
1,1-Dichloroethane																		
1,1-Dichloroethene												X						
1,2-Dichloroethane						X												
2-Butanone																		
4-Methyl-2-pentanone																		
Benzene												X						
Chloroethane																		
Chloroform																		
cis-1,2-Dichloroethene																		
Methylene Chloride						X			X			X			X			X
Tetrachloroethene																		
Toluene																		
trans-1,2-Dichloroethene																		
Trichloroethene						X									X			X
Vinyl Chloride												X						
Xylenes																		
Semivolatile Organic Compounds																		
1,4-Dioxane																		
2-Methylnaphthalene																		
3&4Methylphenol																		
Benzo(a)anthracene									X						X			
Benzo(a)pyrene	X			X			X		X				X					
Benzo(b)fluoranthene							X		X									
Chrysene						X			X						X			
Dibenzo(a,h)anthracene							X						X					
Inorganics																		
Aluminum	X		X	X		X	X		X	X		X	X		X	X		X
Antimony				X		X												
Arsenic	X		X	X		X	X		X	X		X	X		X	X		X
Barium			X			X			X			X			X			X
Beryllium																		
Cadmium			X			X			X									
Chromium			X			X			X			X			X			X
Cobalt			X			X			X			X			X			X
Copper																		
Iron	X			X			X			X			X			X		
Lead			X			X												
Manganese	X		X	X		X	X		X	X		X			X			X
Nickel			X			X												
Thallium										X		X						
Vanadium	X			X			X			X			X			X		
Zinc																		
Perchlorate																		

Notes
X - Indicates chemical was retained as a chemical of potential concern.

TABLE 7-29

CHEMICALS RETAINED AS COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical	Ground Water						Surface Water			Sediment		
	Shallow Aquifer		Intermediate Aquifer		Deep Aquifer		Building 106 Pond	Tributaries	Main Stream	Building 106 Pond	Tributaries	Main Stream
	Direct Contact	Vapor Intrusion	Direct Contact	Vapor Intrusion	Direct Contact	Vapor Intrusion						
Volatile Organic Compounds												
1,1,1-Trichloroethane	X		X	X						X		
1,1,2-Trichloroethane	X		X	X								
1,1-Dichloroethane	X	X	X				X			X		
1,1-Dichloroethene	X	X	X	X			X			X		
1,2-Dichloroethane	X	X	X									
2-Butanone	X	X	X				X					
4-Methyl-2-pentanone	X	X	X				X					
Benzene	X											
Chloroethane	X						X			X		
Chloroform			X									
cis-1,2-Dichloroethene	X	X	X	X			X	X		X		
Methylene Chloride												
Tetrachloroethene			X									
Toluene	X						X					
trans-1,2-Dichloroethene	X		X							X		
Trichloroethene	X	X	X	X			X	X		X		
Vinyl Chloride	X	X	X	X			X	X				
Xylenes	X						X					
Semivolatile Organic Compounds												
1,4-Dioxane	X		X		X							
2-Methylnaphthalene							X					
3&4Methylphenol	X											
Benzo(a)anthracene												
Benzo(a)pyrene										X	X	
Benzo(b)fluoranthene												
Chrysene												
Dibenzo(a,h)anthracene												
Inorganics												
Aluminum	X		X		X		X	X	X		X	X
Antimony	X						X					
Arsenic	X		X		X		X	X		X	X	X
Barium	X						X					
Beryllium	X											
Cadmium	X						X					
Chromium	X						X	X				
Cobalt	X		X									
Copper							X					
Iron	X		X		X		X	X	X	X	X	X
Lead	X						X	X				
Manganese	X		X		X		X	X	X		X	X
Nickel			X									
Thallium	X							X				
Vanadium	X				X		X	X		X	X	X
Zinc							X					
Perchlorate							X			X		

X - Indicates chemical was retained as a chemical of potential concern.

TABLE 7-30

RECEPTORS AND EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE INDIANA

Receptors	Exposure Routes
Construction Workers (future land use)	• Soil dermal contact (surface and subsurface) • Soil ingestion (surface and subsurface) • Inhalation of air/dust/emissions (surface and subsurface) • Groundwater dermal contact (during excavation) • Groundwater inhalation of volatile organics (during excavation)
Maintenance Workers (current and future land use)	• Soil dermal contact (surface) • Soil ingestion (surface) • Inhalation of air/dust/emissions (surface) • Surface water/sediment dermal contact • Sediment (incidental ingestion)
Occupational Worker (current and future land use)(1)	• Soil dermal contact (surface) • Soil ingestion (surface) • Inhalation of air/dust/emissions (surface) • Direct ingestion of groundwater • Groundwater dermal contact
Adolescent Trespassers (6 to 17 years) (current and future land use)	• Soil dermal contact (surface) • Soil ingestion (surface) • Inhalation of air/dust/emissions (surface) • Surface water/sediment dermal contact • Surface water/sediment (incidental ingestion)
Small Child (0 to 6 years) and Adult Recreational Users (future land use)	• Soil dermal contact (surface) • Soil ingestion (surface) • Inhalation of air/dust/emissions (surface) • Surface water/sediment • Surface water/sediment (incidental ingestion) • Groundwater dermal contact • Direct ingestion of groundwater
On-Base Residents (Adult/Children) (future land use)(1)	• Soil dermal contact (surface) • Soil ingestion (surface) • Inhalation of air/dust/emissions (surface) • Direct ingestion of groundwater • Ground water dermal contact (showering/bathing) • Inhalation of volatiles in groundwater (showering/bathing) • Surface water/sediment • Surface water/sediment (incidental ingestion)

1 – Occupational workers and residents were also evaluated for exposures to chemicals of concern in subsurface soil in the uncertainty section of the risk assessment. This scenario was included to account for the possibility that subsurface soil could be brought to the surface in future excavation projects.

TABLE 7-31

EXPOSURE POINT CONCENTRATIONS FOR COPCs
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Chemical	Surface Soil				Surface/Subsurface Soil			
	Building 106 Pond[1]	Grass and Gravel Areas[1]	Building 106[1]	Building 107	Building 106 Pond[2]	Grass and Gravel Areas[2]	Building 106[1]	Building 107
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Volatile Organic Compounds								
1,1,1-Trichloroethane								
1,1,2-Trichloroethane								
1,1-Dichloroethane								
1,1-Dichloroethene								
1,2-Dichloroethane								
2-Butanone								
4-Methyl-2-pentanone								
Benzene								
Chloroethane								
Chloroform								
cis-1,2-Dichloroethene								
Methylene Chloride								
Tetrachloroethene								
Toluene								
trans-1,2-Dichloroethene								
Trichloroethene								
Vinyl Chloride								
Xylenes								
Semivolatile Organic Compounds								
1,4-Dioxane								
2-Methylnaphthalene								
3&4Methylphenol								
Benzo(a)anthracene								
Benzo(a)pyrene	0.091	0.56	0.23		0.11[3,4]	0.5	0.23	
Benzo(b)fluoranthene		0.64				0.5		
Chrysene								
Dibenzo(a,h)anthracene		0.17	0.069			0.1	0.069	
Inorganics								
Aluminum	24500	28200	20900		20200	26000	22100	
Antimony					13.3[4]			
Arsenic	8	7.9	4.9		6.4	7.6	5.5	
Barium								
Beryllium								
Cadmium								
Chromium								
Cobalt								
Copper								
Iron	24300	32400	18300		19100	24300	20000	
Lead								
Manganese	412	522			267	390		
Nickel								
Thallium						0.43		
Vanadium	36.8	40.5	29.4		32.1	38.9	33.5	
Zinc								
Perchlorate								

TABLE 7-31

EXPOSURE POINT CONCENTRATIONS FOR COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical	Groundwater			Surface Water			Sediment		
	Shallow Aquifer[5]	Intermediate Aquifer[6]	Deep Aquifer[7]	Building 106 Pond[1]	Tributaries	Main Stream[1]	Building 106 Pond[1]	Tributaries[1]	Main Stream[1]
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/kg	mg/kg	mg/kg
Volatile Organic Compounds									
1,1,1-Trichloroethane	27	1900					17300		
1,1,2-Trichloroethane	0.15	5							
1,1-Dichloroethane	89	370		99			1100		
1,1-Dichloroethene	29	1300		7.7			1500		
1,2-Dichloroethane	0.15	2							
2-Butanone				7200					
4-Methyl-2-pentanone				530					
Benzene	0.8								
Chloroethane	5.8			89			59.88		
Chloroform		1							
cis-1,2-Dichloroethene	1.8	140		140	6[2]		390		
Methylene Chloride									
Tetrachloroethene		0.6							
Toluene	0.15			110					
trans-1,2-Dichloroethene	0.15	6					51		
Trichloroethene	19	4100		590	23[2]		27800		
Vinyl Chloride	1.4	4		40	0.8[4]				
Xylenes				57					
Semivolatile Organic Compounds									
1,4-Dioxane	21	65	44						
2-Methylnaphthalene				0.9					
3&4Methylphenol									
Benzo(a)anthracene									
Benzo(a)pyrene							0.094	0.069	
Benzo(b)fluoranthene									
Chrysene									
Dibenzo(a,h)anthracene									
Inorganics									
Aluminum	68200	120	5210	6780	25800[1]	710		17800	11800
Antimony	0.0425			3.1					
Arsenic	26.4	0.8	4.5	20.6	7.5[1]		2.5	18.7	19.7
Barium	589			450					
Beryllium	6.1								
Cadmium	2.8			9.5					
Chromium	34.9			73.4	23.8[1]				
Cobalt	22.6	306							
Copper				184					
Iron	45600	9510	13400	31100	29000[1]	588	8360	71900	71400
Lead	29.3								
Manganese	1510	10700	533	4310	6200[1]	156		3130	1790
Nickel		820							
Thallium	0.58				0.46[1]				
Vanadium	38.3		10.9	12.8	39.8[1]		13.6	53.1	54.3
Zinc				1700					
Perchlorate							1.7		

Blank spaces indicate that the chemical was not selected as a COPC for the specified medium.

Footnotes:

1 - Data set consists of less than 10 samples; therefore, the maximum concentration was used as the exposure point concentration (EPC).
2 - Upper concentration levels (UCLs) calculated according to the U.S EPA's ProUCL guidance, unless otherwise noted. See RAGS Part D Table 3s in Appendix I.
3 - UCL is greater than the maximum concentration; therefore, the maximum concentration was used as the EPC.
4 - The maximum concentration was used as the EPC because there were less than 50 percent detections in the data set.
5 - For shallow groundwater, the EPCs are the concentrations in permanent monitoring well 08GWT00601, the most contaminated permanent well in this zone.
6- For intermediate zone groundwater, EPCs are the averages of locations MWT001, MWT003, AND MWT005 for organics, and sample 08GWT00901 for metals.
7 - For deep groundwater, the EPCs are the concentrations in permanent monitoring well 08GWT01101, the most highly contaminated permanent well in this zone.

TABLE 7-32

SUMMARY OF EXPOSURE INPUT PARAMETERS
REASONABLE MAXIMUM EXPOSURES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE INDIANA

Exposure Parameter	Construction Worker	Maintenance Worker	Occupational Worker	Adolescent Trespasser	Child Recreational User	Adult Recreational User	On-Site Child Resident	On-Site Adult Resident
All Exposures								
C_{soil}/C_{sed} (mg/kg)	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
C_{gw} (µg/L)	Average	NA	Average	NA	Average	Average	Average	Average
C_{sw} (µg/L)	NA	Maximum or 95% UCL[1]	NA	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
ED (years)	1[2]	25[3]	25[3]	11[4]	6[5]	24[5]	6[5]	24[5]
BW (kg)	70[5]	70[5]	70[5]	43[6]	15[5]	70[5]	15[5]	70[5]
AT_n (days)	365[6]	9,125[6]	9,125[6]	4,015[6]	2,190[6]	8,760[6]	2,190[6]	8,760[6]
AT_c (days)	25,550[6]	25,550[6]	25,550[6]	25,550[6]	25,550[6]	25,550[6]	25,550[6]	25,550[6]
Incidental Ingestion/Dermal Contact with Soil								
IR (mg/day)	330[7]	100[5]	100[5]	100[5]	200[5]	100[5]	200[5]	100[5]
EF-Soil (days/year)	150[8]	24[9]	250[5]	26[10]	52[11]	52[11]	350[5]	350[5]
FI (unitless)	1[5]	1[5]	1[5]	1[5]	0.5[2]	0.5[2]	1[5]	1[5]
SA (cm^2/day)	3,300[12]	3,300[12]	3,300[12]	3,280[13]	3,300[14]	9,070[15]	2,800[12]	5,700[12]
AF (mg/cm^2)	0.3[12]	0.2[12]	0.2[12]	0.2[12]	0.2[12]	0.07[12]	0.2[12]	0.07[12]
ABS (unitless)	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]
CF (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Surface Soil								
C_{air} (mg/m^3)	calculated[16]	calculated[16]	calculated[16]	calculated[16]	calculated[16]	calculated[16]	calculated[16]	calculated[16]
InhR (m^3/hour)	2.5[17]	20 m^3/day[3]	20 m^3/day[3]	1.2[17]	1.2[17]	1.6[17]	15 m^3/day[17]	20 m^3/day[17]
ET (hours/day)	8[18]	8[18]	8[18]	4[2]	4[2]	4[2]	24[17]	24[17]
PEF (m^3/kg)	1.58E+06[7]	1.316E+09[19]	1.316E+09[19]	1.316E+09[19]	1.316E+09[19]	1.316E+09[19]	1.316E+09[19]	1.316E+09[19]
Ingestion/Dermal Contact with Groundwater								
IR_{gw} (L/day)	NA	NA	1[2]	NA	1[2]	1[2]	1.5[17]	2[5]
EF (days/year)	150[8]	NA	250[5]	NA	52[11]	52[11]	350[5]	350[5]
ET (hours/day) and t_{event} (hours/event)	2[2]	NA	0.25[2]	NA	0.25[2]	0.25[2]	0.25[17]	0.25[17]
EV (events/day)	1[2]	NA	1[2]	NA	1[2]	1[2]	1[2]	1[2]
A (cm^2/day)	3,300[12]	NA	3,300[12]	NA	3,300[14]	9,070[15]	6,600[12]	18,000[12]
K_p (cm/hour)	chemical-specific[12]	NA	chemical-specific[12]	NA	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]
t* (hour/event), τ (hour), and B (unitless)	chemical-specific[12]	NA	chemical-specific[12]	NA	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]

TABLE 7-32

SUMMARY OF EXPOSURE INPUT PARAMETERS
REASONABLE MAXIMUM EXPOSURES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE INDIANA

Exposure Parameter	Construction Worker	Maintenance Worker	Occupational Worker	Adolescent Trespasser	Child Recreational User	Adult Recreational User	On-Site Child Resident	On-Site Adult Resident
Inhalation of Volatile Emissions from Groundwater								
C_{air} (mg/m^3)	calculated[20]	NA	NA	NA	NA	NA	calculated[21]	calculated[21]
InhR (m^3/hour)	2.5[17]	NA	NA	NA	NA	NA	0.6[3]	0.6[3]
ET (hours/day)	2[2]	NA	NA	NA	NA	NA	0.33[2]	0.33[2]
Ingestion/Dermal Contact with Surface Water								
CR_{sw} (ml/hr)	NA	NA	NA	0.05[22]	0.05[22]	0.01[22]	0.05[22]	0.01[22]
EF (days/year)	NA	24[9]	NA	26[10]	52[11]	52[11]	52[11]	52[11]
ET (hours/day) and t_{event} (hours/event)	NA	2[2]	NA	4[2]	4[2]	4[2]	4[2]	4[2]
EV (events/day)	NA	1[2]	NA	1[2]	1[2]	1[2]	1[2]	1[2]
A (cm^2/day)	NA	3,300[12]	NA	3,280[13]	3,300[14]	9,070[15]	3,300[14]	9,070[15]
K_p (cm/hour)	NA	chemical-specific[12]	NA	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]
t* (hour/event), τ (hour), and B (unitless)	NA	chemical-specific[12]	NA	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]
CF (L/cm^3)	NA	1E-03	NA	1E-03	1E-03	1E-03	1E-03	1E-03
Incidental Ingestion/Dermal Contact with Sediment								
IR (mg/day)	NA	100[5]	NA	100[5]	200[5]	100[5]	100[2]	50[2]
EF-Sediment (days/year)	NA	24[9]	NA	26[10]	52[11]	52[11]	52[11]	52[11]
FI (unitless)	NA	1[5]	NA	1[5]	0.5[2]	0.5[2]	1[5]	1[5]
SA (cm^2/day)	NA	3,300[12]	NA	3,280[13]	3,300[14]	9,070[15]	2,800[12]	5,700[12]
AF (mg/cm^2)	NA	0.2[12]	NA	0.2[12]	0.2[12]	0.07[12]	0.2[12]	0.07[12]
ABS (unitless)	NA	chemical-specific[12]	NA	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]	chemical-specific[12]
CF (kg/mg)	NA	1E-06	NA	1E-06	1E-06	1E-06	1E-06	1E-06

TABLE 7-32

SUMMARY OF EXPOSURE INPUT PARAMETERS
REASONABLE MAXIMUM EXPOSURES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE INDIANA

Notes:

A	Skin surface area available for contact	EF	Exposure frequency
ABS	Absorption factor	ET	Exposure time
AF	Soil-to-skin adherence factor	EV	Event frequency
AT_c	Averaging time for carcinogenic effects	FI	Fraction ingested from contaminated source
AT_n	Averaging time for noncarcinogenic effects	InhR	Inhalation rate
B	Bunge Model partitioning coefficient	IR	Ingestion rate (soil or groundwater)
BW	Body weight	K_p	Permeability coefficient from water through skin
CF	Conversion factor	SA	Skin surface area available for contact
CR	Contact rate	PEF	Particulate emission factor
$C_{soil/sed}$	Exposure concentration for soil/sediment	τ	Lag time
$C_{gw/sw}$	Exposure concentration for ground water/surface water	t*	Time it takes to reach steady-state conditions
C_{air}	Exposure concentration for air	t_{event}	Duration of event
ED	Exposure duration		

1 - U.S. EPA, 2002c.
2 - Professional judgment.
3 - U.S. EPA, 1991.
4 - Adolescents ages 7 to 16 years old.
5 - U.S. EPA, 1993a.
6 - U.S. EPA, 1989.
7 - U.S. EPA, 2002a.
8 - Ground is assumed to be frozen or snow covered 22 weeks/year.
9 - Assume two days a month for reasonable maximum exposure and one day a month for central tendency exposure.
10 - Assume one day a week in warm weather months for resonable maximum exposure and every other week for central tendency exposure.
11 - Assume two days a week in warm weather months for reasonable maximum exposure and one day a week for central tendency exposure.
12 - U.S. EPA, 2001a.
13 - Assume 25 percent of total body surface area is exposed, U.S. EPA, 1997.
14 - Assume 50 percent of total body surface area is exposed, U.S. EPA, 2001b.
15 - Assume that head, arms, hands, lower legs, and feet are exposed, U.S. EPA, 1997a.
16 - U.S. EPA, 1996.
17 - U.S. EPA, 1997a.
18 - Assume an 8-hour work shift.
19 - IDEM, 2004.
20 - VDEQ 2004.
21 - Foster, S.A. and P.C. Chrostowski, 1987.
22 - U.S. EPA Region 4, 1995.

TABLE 7-33

SUMMARY OF EXPOSURE INPUT PARAMETERS
CENTRAL TENDENCY EXPOSURES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE INDIANA

Exposure Parameter	Construction Worker	Maintenance Worker	Occupational Worker	Adolescent Trespasser	Child Recreational User	Adult Recreational User	On-Site Child Resident	On-Site Adult Resident
All Exposures								
C_{soil}/C_{sed} (mg/kg)	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
C_{gw} (µg/L)	Average	NA	Average	NA	Average	Average	Average	Average
C_{sw} (µg/L)	NA	Maximum or 95% UCL[1]	NA	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
ED (years)	1[2]	9[3]	9[3]	11[4]	2[3]	7[3]	2[3]	7[3]
BW (kg)	70[3]	70[3]	70[3]	43[5]	15[3]	70[3]	15[3]	70[3]
AT_n (days)	365[5]	3,285[5]	3,285[5]	4,015[5]	730[5]	2,555[5]	730[5]	2,555[5]
AT_c (days)	25,550[5]	25,550[5]	25,550[5]	25,550[5]	25,550[5]	25,550[5]	25,550[5]	25,550[5]
Incidental Ingestion/Dermal Contact with Soil								
IR (mg/day)	165[6]	50[3]	50[3]	50[3]	100[3]	50[3]	100[3]	50[3]
EF-Soil (days/year)	150[7]	12[8]	219[3]	13[9]	26[10]	26[10]	234[3]	234[3]
FI (unitless)	1[3]	1[3]	1[3]	1[3]	0.5[2]	0.5[2]	1[3]	1[3]
SA (cm^2/day)	3,300[11]	3,300[11]	3,300[11]	3,100[12]	3,300[13]	9,070[14]	2,800[11]	5,700[11]
AF (mg/cm^2)	0.1[11]	0.02[11]	0.02[11]	0.04[11]	0.04[11]	0.01[11]	0.04[11]	0.01[11]
ABS (unitless)	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]
CF (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Inhalation Fugitive Dust/Volatile Emissions from Surface Soil								
C_{air} (mg/m^3)	calculated[15]	calculated[15]	calculated[15]	calculated[15]	calculated[15]	calculated[15]	calculated[15]	calculated[15]
InhR (m^3/hour)	2.5[16]	20 m^3/day[17]	20 m^3/day[17]	1.2[16]	1.2[16]	1.6[16]	15 m^3/day[16]	20 m^3/day[16]
ET (hours/day)	8[18]	8[18]	8[18]	2[2]	2[2]	2[2]	24[16]	24[16]
PEF (m^3/kg)	1.58E+06[19]	1.316E+09[20]	1.316E+09[20]	1.316E+09[20]	1.316E+09[20]	1.316E+09[20]	1.316E+09[20]	1.316E+09[20]
Ingestion/Dermal Contact with Groundwater								
IR_{gw} (L/day)	NA	NA	1[2]	NA	1[2]	1[2]	0.66[16]	1.4[3]
EF (days/year)	150[7]	NA	219[3]	NA	26[10]	26[10]	234[3]	234[3]
ET (hours/day) and t_{event} (hours/event)	1.5[2]	NA	0.167[2]	NA	0.167[2]	0.167[2]	0.167[16]	0.167[16]
EV (events/day)	1[2]	NA	1[2]	NA	1[2]	1[2]	1[2]	1[2]
A (cm^2/day)	3,300[11]	NA	3,300[11]	NA	3,300[13]	9,070[14]	6,600[11]	18,000[11]
K_p (cm/hour)	chemical-specific[11]	NA	chemical-specific[11]	NA	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]

TABLE 7-33

SUMMARY OF EXPOSURE INPUT PARAMETERS
CENTRAL TENDENCY EXPOSURES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE INDIANA

Exposure Parameter	Construction Worker	Maintenance Worker	Occupational Worker	Adolescent Trespasser	Child Recreational User	Adult Recreational User	On-Site Child Resident	On-Site Adult Resident
Ingestion/Dermal Contact with Groundwater (Continued)								
t* (hour/event), τ (hour), and B (unitless)	chemical-specific[11]	NA	chemical-specific[11]	NA	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]
Inhalation of Volatile Emissions from Groundwater								
C_{air} (mg/m^3)	calculated[21]	NA	NA	NA	NA	NA	calculated[22]	calculated[22]
InhR (m^3/hour)	2.5[16]	NA	NA	NA	NA	NA	0.6[17]	0.6[17]
ET (hours/day)	1.5[2]	NA	NA	NA	NA	NA	0.25[2]	0.25[2]
Ingestion/Dermal Contact with Surface Water								
CR_{sw} (ml/hr)	NA	NA	NA	0.05[23]	0.05[23]	0.01[23]	0.05[23]	0.01[23]
EF (days/year)	NA	12[8]	NA	13[9]	26[10]	26[10]	26[10]	26[10]
ET (hours/day) and t_{event} (hours/event)	NA	1.5[2]	NA	2[2]	2[2]	2[2]	2[2]	2[2]
EV (events/day)	NA	1[2]	NA	1[2]	1[2]	1[2]	1[2]	1[2]
A (cm^2/day)	NA	3,300[11]	NA	3,100[12]	3,300[13]	9,070[14]	3,300[13]	9,070[14]
K_p (cm/hour)	NA	chemical-specific[11]	NA	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]
t* (hour/event), τ (hour), and B (unitless)	NA	chemical-specific[11]	NA	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]
CF (L/cm^3)	NA	1E-03	NA	1E-03	1E-03	1E-03	1E-03	1E-03
Incidental Ingestion/Dermal Contact with Sediment								
IR (mg/day)	NA	50[3]	NA	50[3]	100[3]	50[3]	50[2]	25[2]
EF-Sediment (days/year)	NA	12[8]	NA	13[9]	26[10]	26[10]	26[10]	26[10]
FI (unitless)	NA	1[3]	NA	1[3]	0.5[2]	0.5[2]	1[3]	1[3]
SA (cm^2/day)	NA	3,300[11]	NA	3,100[12]	3,300[13]	9,070[14]	2,800[11]	5,700[11]
AF (mg/cm^2)	NA	0.02[11]	NA	0.04[11]	0.04[11]	0.01[11]	0.04[11]	0.01[11]
ABS (unitless)	NA	chemical-specific[11]	NA	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]	chemical-specific[11]
CF (kg/mg)	NA	1E-06	NA	1E-06	1E-06	1E-06	1E-06	1E-06

TABLE 7-33

SUMMARY OF EXPOSURE INPUT PARAMETERS
CENTRAL TENDENCY EXPOSURES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE INDIANA

Notes:

A	Skin surface area available for contact	EF	Exposure frequency
ABS	Absorption factor	ET	Exposure time
AF	Soil-to-skin adherence factor	EV	Event frequency
AT_c	Averaging time for carcinogenic effects	FI	Fraction ingested from contaminated source
AT_n	Averaging time for noncarcinogenic effects	InhR	Inhalation rate
B	Bunge Model partitioning coefficient	IR	Ingestion rate (soil or groundwater)
BW	Body weight	K_p	Permeability coefficient from water through skin
CF	Conversion factor	NA	Not applicable
CR	Contact rate	SA	Skin surface area available for contact
$C_{soil/sed}$	Exposure concentration for soil/sediment	PEF	Particulate emission factor
$C_{gw/sw}$	Exposure concentration for ground water/surface water	τ	Lag time
C_{air}	Exposure concentration for air	t*	Time it takes to reach steady-state conditions
ED	Exposure duration	t_{event}	Duration of event
		UCL	Upper confidence limit on arithmetic mean

1 - U.S. EPA, 2002c.
2 - Professional judgment.
3 - U.S. EPA, 1993a.
4 - Adolescents ages 7 to 16 years.
5 - U.S. EPA, 1989a.
6 - Central tendency exposure is assumed to be one-half the reasonable maximum expousre value.
7 - Ground is assumed to be frozen or snow covered 22 weeks per year.
8 - Assume 2 days a month for RME and one day a month for CTE.
9 - Assume 1 day a week in warm weather months for RME and every other week for CTE.
10 - Assume 2 days a week in warm weather months for RME and one day a week for CTE.
11 - U.S. EPA, 2001b.
12 - Assume 25 percent of total body surface area is exposed (U.S. EPA, 1997a).
13 - Assume 50 percent of total body surface area is exposed (U.S. EPA, 2001b).
14 - Assume that head, arms, hands, lower legs, and feet are exposed (U.S. EPA, 1997a).
15 - U.S. EPA, 1996 (PEF values site specific).
16 - U.S. EPA, 1997a.
17 - U.S. EPA, 1991.
18 - Assume an 8-hour work shift.
19 - U.S. EPA, 2002a.
20 - IDEM, 2004.
21 - VDEQ, 2004.
22 - Foster, and Chrostowski, 1987.
23 - U.S. EPA Region 4, 2000.

TABLE 7-34

NON-CANCER TOXICITY DATA - ORAL/DERMAL
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE. CRANE, INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds										
1,1,1-Trichloroethane	Chronic	2.8E-01	mg/kg/day	1	2.8E-01	mg/kg/day			NCEA	10/25/2005
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	1000/1	IRIS	2/22/2006
1,1-Dichloroethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day			EPA PPRV	10/25/2005
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Liver	100/1	IRIS	2/22/2006
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	EPA PPRV	10/19/2004
2-Butanone	Chronic	6.0E-01	mg/kg/day	1	6.0E-01	mg/kg/day	Body Weight	1000/1	IRIS	2/22/2006
Benzene	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	300/1	IRIS	2/22/2006
Chloroethane	Chronic	4.0E-01	mg/kg/day	1	4.0E-01	mg/kg/day			NCEA	10/25/2005
Chloroform	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver	1000/1	IRIS	2/22/2006
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	NA	EPA 9	10/2004
Tetrachloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver, Body Weight	1000/1	IRIS	2/22/2006
Toluene	Chronic	8.0E-02	mg/kg/day	1	8.0E-02	mg/kg/day	Kidney	3000/1	IRIS	2/22/2006
Total Xylenes	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Body Weight	1000/1	IRIS	2/22/2006
trans-1,2-Dichloroethene	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Blood	1000/1	IRIS	2/22/2006
Trichloroethene	Chronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	Liver	NA	CA EPA	12/2002
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	2/22/2006
Semivolatile Organic Compounds										
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Lungs	1000/1	IRIS	2/22/2006
3&4-Methylphenol[3]	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day			HEAST	7/1997
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals										
Aluminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	CNS	100	EPA 9	10/2004
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	2/22/2006
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	2/22/2006
Barium	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Kidney	300/1	IRIS	2/22/2006
Beryllium	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	GS	300/1	IRIS	2/22/2006
Cadmium[3]	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Kidney	10/1	IRIS	2/22/2006
Chromium III	Chronic	1.5E+00	mg/kg/day	0.013	2.0E-02	mg/kg/day	NOEL	100/10	IRIS	2/22/2006
Chromium VI	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Fetotoxicity/GS/Bone	300/3	IRIS	2/22/2006
Cobalt	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	EPA 9	10/2004
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
Iron	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	NA	1	NCEA	10/25/2005
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Soil)	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	CNS	1/1	IRIS	2/22/2006
Manganese (Water)	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	3/1	IRIS	2/22/2006
Nickel	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	2/22/2006
Thallium	Chronic	7.0E-05	mg/kg/day	0.04	2.8E-06	mg/kg/day	Liver	3000	EPA 3	10/25/2005
Vanadium	Chronic	1.0E-03	mg/kg/day	0.026	2.6E-05	mg/kg/day	Kidney	300	NCEA	10/25/2005
Miscellaneous										
Perchlorate	Chronic	7.0E-04	mg/kg/day	1	7.0E-04	mg/kg/day	Thyroid	10/1	IRIS	2/22/2006

TABLE 7-34

NON-CANCER TOXICITY DATA - ORAL/DERMAL
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE. CRANE, INDIANA

Notes:
1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - Values are for 4-methylphenol.
4 - Water value for cadmium is listed.

Definitions:
CNS = Central Nervous System
CVS = Cardiovascular system
EPA 3 = U.S. EPA Region 3 Risk-Based Concentration Table, October 25, 2005.
EPA 9 = U.S. EPA Region 9 Preliminary Remediation Goal Table, October 2004, Updated December 28, 2004.
EPA PPRV - U.S. EPA provisional peer reviewed value, value from U.S. EPA Region 3 RBC Table, October 25, 2005.
GS = Gastrointestinal System
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Applicable
NCEA = National Center for Environmental Assessment, value from U.S. EPA Region 3 RBC Table, October 25, 2005.
NOEL = No Observed Effect Level.
CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 7-35

NON-CANCER TOXICITY DATA - INHALATION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds									
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	Chronic	4.9E-01	mg/m^3	1.4E-01	(mg/kg/day)			HEAST	7/1997
1,1-Dichloroethene	Chronic	2.0E-01	mg/m^3	5.7E-02	(mg/kg/day)	Liver	30/1	IRIS	2/22/2006
1,2-Dichloroethane	Chronic	2.5E+00	mg/m^3	7.0E-01	(mg/kg/day)	NA	NA	ATSDR MRL	10/25/2005
2-Butanone	Chronic	5.0E+00	mg/m^3	1.4E+00	(mg/kg/day)	Developmental	300/3	IRIS	2/22/2006
Benzene	Chronic	3.0E-02	mg/m^3	1.4E-03	(mg/kg/day)	Blood	300/1	IRIS	2/22/2006
Chloroethane	Chronic	1.0E+01	mg/m^3	2.9E+00	(mg/kg/day)	Fetal	300/1	IRIS	2/22/2006
Chloroform	Chronic	4.9E-02	mg/m^3	1.4E-02	(mg/kg/day)	Liver	NA	NCEA	10/25/2005
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Chronic	2.8E-01	mg/m^3	8.0E-02	(mg/kg/day)	Liver	NA	ATSDR MRL	10/25/2005
Toluene	Chronic	5.0E+00	mg/m^3	1.4E+00	(mg/kg/day)	CNS	300/1	IRIS	2/22/2006
Total Xylenes	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)		300/1	IRIS	2/22/2006
trans-1,2-Dichloroethene	Chronic	6.0E-02	mg/m^3	1.7E-02	(mg/kg/day)	Blood	NA	EPA PPRV	10/25/2005
Trichloroethene	Chronic	6.0E-01	mg/m^3	1.7E-01	(mg/kg/day)	Liver	NA	CA EPA	12/2002
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	2/22/2006
Semivolatile Organic Compounds									
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals									
Aluminum	Chronic	4.9E-03	mg/m^3	1.4E-03	(mg/kg/day)	CNS	300	EPA 9	10/2004
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetus	1000/1	HEAST	7/1997
Beryllium	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	Lungs	10/1	IRIS	3/24/2005
Cadmium	Chronic	2.0E-04	mg/m^3	5.7E-05	(mg/kg/day)	Kidney	NA	EPA 3	10/25/2005
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium VI	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Lungs	300/1	IRIS	2/22/2006

TABLE 7-35

NON-CANCER TOXICITY DATA - INHALATION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Cobalt	Chronic	2.0E-05	mg/m^3	5.7E-06	(mg/kg/day)	NA	NA	EPA 9	10/2004
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lithium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	2/22/2006
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium									
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous									
Perchlorate	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

Definitions:

ATSDR MRL = Agency for Toxic Substances and Disease Registry Minimal Risk Levels, value from U.S. EPA Region 3 RBC Table, October 25, 2005.

CNS = Central Nervous System

EPA 3 = U.S. EPA Region 3 RBC Table, October 25, 2005.

EPA 9 = U.S. EPA Region 9 Preliminary Remediation Goal Table, October 2004, Updated December 28, 2004.

HEAST= Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Applicable

NCEA = National Center for Environmental Assessment, value from U.S. EPA Region 3 RBC Table, October 25, 2005.

CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 7-36

CANCER TOXICITY DATA - ORAL/DERMAL
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds								
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	5.7E-02	$(mg/kg/day)^{-1}$	1	5.7E-02	$(mg/kg/day)^{-1}$	C	IRIS	2/22/2006
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	C	IRIS	2/22/2006
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	1	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	2/22/2006
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Chloroethane	2.9E-03	$(mg/kg/day)^{-1}$	1	2.9E-03	$(mg/kg/day)^{-1}$	NA	EPA 3	10/25/2005
Chloroform	NA	NA	NA	NA	NA	B2	IRIS	2/22/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	D	IRIS	2/22/2006
Tetrachloroethene	5.4E-01	$(mg/kg/day)^{-1}$	1	5.4E-01	$(mg/kg/day)^{-1}$	NA	EPA 3	10/25/2005
Toluene	NA	NA	NA	NA	NA	D	IRIS	2/22/2006
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	1.3E-02	$(mg/kg/day)^{-1}$	1	1.3E-02	$(mg/kg/day)^{-1}$	C	CA EPA	12/2002
Vinyl Chloride (Adult)	7.2E-01	$(mg/kg/day)^{-1}$	1	7.2E-01	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Vinyl Chloride (Lifetime)	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Semivolatile Organic Compounds								
1,4-Dioxane	1.1E-02	$(mg/kg/day)^{-1}$	1	1.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	2/22/2006
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	2/22/2006
Benzo(b)fluoranthene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Dibenzo(a,h)anthracene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Barium	NA	NA	NA	NA	NA	D	IRIS	2/22/2006
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	B1	IRIS	2/22/2006
Chromium III	NA	NA	NA	NA	NA	D	IRIS	2/22/2006
Chromium VI	NA	NA	NA	NA	NA	D	IRIS	2/22/2006
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	D	IRIS	2/22/2006
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2	IRIS	2/22/2006

TABLE 7-36

CANCER TOXICITY DATA - ORAL/DERMAL
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Lithium	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	D	IRIS	2/22/2006
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Thallium								
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Miscellaneous								
Perchlorate	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral Absorption Efficiency for Dermal.

EPA Group:
A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.
E - Evidence of noncarcinogenicity.

EPA 3 = U.S. EPA Region 3 RBC Table, October 25, 2005.

EPA(1) = U.S. EPA, Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, July 1993, EPA/600/R-93/089.

IRIS = Integrated Risk Information System.

NA = Not Available.

CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 7-37

CANCER TOXICITY DATA - INHALATION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds							
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	1.6E-02	$(mg/m^3)^{-1}$	5.6E-02	$(mg/kg/day)^{-1}$	C	IRIS	2/22/2006
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	C	IRIS	2/22/2006
1,2-Dichloroethane	2.6E-02	$(mg/m^3)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	2/22/2006
2-Butanone	NA	NA	NA	NA	NA	NA	NA
Benzene	7.8E-03	$(mg/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Chloroethane	NA	NA	NA	NA	NA	NA	NA
Chloroform	2.3E-02	$(mg/m^3)^{-1}$	8.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	2/22/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	2/22/2006
Tetrachloroethene	5.7E-03	$(mg/m^3)^{-1}$	2.0E-02	$(mg/kg/day)^{-1}$	NA	EPA 3	10/25/2005
Toluene	NA	NA	NA	NA	D	IRIS	2/22/2006
Total Xylenes	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	2.0E-03	$(mg/m^3)^{-1}$	7.0E-03	$(mg/kg/day)^{-1}$	C	CA EPA	12/2002
Vinyl Chloride (Adult)	4.4E-03	$(mg/m^3)^{-1}$	1.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Vinyl Chloride (Lifetime)	8.8E-03	$(mg/m^3)^{-1}$	3.1E-02	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Semivolatile Organic Compounds							
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
3&4-Methylphenol	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	8.9E-01	$(mg/m^3)^{-1}$	3.1E+00	$(mg/kg/day)^{-1}$	B2	NCEA	10/25/2005
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Metals							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E+00	$(mg/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Barium	NA	NA	NA	NA	D	IRIS	2/22/2006

TABLE 7-37

CANCER TOXICITY DATA - INHALATION
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA
PAGE 2 OF 2

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Beryllium	2.4E+00	$(mg/m^3)^{-1}$	8.4E+00	$(mg/kg/day)^{-1}$	B1	IRIS	2/22/2006
Cadmium	1.8E+00	$(mg/m^3)^{-1}$	6.3E+00	$(mg/kg/day)^{-1}$	B1	IRIS	2/22/2006
Chromium III	NA	NA	NA	NA	D	IRIS	2/22/2006
Chromium VI	1.2E+01	$(mg/m^3)^{-1}$	4.2E+01	$(mg/kg/day)^{-1}$	A	IRIS	2/22/2006
Cobalt	2.8E+00	$(mg/m^3)^{-1}$	9.8E+00	$(mg/kg/day)^{-1}$	NA	EPA 9	10/2004
Copper	NA	NA	NA	NA	D	IRIS	2/22/2006
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	B2	IRIS	2/22/2006
Lithium	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	D	IRIS	2/22/2006
Nickel	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Miscellaneous							
Perchlorate	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

EPA Group:
A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.
E - Evidence of noncarcinogenicity.

Definitions:
IRIS = Integrated Risk Information System.
NA = Not Available.
EPA 3 = U.S. EPA Region 3 RBC Table, October 25, 2005.
EPA 9 = U.S. EPA Region 9 Preliminary Remediation Goal Table, October 2004, Updated December 28, 2004.
NCEA = National Center for Environmental Assessment, value from U.S. EPA Region 3 RBC Table, October 25, 2005.
CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Construction Worker	Surface/Subsurface Soil near Building 106 Pond	Ingestion	3.E-07	- -	- -	- -	0.3	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	0.3	- -
	Surface/Subsurface Soil Grass and Gravel Areas	Ingestion	4.E-07	- -	- -	- -	0.4	- -
		Dermal Contact	8.E-08	- -	- -	- -	0.004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-07	- -	- -	- -	0.4	- -
	Surface/Subsurface Soil Building 106	Ingestion	3.E-07	- -	- -	- -	0.3	- -
		Dermal Contact	4.E-08	- -	- -	- -	0.003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	0.3	- -
	Surface/Subsurface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Groundwater Shallow Zone	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.2	- -
		Inhalation in a Trench	3.E-09	- -	- -	- -	0.002	- -
		Total	3.E-08	- -	- -	- -	0.2	- -
	Groundwater Intermediate Zone	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Groundwater Deep Zone	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Surface/Subsurface Soil	1.E-06				1	
		Total Shallow Zone Groundwater	3.E-08				0.2	
		Total across All Exposure Media and Pathways	**1.E-06**				**1**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Maintenance Worker	Surface Soil near Building 106 Pond	Ingestion	4.E-07	- -	- -	- -	0.02	- -
		Dermal Contact	1.E-07	- -	- -	- -	0.0005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-07	- -	- -	- -	0.02	- -
	Surface Soil Grass and Gravel Areas	Ingestion	6.E-07	- -	- -	- -	0.02	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.0005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	8.E-07	- -	- -	- -	0.02	- -
	Surface Soil Building 106	Ingestion	3.E-07	- -	- -	- -	0.01	- -
		Dermal Contact	1.E-07	- -	- -	- -	0.0003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	4.E-07	- -	- -	- -	0.01	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	8.E-07	- -	- -	- -	0.1	- -
		Total	8.E-07	- -	- -	- -	0.1	- -
	Sediment Building 106 Pond	Ingestion	1.E-05	- -	- -	TCE	0.02	- -
		Dermal Contact	4.E-08	- -	- -	- -	0.0002	- -
		Total	1.E-05	- -	- -	TCE	0.02	- -
	Surface Water Tributary	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	5.E-08	- -	- -	- -	0.05	- -
		Total	5.E-08	- -	- -	- -	0.05	- -
	Sediment Tributary	Ingestion	1.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.001	- -
		Total	1.E-06	- -	- -	- -	0.04	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	0.001	- -
		Total	NA	- -	- -	- -	0.001	- -
	Sediment Mainstream	Ingestion	1.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.001	- -
		Total	1.E-06	- -	- -	- -	0.04	- -
		Total Surface Soil	2.E-06				0.05	
		Total Surface Water and Sediment	2.E-05				0.2	
		Total across All Exposure Media and Pathways	**2.E-05**				**0.3**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Occupational Worker	Surface Soil near Building 106 Pond	Ingestion	4.E-06	- -	- -	Arsenic	0.2	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-06	- -	- -	Arsenic	0.2	- -
	Surface Soil Grass and Gravel Areas	Ingestion	6.E-06	- -	- -	Arsenic	0.2	- -
		Dermal Contact	3.E-06	- -	- -	- -	0.005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	9.E-06	- -	- -	Arsenic, cPAHS	0.2	- -
	Surface Soil Building 106	Ingestion	3.E-06	- -	- -	- -	0.1	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	4.E-06	- -	- -	- -	0.1	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Groundwater Shallow Zone	Ingestion	1.E-04	- -	Arsenic	Vinyl Chloride	4	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.04	- -
		Inhalation - Showering	NA				NA	- -
		Total	1.E-04	- -	Arsenic	Vinyl Chloride	4	- -
	Groundwater Intermediate Zone	Ingestion	2.E-04	TCE		Vinyl Chloride, I,4-Dioxane	6	Manganese
		Dermal Contact	8.E-06	- -	- -	TCE	0.1	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	2.E-04	TCE		Vinyl Chloride, I,4-Dioxane	6	Manganese
	Groundwater Deep Zone	Ingestion	3.E-05	- -	Arsenic	I,4-Dioxane	1	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.008	- -
		Inhalation - Showering	NA				NA	- -
		Total	3.E-05	- -	Arsenic	I,4-Dioxane	1	- -
		Total Surface Soil	2.E-05				0.52	
		Total Shallow Zone Groundwater	1.E-04				4	
		Total Intermediate Zone Groundwater	2.E-04				6	
		Total Deep Zone Groundwater	3.E-05				1	
		Total across All Exposure Media and Pathways	**4.E-04**				**12**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Trespasser	Surface Soil near Building 106 Pond	Ingestion	3.E-07	- -	- -	- -	0.03	- -
		Dermal Contact	8.E-08	- -	- -	- -	0.0009	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	4.E-07	- -	- -	- -	0.03	- -
	Surface Soil Grass and Gravel Areas	Ingestion	5.E-07	- -	- -	- -	0.0	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.0009	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-07	- -	- -	- -	0.04	- -
	Surface Soil Building 106	Ingestion	2.E-07	- -	- -	- -	0.02	- -
		Dermal Contact	9.E-08	- -	- -	- -	0.0005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	0.02	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	4.E-06	- -	- -	Vinyl Chloride, Arsenic	0.2	- -
		Dermal Contact	1.E-05	- -	- -	Vinyl Chloride, Arsenic	0.2	- -
		Total	1.E-05	- -	- -	Vinyl Chloride, Arsenic	0.3	- -
	Sediment Building 106 Pond	Ingestion	1.E-05	- -	- -	TCE	0.04	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.0003	- -
		Total	1.E-05	- -	- -	TCE	0.04	- -
	Surface Water Tributary	Ingestion	6.E-07	- -	- -	- -	0.2	- -
		Dermal Contact	5.E-08	- -	- -	- -	0.2	- -
		Total	7.E-07	- -	- -	- -	0.3	- -
	Sediment Tributary	Ingestion	7.E-07	- -	- -	- -	0.07	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.002	- -
		Total	9.E-07	- -	- -	- -	0.07	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.003	- -
		Dermal Contact	NA	- -	- -	- -	0.004	- -
		Total	NA	- -	- -	- -	0.007	- -
	Sediment Mainstream	Ingestion	8.E-07	- -	- -	- -	0.07	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.002	- -
		Total	9.E-07	- -	- -	- -	0.07	- -
		Total Surface Soil	1.E-06				0.09	
		Total Surface Water and Sediment	3.E-05				0.9	
		Total across All Exposure Media and Pathways	**3.E-05**				**1**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Child Recreational User	Surface Soil near Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	0.2	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	- -	0.2	- -
	Surface Soil Grass and Gravel Areas	Ingestion	1.E-06	- -	- -	- -	0.2	- -
		Dermal Contact	6.E-07	- -	- -	- -	0.005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	- -	0.2	- -
	Surface Soil Building 106	Ingestion	8.E-07	- -	- -	- -	0.1	- -
		Dermal Contact	3.E-07	- -	- -	- -	0.003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	- -	0.1	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	2.E-05	- -	- -	Vinyl Chloride, Arsenic	0.9	- -
		Dermal Contact	6.E-06	- -	- -	Vinyl Chloride	1	- -
		Total	2.E-05	- -	- -	TCE, Vinyl Chloride, Arsenic	2	- -
	Sediment Building 106 Pond	Ingestion	3.E-05	- -	TCE	- -	0.2	- -
		Dermal Contact	1.E-07	- -	- -	- -	0.002	- -
		Total	3.E-05	- -	TCE	- -	0.2	- -
	Surface Water Tributary	Ingestion	2.E-06	- -	- -	Arsenic	0.9	- -
		Dermal Contact	2.E-07	- -	- -	- -	1	- -
		Total	2.E-06	- -	- -	Arsenic	2	- -
	Sediment Tributary	Ingestion	2.E-06	- -	- -	Arsenic	0.4	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.01	- -
		Total	3.E-06	- -	- -	Arsenic	0.4	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.02	- -
		Dermal Contact	NA	- -	- -	- -	0.02	- -
		Total	NA	- -	- -	- -	0.04	- -
	Sediment Mainstream	Ingestion	2.E-06	- -	- -	- -	0.4	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.01	- -
		Total	3.E-06	- -	- -	- -	0.4	- -
	Groundwater Shallow Zone	Ingestion	3.E-05	- -	Arsenic	Vinyl Chloride	4	- -
		Dermal Contact	1.E-07	- -	- -	- -	0.08	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	3.E-05	- -	Arsenic	Vinyl Chloride	4	- -
	Groundwater Intermediate Zone	Ingestion	5.E-05	- -	TCE	Vinyl Chloride	6	Manganese
		Dermal Contact	4.E-06	- -	- -	TCE	0.2	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	5.E-05	- -	TCE	Vinyl Chloride	6	Manganese
	Groundwater Deep Zone	Ingestion	6.E-06	- -		Arsenic	0.9	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.02	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	6.E-06	- -	- -	Arsenic	0.9	- -
		Total Surface Soil	4.E-06				0.5	
		Total Surface Water and Sediment	6.E-05				5	
		Total Shallow Zone Groundwater	3.E-05				4	
		Total Intermediate Zone Groundwater	5.E-05				6	
		Total Deep Zone Groundwater	6.E-06				0.9	
		Total across All Exposure Media and Pathways	**2.E-04**				**17**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Adult Recreational User	Surface Soil near Building 106 Pond	Ingestion	4.E-07	- -	- -	- -	0.02	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.001	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-07	- -	- -	- -	0.02	- -
	Surface Soil Grass and Gravel Areas	Ingestion	6.E-07	- -	- -	- -	0.02	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.001	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	- -	0.02	- -
	Surface Soil Building 106	Ingestion	3.E-07	- -	- -	- -	0.01	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.0006	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-07	- -	- -	- -	0.01	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	2.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	8.E-06	- -	- -	TCE, Vinyl Chloride	0.6	- -
		Total	1.E-05	- -	- -	TCE, Vinyl Chloride, Arsenic	0.6	- -
	Sediment Building 106 Pond	Ingestion	1.E-05	- -	- -	TCE	0.03	- -
		Dermal Contact	9.E-08	- -	- -	- -	0.0003	- -
		Total	1.E-05	- -	- -	TCE	0.03	- -
	Surface Water Tributary	Ingestion	3.E-07	- -	- -	- -	0.04	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.6	- -
		Total	8.E-07	- -	- -	- -	0.7	- -
	Sediment Tributary	Ingestion	1.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	4.E-07	- -	- -	- -	0.002	- -
		Total	1.E-06	- -	- -	- -	0.04	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.0007	- -
		Dermal Contact	NA	- -	- -	- -	0.01	- -
		Total	NA	- -	- -	- -	0.01	- -
	Sediment Mainstream	Ingestion	1.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	4.E-07	- -	- -	- -	0.003	- -
		Total	1.E-06	- -	- -	- -	0.04	- -
	Groundwater Shallow Zone	Ingestion	3.E-05		Arsenic	- -	0.9	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.05	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	3.E-05		Arsenic	- -	0.9	- -
	Groundwater Intermediate Zone	Ingestion	4.E-05	- -	TCE	Vinyl Chloride	1	- -
		Dermal Contact	9.E-06	- -	- -	TCE	0.1	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	5.E-05	- -	TCE	Vinyl Chloride	1	- -
	Groundwater Deep Zone	Ingestion	5.E-06	- -	- -	Aesenic	0.2	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.01	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	5.E-06	- -	- -	Aesenic	0.2	- -
		Total Surface Soil	2.E-06				0.05	
		Total Surface Water and Sediment	3.E-05				1	
		Total Shallow Zone Groundwater	3.E-05				0.9	
		Total Intermediate Zone Groundwater	5.E-05				1	
		Total Deep Zone Groundwater	5.E-06				0.2	
		Total across All Exposure Media and Pathways	**1.E-04**				**4**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Total Recreational Risks	Surface Soil near Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	NA	- -
		Dermal Contact	4.E-07	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	Arsenic	NA	- -
	Surface Soil Grass and Gravel Areas	Ingestion	2.E-06	- -	- -	- -	NA	- -
		Dermal Contact	1.E-06	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	Arsenic	NA	- -
	Surface Soil Building 106	Ingestion	1.E-06	- -	- -	- -	NA	- -
		Dermal Contact	5.E-07	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	- -	NA	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	2.E-05	- -	- -	Vinyl Chloride, Arsenic	NA	- -
		Dermal Contact	1.E-05	- -	- -	TCE, Vinyl Chloride	NA	- -
		Total	3.E-05	- -	Vinyl Chloride	TCE, Arsenic	NA	- -
	Sediment Building 106 Pond	Ingestion	4.E-05	- -	TCE	- -	NA	- -
		Dermal Contact	2.E-07	- -	- -	- -	NA	- -
		Total	4.E-05	- -	TCE	- -	NA	- -
	Surface Water Tributary	Ingestion	2.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	7.E-07	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	Arsenic	NA	- -
	Sediment Tributary	Ingestion	3.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	9.E-07	- -	- -	- -	NA	- -
		Total	4.E-06	- -	- -	Arsenic	NA	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Sediment Mainstream	Ingestion	3.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	9.E-07	- -	- -	- -	NA	- -
		Total	4.E-06	- -	- -	Arsenic	NA	- -
	Groundwater Shallow Zone	Ingestion	6.E-05	- -	Arsenic	Vinyl Chloride	NA	- -
		Dermal Contact	3.E-07	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	6.E-05	- -	Arsenic	Vinyl Chloride	NA	- -
	Groundwater Intermediate Zone	Ingestion	9.E-05	- -	TCE	Vinyl Chloride	NA	- -
		Dermal Contact	1.E-05	- -	- -	TCE	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	1.E-04	- -	TCE	Vinyl Chloride	NA	- -
	Groundwater Deep Zone	Ingestion	1.E-05	- -	- -	Arsenic	NA	- -
		Dermal Contact	3.E-08	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	1.E-05	- -	- -	Arsenic	NA	- -
		Total Surface Soil	7.E-06				NA	
		Total Surface Water and Sediment	9.E-05				NA	
		Total Shallow Zone Groundwater	6.E-05				NA	
		Total Intermediate Zone Groundwater	1.E-04				NA	
		Total Deep Zone Groundwater	1.E-05				NA	
		Total across All Exposure Media and Pathways	**3.E-04**				**NA**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Future Child Resident	Surface Soil near Building 106 Pond	Ingestion	1.E-05	- -	- -	Arsenic	2	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.03	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-05	- -	- -	Arsenic	2	- -
	Surface Soil Grass and Gravel Areas	Ingestion	2.E-05	- -	- -	Arsenic, cPAHS	3	- -
		Dermal Contact	3.E-06	- -	- -	cPAHS	0.03	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-05	- -	- -	Arsenic, cPAHS	3	- -
	Surface Soil Building 106	Ingestion	1.E-05	- -	- -	Arsenic, cPAHS	2	- -
		Dermal Contact	2.E-06	- -	- -	- -	0.02	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-05	- -	- -	Arsenic, cPAHS	2	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	2.E-05	- -	- -	Vinyl Chloride, Arsenic	0.9	- -
		Dermal Contact	6.E-06	- -	- -	Vinyl Chloride	1	- -
		Total	2.E-05	- -	- -	TCE, Vinyl Chloride, Arsenic	2	- -
	Sediment Building 106 Pond	Ingestion	3.E-05	- -	TCE	- -	0.2	- -
		Dermal Contact	9.E-08	- -	- -	- -	0.001	- -
		Total	3.E-05	- -	TCE	- -	0.2	- -
	Surface Water Tributary	Ingestion	2.E-06	- -	- -	Arsenic	0.9	- -
		Dermal Contact	2.E-07	- -	- -	- -	1	- -
		Total	2.E-06	- -	- -	Arsenic	2	- -
	Sediment Tributary	Ingestion	2.E-06	- -	- -	Arsenic	0.4	- -
		Dermal Contact	4.E-07	- -	- -	- -	0.01	- -
		Total	3.E-06	- -	- -	Arsenic	0.4	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.02	- -
		Dermal Contact	NA	- -	- -	- -	0.02	- -
		Total	NA	- -	- -	- -	0.04	- -
	Sediment Mainstream	Ingestion	2.E-06	- -	- -	- -	0.4	- -
		Dermal Contact	4.E-07	- -	- -	- -	0.01	- -
		Total	3.E-06	- -	- -	- -	0.4	- -
	Groundwater Shallow Zone	Ingestion	3.E-04	Arsenic	Vinyl Chloride	TCE, 1,4-Dioxane	43	Aluminum, Arsenic, Iron, Manganese, Vanadium
		Dermal Contact	8.E-07	- -	- -	- -	0.5	- -
		Inhalation - Showering	7.E-07	- -	- -	- -	0.08	- -
		Total	3.E-04	Arsenic	Vinyl Chloride	TCE, 1,4-Dioxane	43	Aluminum, Arsenic, Iron, Manganese, Vanadium
	Groundwater Intermediate Zone	Ingestion	5.E-04	TCE	Vinyl Chloride	1,1,2-TCA, PCE, 1,4-Dioxane, Arsenic	57	1,1-DCE, TCE, Iron, Manganese, Nickel
		Dermal Contact	3.E-05	- -	TCE	- -	1	- -
		Inhalation - Showering	8.E-05	- -	TCE	- -	2	- -
		Total	6.E-04	TCE	Vinyl Chloride	1,1,2-TCA, PCE, 1,4-Dioxane, Arsenic	60	1,1-DCE, TCE, Iron, Manganese, Nickel
	Groundwater Deep Zone	Ingestion	6.E-05	- -	Arsenic	1,4-Dioxane	9	Iron, Manganese
		Dermal Contact	7.E-08	- -	- -	- -	0.1	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	6.E-05	- -	Arsenic	1,4-Dioxane	10	Iron, Manganese
		Total Surface Soil	5.E-05				7	
		Total Surface Water and Sediment	6.E-05				5	
		Total Shallow Zone Groundwater	3.E-04				43	
		Total Intermediate Zone Groundwater	6.E-04				60	
		Total Deep Zone Groundwater	6.E-05				10	
		Total across All Exposure Media and Pathways	**1.E-03**				**125**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Future Adult Resident	Surface Soil near Building 106 Pond	Ingestion	6.E-06	- -	- -	Arsenic	0.2	- -
		Dermal Contact	8.E-07	- -	- -	- -	0.004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	7.E-06	- -	- -	Arsenic	0.2	- -
	Surface Soil Grass and Gravel Areas	Ingestion	8.E-06	- -	- -	Arsenic, cPAHS	0.3	- -
		Dermal Contact	2.E-06	- -	- -	- -	0.004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-05	- -	- -	Arsenic, cPAHS	0.3	- -
	Surface Soil Building 106	Ingestion	4.E-06	- -	- -	Arsenic	0.2	- -
		Dermal Contact	9.E-07	- -	- -	- -	0.003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-06	- -	- -	Arsenic	0.2	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	2.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	8.E-06	- -	- -	TCE, Vinyl Chloride	0.6	- -
		Total	1.E-05	- -	- -	TCE, Vinyl Chloride, Arsenic	0.6	- -
	Sediment Building 106 Pond	Ingestion	1.E-05	- -	- -	TCE	0.03	- -
		Dermal Contact	6.E-08	- -	- -	- -	0.0002	- -
		Total	1.E-05	- -	- -	TCE	0.03	- -
	Surface Water Tributary	Ingestion	3.E-07	- -	- -	- -	0.04	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.6	- -
		Total	8.E-07	- -	- -	- -	0.7	- -
	Sediment Tributary	Ingestion	1.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	3.E-07	- -	- -	- -	0.002	- -
		Total	1.E-06	- -	- -	- -	0.04	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.0007	- -
		Dermal Contact	NA	- -	- -	- -	0.01	- -
		Total	NA	- -	- -	- -	0.01	- -
	Sediment Mainstream	Ingestion	1.E-06	- -	- -	- -	0.04	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.002	- -
		Total	1.E-06	- -	- -	- -	0.04	- -
	Groundwater Shallow Zone	Ingestion	4.E-04	Arsenic	- -	TCE, Vinyl Chloride, 1,4-Dioxane	12	Aluminum, Arsenic, Iron, Manganese
		Dermal Contact	1.E-06	- -	- -	- -	0.3	- -
		Inhalation - Showering	5.E-07	- -	- -	- -	0.02	- -
		Total	4.E-04	Arsenic	- -	TCE, Vinyl Chloride, 1,4-Dioxane	12	Aluminum, Arsenic, Iron, Manganese
	Groundwater Intermediate Zone	Ingestion	6.E-04	TCE	Vinyl Chloride	1,1,2-TCA, 1,2-DCA, PCE, 1,4-Dioxane, Arsenic	16	Manganese
		Dermal Contact	6.E-05	- -	TCE	- -	0.8	- -
		Inhalation - Showering	7.E-05	- -	TCE	- -	0.4	- -
		Total	7.E-04	TCE	Vinyl Chloride	1,1,2-TCA, 1,2-DCA, PCE, 1,4-Dioxane, Arsenic	18	Manganese
	Groundwater Deep Zone	Ingestion	7.E-05	- -	Arsenic	1,4-Dioxane	3	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.1	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	7.E-05	- -	Arsenic	1,4-Dioxane	3	- -
		Total Surface Soil	2.E-05				1	
		Total Surface Water and Sediment	3.E-05				1	
		Total Shallow Zone Groundwater	4.E-04				12	
		Total Intermediate Zone Groundwater	7.E-04				18	
		Total Deep Zone Groundwater	7.E-05				3	
		Total across All Exposure Media and Pathways	**1.E-03**				**35**	

TABLE 7-38

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SWMU 8 - BUILDING 106 POND
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Total Residential Risks	Surface Soil near Building 106 Pond	Ingestion	2.E-05	- -	Arsenic	- -	NA	- -
		Dermal Contact	2.E-06	- -	- -	Arsenic	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-05	- -	Arsenic	- -	NA	- -
	Surface Soil Grass and Gravel Areas	Ingestion	3.E-05	- -	Arsenic	cPAHs	NA	- -
		Dermal Contact	5.E-06	- -	- -	Arsenic, cPAHs	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-05	- -	Arsenic	cPAHs	NA	- -
	Surface Soil Building 106	Ingestion	1.E-05	- -	- -	Arsenic, cPAHs	NA	- -
		Dermal Contact	2.E-06	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-05	- -	- -	Arsenic, cPAHs	NA	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	2.E-05	- -	- -	Vinyl Chloride, Arsenic	NA	- -
		Dermal Contact	1.E-05	- -	- -	TCE, Vinyl Chloride	NA	- -
		Total	3.E-05	- -	Vinyl Chloride	TCE, Arsenic	NA	- -
	Sediment Building 106 Pond	Ingestion	4.E-05	- -	TCE	- -	NA	- -
		Dermal Contact	1.E-07	- -	- -	- -	NA	- -
		Total	4.E-05	- -	TCE	- -	NA	- -
	Surface Water Tributary	Ingestion	2.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	7.E-07	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	Arsenic	NA	- -
	Sediment Tributary	Ingestion	3.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	7.E-07	- -	- -	- -	NA	- -
		Total	4.E-06	- -	- -	Arsenic	NA	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Sediment Mainstream	Ingestion	3.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	7.E-07	- -	- -	- -	NA	- -
		Total	4.E-06	- -	- -	Arsenic	NA	- -
	Groundwater Shallow Zone	Ingestion	7.E-04	Arsenic	Vinyl Chloride	TCE, 1,4-Dioxane	NA	- -
		Dermal Contact	2.E-06	- -	- -	- -	NA	- -
		Inhalation - Showering	1.E-06	- -	- -	- -	NA	- -
		Total	7.E-04	Arsenic	Vinyl Chloride	TCE, 1,4-Dioxane	NA	- -
	Groundwater Intermediate Zone	Ingestion	1.E-03	TCE	Vinyl Chloride	1,1,2-TCA, 1,2-DCA, PCE, 1,4-Dioxane, Arsenic	NA	- -
		Dermal Contact	8.E-05	- -	TCE	PCE, Vinyl Chloride	NA	- -
		Inhalation - Showering	2.E-04	TCE	- -	- -	NA	- -
		Total	1.E-03	TCE	Vinyl Chloride	1,1,2-TCA, 1,2-DCA, PCE, 1,4-Dioxane, Arsenic	NA	- -
	Groundwater Deep Zone	Ingestion	1.E-04	- -	Arsenic	1,4-Dioxane	NA	- -
		Dermal Contact	2.E-07	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	1.E-04	- -	Arsenic	1,4-Dioxane	NA	- -
		Total Surface Soil	7.E-05				NA	
		Total Surface Water and Sediment	9.E-05				NA	
		Total Shallow Zone Groundwater	7.E-04				NA	
		Total Intermediate Zone Groundwater	1.E-03				NA	
		Total Deep Zone Groundwater	1.E-04				NA	
		Total across All Exposure Media and Pathways	**2.E-03**				**NA**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Construction Worker	Surface/Subsurface Soil near Building 106 Pond	Ingestion	1.E-07	- -	- -	- -	0.2	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.001	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-07	- -	- -	- -	0.2	- -
	Surface/Subsurface Soil Grass and Gravel Areas	Ingestion	2.E-07	- -	- -	- -	0.2	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.001	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-07	- -	- -	- -	0.2	- -
	Surface/Subsurface Soil Building 106	Ingestion	1.E-07	- -	- -	- -	0.1	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.001	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-07	- -	- -	- -	0.1	- -
	Surface/Subsurface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Groundwater Shallow Zone	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.1	- -
		Inhalation in a Trench	2.E-09	- -	- -	- -	0.002	- -
		Total	2.E-08	- -	- -	- -	0.1	- -
	Groundwater Intermediate Zone	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Groundwater Deep Zone	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Surface/Subsurface Soil	6.E-07				0.5	
		Total Shallow Zone Groundwater	2.E-08				0.1	
		Total across All Exposure Media and Pathways	**6.E-07**				**1**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Maintenance Worker	Surface Soil near Building 106 Pond	Ingestion	4.E-08	- -	- -	- -	0.004	- -
		Dermal Contact	2.E-09	- -	- -	- -	0.00002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	4.E-08	- -	- -	- -	0.004	- -
	Surface Soil Grass and Gravel Areas	Ingestion	5.E-08	- -	- -	- -	0.00	- -
		Dermal Contact	4.E-09	- -	- -	- -	0.00002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-08	- -	- -	- -	0.00	- -
	Surface Soil Building 106	Ingestion	3.E-08	- -	- -	- -	0.003	- -
		Dermal Contact	2.E-09	- -	- -	- -	0.00002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-08	- -	- -	- -	0.003	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	9.E-08	- -	- -	- -	0.01	- -
		Total	9.E-08	- -	- -	- -	0.01	- -
	Sediment Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	0.006	- -
		Dermal Contact	8.E-10	- -	- -	- -	0.000008	- -
		Total	1.E-06	- -	- -	- -	0.006	- -
	Surface Water Tributary	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	5.E-09	- -	- -	- -	0.01	- -
		Total	5.E-09	- -	- -	- -	0.01	- -
	Sediment Tributary	Ingestion	9.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	4.E-09	- -	- -	- -	0.00006	- -
		Total	9.E-08	- -	- -	- -	0.01	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	0.0003	- -
		Total	NA	- -	- -	- -	0.0003	- -
	Sediment Mainstream	Ingestion	9.E-08	- -	- -	- -	0.009	- -
		Dermal Contact	4.E-09	- -	- -	- -	0.00006	- -
		Total	9.E-08	- -	- -	- -	0.009	- -
		Total Surface Soil	1.E-07				0.01	
		Total Surface Water and Sediment	1.E-06				0.05	
		Total across All Exposure Media and Pathways	**2.E-06**				**0.06**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Occupational Worker	Surface Soil near Building 106 Pond	Ingestion	7.E-07	- -	- -	- -	0.07	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.0005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	7.E-07	- -	- -	- -	0.08	- -
	Surface Soil Grass and Gravel Areas	Ingestion	1.E-06	- -	- -	- -	0.1	- -
		Dermal Contact	8.E-08	- -	- -	- -	0.0004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	- -	0.1	- -
	Surface Soil Building 106	Ingestion	5.E-07	- -	- -	- -	0.05	- -
		Dermal Contact	4.E-08	- -	- -	- -	0.0003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-07	- -	- -	- -	0.05	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Groundwater Shallow Zone	Ingestion	5.E-05		Arsenic	Vinyl Chloride	4	- -
		Dermal Contact	5.E-08	- -	- -	- -	0.02	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	5.E-05	- -	Arsenic	Vinyl Chloride	4	- -
	Groundwater Intermediate Zone	Ingestion	7.E-05	- -	TCE	Vinyl Chloride	5	Manganese
		Dermal Contact	2.E-06	- -	- -	TCE	0.07	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	7.E-05	- -	TCE	Vinyl Chloride	5	Manganese
	Groundwater Deep Zone	Ingestion	8.E-06	- -	- -	Arsenic	0.8	- -
		Dermal Contact	4.E-09	- -	- -	- -	0.005	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	8.E-06	- -	- -	Arsenic	0.8	- -
		Total Surface Soil	2.E-06				0.2	
		Total Shallow Zone Groundwater	5.E-05				4	
		Total Intermediate Zone Groundwater	7.E-05				5	
		Total Deep Zone Groundwater	8.E-06				0.8	
		Total across All Exposure Media and Pathways	**1.E-04**				**10**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Trespasser	Surface Soil near Building 106 Pond	Ingestion	8.E-08	- -	- -	- -	0.007	- -
		Dermal Contact	7.E-09	- -	- -	- -	0.00008	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	9.E-08	- -	- -	- -	0.007	- -
	Surface Soil Grass and Gravel Areas	Ingestion	1.E-07	- -	- -	- -	0.01	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.00008	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-07	- -	- -	- -	0.01	- -
	Surface Soil Building 106	Ingestion	6.E-08	- -	- -	- -	0.005	- -
		Dermal Contact	8.E-09	- -	- -	- -	0.00005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	7.E-08	- -	- -	- -	0.005	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	9.E-07	- -	- -	- -	0.04	- -
		Dermal Contact	3.E-06	- -	- -	Vinyl chloride	0.04	- -
		Total	4.E-06	- -	- -	Vinyl chloride	0.08	- -
	Sediment Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	0.005	- -
		Dermal Contact	3.E-09	- -	- -	- -	0.00003	- -
		Total	1.E-06	- -	- -	- -	0.005	- -
	Surface Water Tributary	Ingestion	2.E-07	- -	- -	- -	0.04	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.05	- -
		Total	2.E-07	- -	- -	- -	0.08	- -
	Sediment Tributary	Ingestion	9.E-08	- -	- -	- -	0.009	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.0002	- -
		Total	1.E-07	- -	- -	- -	0.009	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.0008	- -
		Dermal Contact	NA	- -	- -	- -	0.0008	- -
		Total	NA	- -	- -	- -	0.002	- -
	Sediment Mainstream	Ingestion	1.E-07	- -	- -	- -	0.008	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.0002	- -
		Total	1.E-07	- -	- -	- -	0.008	- -
		Total Surface Soil	3.E-07				0.02	
		Total Surface Water and Sediment	5.E-06				0.2	
		Total across All Exposure Media and Pathways	**6.E-06**				**0.2**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Child Recreational User	Surface Soil near Building 106 Pond	Ingestion	9.E-08	- -	- -	- -	0.04	- -
		Dermal Contact	8.E-09	- -	- -	- -	0.0005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	9.E-08	- -	- -	- -	0.04	- -
	Surface Soil Grass and Gravel Areas	Ingestion	1.E-07	- -	- -	- -	0.0	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.0005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-07	- -	- -	- -	0.1	- -
	Surface Soil Building 106	Ingestion	6.E-08	- -	- -	- -	0.03	- -
		Dermal Contact	9.E-09	- -	- -	- -	0.0003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	7.E-08	- -	- -	- -	0.03	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	0.2	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.3	- -
		Total	2.E-06	- -	- -	- -	0.5	- -
	Sediment Building 106 Pond	Ingestion	2.E-06	- -	- -	TCE	0.06	- -
		Dermal Contact	4.E-09	- -	- -	- -	0.0002	- -
		Total	2.E-06	- -	- -	TCE	0.06	- -
	Surface Water Tributary	Ingestion	2.E-07	- -	- -	- -	0.2	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.3	- -
		Total	2.E-07	- -	- -	- -	0.5	- -
	Sediment Tributary	Ingestion	2.E-07	- -	- -	- -	0.1	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.001	- -
		Total	2.E-07	- -	- -	- -	0.1	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.004	- -
		Dermal Contact	NA	- -	- -	- -	0.005	- -
		Total	NA	- -	- -	- -	0.01	- -
	Sediment Mainstream	Ingestion	2.E-07	- -	- -	- -	0.09	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.001	- -
		Total	2.E-07	- -	- -	- -	0.1	- -
	Groundwater Shallow Zone	Ingestion	6.E-06	- -	- -	Arsenic	2	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.03	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	6.E-06		- -	Arsenic	2	- -
	Groundwater Intermediate Zone	Ingestion	8.E-06	- -	- -	TCE	3	Manganese
		Dermal Contact	5.E-07	- -	- -	- -	0.07	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	9.E-06	- -	- -	TCE	3	Manganese
	Groundwater Deep Zone	Ingestion	1.E-06	- -	- -	- -	0.5	- -
		Dermal Contact	1.E-09	- -	- -	- -	0.005	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	- -	0.5	- -
		Total Surface Soil	3.E-07				0.1	
		Total Surface Water and Sediment	5.E-06				1	
		Total Shallow Zone Groundwater	6.E-06				2	
		Total Intermediate Zone Groundwater	9.E-06				3	
		Total Deep Zone Groundwater	1.E-06				0.5	
		Total across All Exposure Media and Pathways	**2.E-05**				**7**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Adult Recreational User	Surface Soil near Building 106 Pond	Ingestion	3.E-08	- -	- -	- -	0.004	- -
		Dermal Contact	4.E-09	- -	- -	- -	0.00007	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	4.E-08	- -	- -	- -	0.005	- -
	Surface Soil Grass and Gravel Areas	Ingestion	4.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.00007	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-08	- -	- -	- -	0.01	- -
	Surface Soil Building 106	Ingestion	2.E-08	- -	- -	- -	0.003	- -
		Dermal Contact	5.E-09	- -	- -	- -	0.00005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-08	- -	- -	- -	0.003	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	1.E-07	- -	- -	- -	0.01	- -
		Dermal Contact	7.E-07	- -	- -	- -	0.1	- -
		Total	8.E-07	- -	- -	- -	0.2	- -
	Sediment Building 106 Pond	Ingestion	9.E-07	- -	- -	- -	0.006	- -
		Dermal Contact	2.E-09	- -	- -	- -	0.00002	- -
		Total	9.E-07	- -	- -	- -	0.006	- -
	Surface Water Tributary	Ingestion	2.E-08	- -	- -	- -	0.009	- -
		Dermal Contact	4.E-08	- -	- -	- -	0.2	- -
		Total	6.E-08	- -	- -	- -	0.2	- -
	Sediment Tributary	Ingestion	7.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	8.E-09	- -	- -	- -	0.0002	- -
		Total	8.E-08	- -	- -	- -	0.01	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.0002	- -
		Dermal Contact	NA	- -	- -	- -	0.003	- -
		Total	NA	- -	- -	- -	0.003	- -
	Sediment Mainstream	Ingestion	8.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	8.E-09	- -	- -	- -	0.0002	- -
		Total	8.E-08	- -	- -	- -	0.01	- -
	Groundwater Shallow Zone	Ingestion	4.E-06	- -	- -	Arsenic	0.5	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.02	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	4.E-06	- -	- -	Arsenic	0.5	- -
	Groundwater Intermediate Zone	Ingestion	6.E-06	- -	- -	TCE	0.6	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.04	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	7.E-06	- -	- -	TCE	0.7	- -
	Groundwater Deep Zone	Ingestion	7.E-07	- -	- -	- -	0.1	- -
		Dermal Contact	2.E-09	- -	- -	- -	0.003	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	7.E-07	- -	- -	- -	0.1	- -
		Total Surface Soil	1.E-07				0.01	
		Total Surface Water and Sediment	2.E-06				0.4	
		Total Shallow Zone Groundwater	4.E-06				0.5	
		Total Intermediate Zone Groundwater	7.E-06				0.7	
		Total Deep Zone Groundwater	7.E-07				0.1	
		Total across All Exposure Media and Pathways	**1.E-05**				**2**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Total Recreational Risks	Surface Soil near Building 106 Pond	Ingestion	1.E-07	- -	- -	- -	NA	- -
		Dermal Contact	1.E-08	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-07	- -	- -	- -	NA	- -
	Surface Soil Grass and Gravel Areas	Ingestion	2.E-07	- -	- -	- -	NA	- -
		Dermal Contact	3.E-08	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-07	- -	- -	- -	NA	- -
	Surface Soil Building 106	Ingestion	9.E-08	- -	- -	- -	NA	- -
		Dermal Contact	1.E-08	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-07	- -	- -	- -	NA	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	NA	- -
		Dermal Contact	1.E-06	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	Vinyl Chloride	NA	- -
	Sediment Building 106 Pond	Ingestion	3.E-06	- -	- -	TCE	NA	- -
		Dermal Contact	5.E-09	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	TCE	NA	- -
	Surface Water Tributary	Ingestion	2.E-07	- -	- -	- -	NA	- -
		Dermal Contact	6.E-08	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	NA	- -
	Sediment Tributary	Ingestion	3.E-07	- -	- -	- -	NA	- -
		Dermal Contact	2.E-08	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	NA	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Sediment Mainstream	Ingestion	3.E-07	- -	- -	- -	NA	- -
		Dermal Contact	2.E-08	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	NA	- -
	Groundwater Shallow Zone	Ingestion	1.E-05	- -	- -	Arsenic	NA	- -
		Dermal Contact	4.E-08	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	1.E-05	- -	- -	Arsenic	NA	- -
	Groundwater Intermediate Zone	Ingestion	1.E-05	- -	- -	TCE	NA	- -
		Dermal Contact	2.E-06	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	2.E-05	- -	- -	TCE	NA	- -
	Groundwater Deep Zone	Ingestion	2.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	3.E-09	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	Arsenic	NA	- -
		Total Surface Soil	4.E-07				NA	
		Total Surface Water and Sediment	7.E-06				NA	
		Total Shallow Zone Groundwater	1.E-05				NA	
		Total Intermediate Zone Groundwater	2.E-05				NA	
		Total Deep Zone Groundwater	2.E-06				NA	
		Total across All Exposure Media and Pathways	**4.E-05**				**NA**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Future Child Resident	Surface Soil near Building 106 Pond	Ingestion	2.E-06	- -	- -	- -	0.7	- -
		Dermal Contact	6.E-08	- -	- -	- -	0.004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	Arsenic	0.8	- -
	Surface Soil Grass and Gravel Areas	Ingestion	2.E-06	- -	- -	- -	1	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	- -	1	- -
	Surface Soil Building 106	Ingestion	1.E-06	- -	- -	- -	0.5	- -
		Dermal Contact	7.E-08	- -	- -	- -	0.002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	- -	0.5	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	0.2	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.3	- -
		Total	2.E-06	- -	- -	- -	0.5	- -
	Sediment Building 106 Pond	Ingestion	2.E-06	- -	- -	TCE	0.06	- -
		Dermal Contact	3.E-09	- -	- -	- -	0.0001	- -
		Total	2.E-06	- -	- -	TCE	0.06	- -
	Surface Water Tributary	Ingestion	2.E-07	- -	- -	- -	0.2	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.3	- -
		Total	2.E-07	- -	- -	- -	0.5	- -
	Sediment Tributary	Ingestion	2.E-07	- -	- -	- -	0.1	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.001	- -
		Total	2.E-07	- -	- -	- -	0.1	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.004	- -
		Dermal Contact	NA	- -	- -	- -	0.005	- -
		Total	NA	- -	- -	- -	0.01	- -
	Sediment Mainstream	Ingestion	2.E-07	- -	- -	- -	0.09	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.001	- -
		Total	2.E-07	- -	- -	- -	0.09	- -
	Groundwater Shallow Zone	Ingestion	3.E-05	- -	Arsenic	Vinyl Chloride	13	Aluminum, Arsenic, Iron, Manganese
		Dermal Contact	1.E-07	- -	- -	- -	0.2	- -
		Inhalation - Showering	8.E-08	- -	- -	- -	0.03	- -
		Total	3.E-05	- -	Arsenic	Vinyl Chloride	13	Aluminum, Arsenic, Iron, Manganese
	Groundwater Intermediate Zone	Ingestion	5.E-05	- -	TCE	Vinyl Chloride	17	Manganese
		Dermal Contact	5.E-06	- -	- -	TCE	0.7	- -
		Inhalation - Showering	1.E-05	- -	- -	TCE	0.7	- -
		Total	6.E-05	- -	TCE	Vinyl Chloride	18	Manganese
	Groundwater Deep Zone	Ingestion	6.E-06	- -	- -	Arsenic	3	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.05	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	6.E-06	- -	- -	Arsenic	3	- -
		Total Surface Soil	5.E-06				2	
		Total Surface Water and Sediment	5.E-06				1	
		Total across All Exposure Media and Pathways	**1.E-04**				**37**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Future Adult Resident	Surface Soil near Building 106 Pond	Ingestion	6.E-07	- -	- -	- -	0.08	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.0004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-07	- -	- -	- -	0.08	- -
	Surface Soil Grass and Gravel Areas	Ingestion	8.E-07	- -	- -	- -	0.1	- -
		Dermal Contact	6.E-08	- -	- -	- -	0.0004	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	9.E-07	- -	- -	- -	0.1	- -
	Surface Soil Building 106	Ingestion	4.E-07	- -	- -	- -	0.06	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.0003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-07	- -	- -	- -	0.06	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	1.E-07	- -	- -	- -	0.01	- -
		Dermal Contact	7.E-07	- -	- -	- -	0.1	- -
		Total	8.E-07	- -	- -	- -	0.2	- -
	Sediment Building 106 Pond	Ingestion	9.E-07	- -	- -	- -	0.006	- -
		Dermal Contact	1.E-09	- -	- -	- -	0.00001	- -
		Total	9.E-07	- -	- -	- -	0.006	- -
	Surface Water Tributary	Ingestion	2.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	4.E-08	- -	- -	- -	0.2	- -
		Total	6.E-08	- -	- -	- -	0.2	- -
	Sediment Tributary	Ingestion	7.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	5.E-09	- -	- -	- -	0.0001	- -
		Total	8.E-08	- -	- -	- -	0.01	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	0.0002	- -
		Dermal Contact	NA	- -	- -	- -	0.003	- -
		Total	NA	- -	- -	- -	0.003	- -
	Sediment Mainstream	Ingestion	8.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	5.E-09	- -	- -	- -	0.0001	- -
		Total	8.E-08	- -	- -	- -	0.01	- -
	Groundwater Shallow Zone	Ingestion	5.E-05	- -	Arsenic	- -	6	Iron
		Dermal Contact	2.E-07	- -	- -	- -	0.1	- -
		Inhalation - Showering	5.E-08	- -	- -	- -	0.006	- -
		Total	5.E-05	- -	Arsenic	- -	6	Iron
	Groundwater Intermediate Zone	Ingestion	8.E-05	- -	TCE	Vinyl Chloride, Arsenic	8	Manganese
		Dermal Contact	9.E-06	- -	- -	TCE	0	- -
		Inhalation - Showering	8.E-06	- -	- -	TCE	0.1	- -
		Total	9.E-05	- -	TCE	Vinyl Chloride, Arsenic	8	Manganese
	Groundwater Deep Zone	Ingestion	9.E-06	- -	- -	Arsenic	1	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.03	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	9.E-06	- -	- -	Arsenic	1	- -
		Total Surface Soil	2.E-06				0.2	
		Total Surface Water and Sediment	2.E-06				0.4	
		Total Shallow Zone Groundwater	5.E-05				6	
		Total Intermediate Zone Groundwater	9.E-05				8	
		Total Deep Zone Groundwater	9.E-06				1	
		Total across All Exposure Media and Pathways	**2.E-04**				**16**	

TABLE 7-39

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Total Residential Risks	Surface Soil near Building 106 Pond	Ingestion	2.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	8.E-08	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	Arsenic	NA	- -
	Surface Soil Grass and Gravel Areas	Ingestion	3.E-06	- -	- -	Arsenic	NA	- -
		Dermal Contact	2.E-07	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	Arsenic	NA	- -
	Surface Soil Building 106	Ingestion	2.E-06	- -	- -	- -	NA	- -
		Dermal Contact	1.E-07	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	- -	NA	- -
	Surface Soil Building 107	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Surface Water Building 106 Pond	Ingestion	1.E-06	- -	- -	- -	NA	- -
		Dermal Contact	1.E-06	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	Vinyl Chloride	NA	- -
	Sediment Building 106 Pond	Ingestion	3.E-06	- -	- -	TCE	NA	- -
		Dermal Contact	4.E-09	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	TCE	NA	- -
	Surface Water Tributary	Ingestion	2.E-07	- -	- -	- -	NA	- -
		Dermal Contact	6.E-08	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	NA	- -
	Sediment Tributary	Ingestion	3.E-07	- -	- -	- -	NA	- -
		Dermal Contact	2.E-08	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	NA	- -
	Surface Water Mainstream	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
	Sediment Mainstream	Ingestion	3.E-07	- -	- -	- -	NA	- -
		Dermal Contact	2.E-08	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	NA	- -
	Groundwater Shallow Zone	Ingestion	9.E-05	- -	Arsenic	Vinyl Chloride	NA	- -
		Dermal Contact	3.E-07	- -	- -	- -	NA	- -
		Inhalation - Showering	1.E-07	- -	- -	- -	NA	- -
		Total	9.E-05	- -	Arsenic	Vinyl Chloride	NA	- -
	Groundwater Intermediate Zone	Ingestion	1.E-04	- -	TCE	Vinyl Chloride, Arsenic	NA	- -
		Dermal Contact	1.E-05	- -	- -	TCE	NA	- -
		Inhalation - Showering	2.E-05	- -	TCE	- -	NA	- -
		Total	2.E-04	- -	TCE	Vinyl Chloride, Arsenic	NA	- -
	Groundwater Deep Zone	Ingestion	2.E-05	- -	- -	Arsenic	NA	- -
		Dermal Contact	3.E-08	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	2.E-05	- -	- -	Arsenic	NA	- -
		Total Surface Soil	7.E-06				NA	
		Total Surface Water and Sediment	7.E-06				NA	
		Total Shallow Zone Groundwater	9.E-05				NA	
		Total Intermediate Zone Groundwater	2.E-04				NA	
		Total Deep Zone Groundwater	2.E-05				NA	
		Total across All Exposure Media and Pathways	**3.E-04**				**NA**	

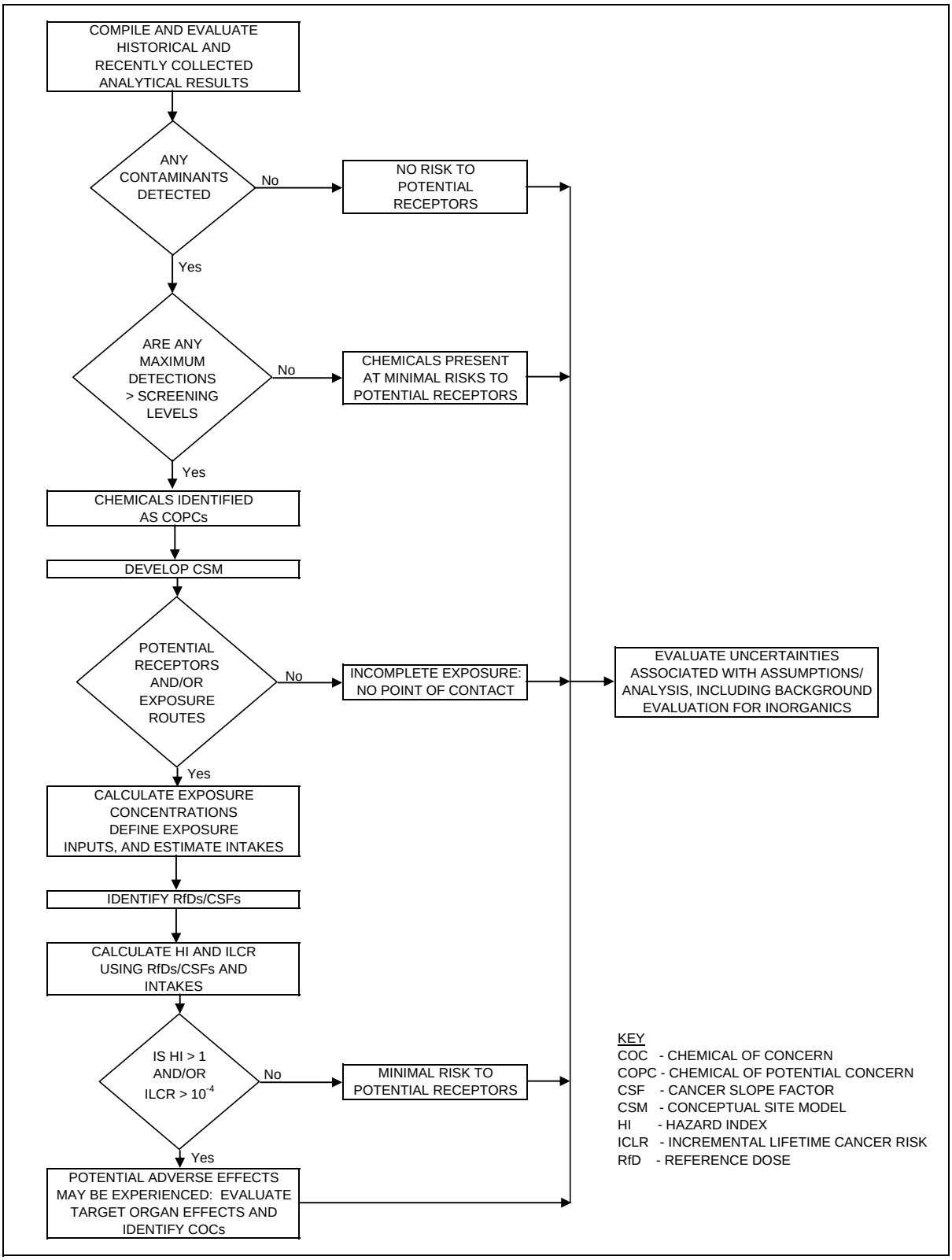
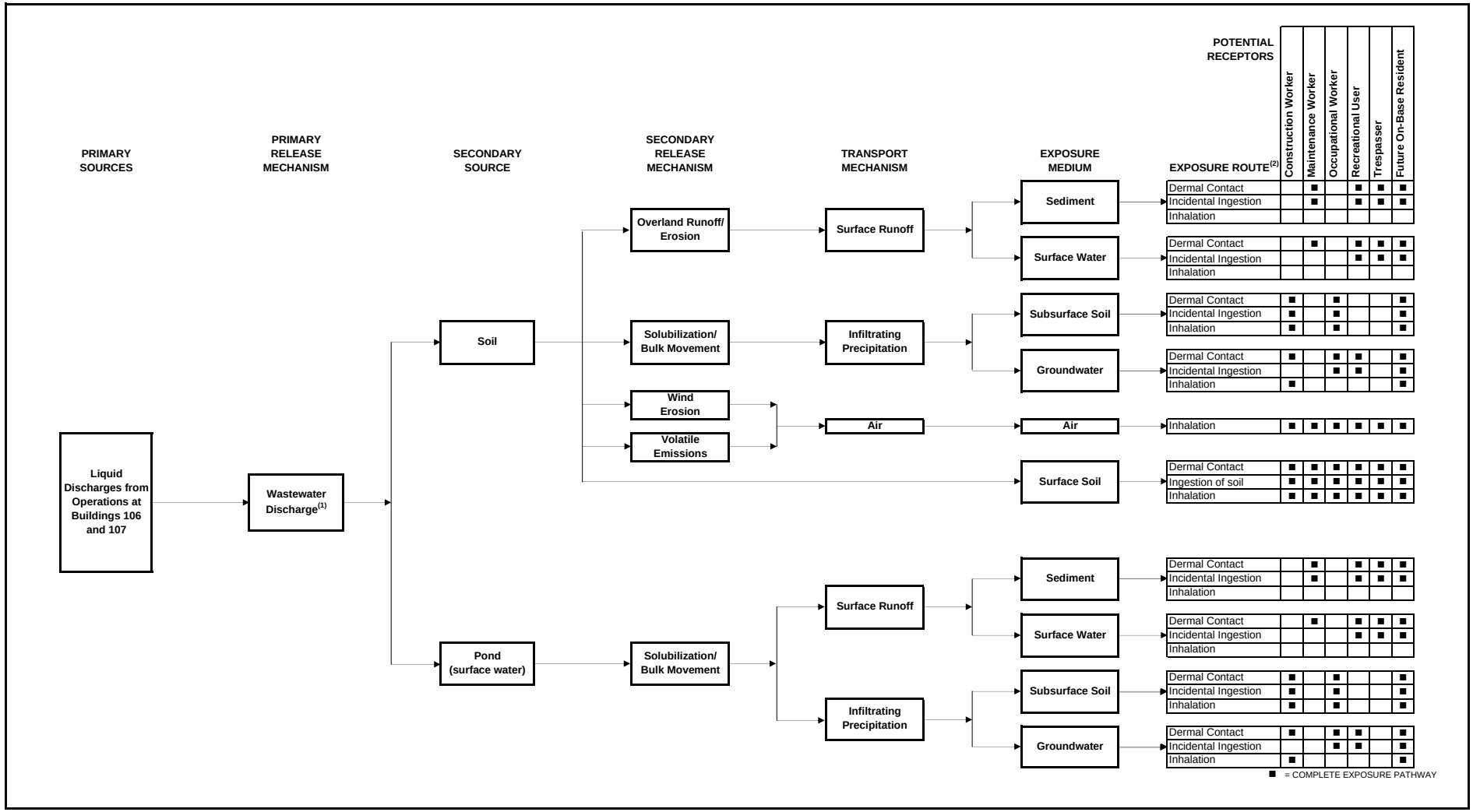


FIGURE 7-1

SUMMARY OF HUMAN HEALTH RISK ASSESSMENT PROCESS
SWMU 8 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

FIGURE 7-2

HUMAN HEALTH CONCEPTUAL SITE MODEL
SWMU 8 - BUILDING 106 POND
NSWC CRANE, INDIANA



1 - Wastewater containing explosives was collected in sumps from which the water was released directly to surface drainage that flows into Boggs Creek.
2 - Blank space indicates incomplete exposure pathway or relatively insignificant or not applicable potential exposure.

8.0 ECOLOGICAL RISK ASSESSMENT

The goal of this SERA for SWMU 8 – Building 106 Pond Area is to evaluate the potential for adverse ecological impacts of site-related contamination. The goal of this SERA was accomplished by identifying the COPCs detected at concentrations that exceed screening levels, identifying the locations of these exceedances, and concluding whether or not further investigation and/or remedial action at SWMU 8 at NSWC Crane is warranted from an ecological perspective.

8.1 INTRODUCTION

The SERA methodology used at NSWC Crane is in accordance with the following guidance documents:

- Department of Navy Environmental Policy Memorandum 97-04: Use of Ecological Risk Assessments dated May 16, 1997.
- Navy Policy for Conducting Ecological Risk Assessment (Navy, 1999).
- Final Guidelines for Ecological Risk Assessment (U.S. EPA, 1998).
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (U.S. EPA, 1997c).

This SERA consists of Steps 1, 2, and 3a of the eight-step ecological risk evaluation process discussed in U.S. EPA guidance (1997c and 1998) and the Navy Policy for Conducting Ecological Risk Assessments (ERAs) (1999). These eight steps consist of Steps 1 and 2, which constitute a SERA, followed by four additional steps, which constitute a baseline ERA (BERA), and conclude with Step 8, a risk management evaluation. Step 3a is technically the first step of the BERA and consists of a refinement of the conservative exposure assumptions, but it is included in this SERA in accordance with Navy guidance. Steps 3b through 7 are conducted if additional evaluations or investigations are necessary. Aspects of Step 8, risk management, are addressed throughout the ERA process, in cooperation with the Region 5 regulators.

A schematic diagram of the general risk assessment process is provided in Figure 8-1. In addition, Figures 8-2, 8-3, and 8-4 are flow charts that summarize the ERA process used to evaluate risks for

ecological receptors exposed to chemicals in surface soil, sediment, and surface water, respectively. These flow charts are discussed later in this SERA.

8.2 SCREENING-LEVEL PROBLEM FORMULATION

The screening-level problem formulation is the first step of the SERA and includes identification of potential receptor groups, COPCs, and the mechanisms for contaminant fate, transport, and toxicity. Determination of the complete exposure pathways that exist at a site is accomplished at this point to facilitate receptor selection. The problem formulation process enables the risk assessor to identify the ecological resources to be protected (known as assessment endpoints); the measurements that were used to evaluate risks to those resources (known as measures of effects); and the chemicals, geographic areas, and environmental media relevant to the risk assessment.

As part of receptor identification, site habitats and potential ecological receptors are described. These characteristics, as they apply to ecological risk, are described in the following subsections.

8.2.1 Environmental Setting

8.2.1.1 Basewide Environmental Setting

A biological characterization of NSWC Crane, including a list of plants and animals found at the facility, is presented in the Installation Assessment (IA) (Army, 1978) and the IAS (NEESA, 1983) and is summarized in the EMRs (Halliburton NUS, 1992a and 1992b). A list of the species that may inhabit NSWC Crane and are protected under the United States Endangered Species Act, Indiana Department of Natural Resources Heritage Data Center, or the United States Fish and Wildlife Service is summarized in the RCRA Facility Permit and below. The following paragraphs briefly summarize the environmental setting at the base.

Eighty percent of NSWC Crane's 63,000 acres is classified as Central Hardwoods Forest of the United States (NEESA, 1983). In addition, some former agricultural fields are in various stages of succession. Open spaces on dry upland sites contain almost pure stands of grasses with some clumps of woody plants such as persimmon, sassafras, and sumac. Wetter sites have river birch, willow, sycamore, and cottonwood. Hillside communities have mostly hickory, white and black oak, red and sugar maple, tulip poplar, ash, and beech (NEESA, 1983).

The great variety of habitats at NSWC Crane (i.e., many stages of forest succession, streams, ponds, Lake Greenwood, grassy open spaces) lead to great diversity of animal species (NEESA, 1983). These

species include but are not limited to mammals such as white-tailed deer, beaver, coyote, hawks, red fox, rabbits, raccoons, and mice; birds such as ducks, geese, wild turkey, bobwhite quail, red-tailed hawks, and American robins; and various amphibians, reptiles, fish, and invertebrates.

Six main creeks receive drainage in five separate drainage basins at NSWC Crane: Furst Creek, Sulphur Creek, Little Sulphur Creek, Boggs Creek, Turkey Creek, and Seed Tick Creek. There also are many smaller streams, creeks, and drainage ditches located at the facility, along with several small man-made ponds and one large lake (Lake Greenwood). Lake Greenwood is the source of potable water for NSWC Crane. Surface water from the facility eventually discharges to the East Fork of the White River, which is located south of the facility.

Threatened and Endangered Species

The Endangered Species Management Plan for NSWC Crane (Comarco Systems, Inc., 2000) identified the federal and State threatened and endangered species and species of special concern potentially present at NSWC Crane. Information included in the Endangered Species Management Plan was obtained from studies and surveys conducted by the Navy and other agencies and groups such as universities and research institutions. A small subset of these studies include the Inventory of Neotropical Migratory Birds, Mist Net and Radiotelemetry Surveys for the Indiana bat, Bobcat Trapping, Rattlesnake Survey, Purdue University Wildlife Studies, and several fish surveys and bird counts. These studies and others that were used in compiling the list of endangered species present at NSWC Crane are described in more detail in the Endangered Species Management Plan (Comarco Systems, Inc., 2000) and below.

The Indiana bat and bald eagle are the only federally threatened or endangered species documented to occur at NSWC Crane. The bald eagle is not likely present at SWMU 8 due to a lack of vast expanses of open water (i.e., the preferred hunting habitat for the bald eagle). No mist nets were located at SWMU 8 during the Mist Net and Radiotelemetry Surveys for the Indiana bat; however, two mist net sites were located in the Main Stream Tributary to Boggs Creek adjacent to SWMU 13, which is close to SWMU 8. No Indiana bats were captured at these two locations between May 18 and July 11, 1998. Therefore, although Indiana bats have been captured at NSWC Crane, their presence surrounding SWMU 8 has not been documented.

In addition, a number of State endangered and federal and State species of concern have been listed for NSWC Crane (Comarco Systems, Inc., 2000). The State endangered species list includes two mammals (bobcat and Indiana bat), one reptile (timber rattlesnake), and several birds (bald eagle, osprey, loggerhead shrike, yellow-crowned night-heron, Virginia rail, king rail, and Henslow's sparrow). The

Indiana Division of Fish and Wildlife website (http://www.in.gov/dnr/fishwild/endangered/e-list.htm) was reviewed to verify that no changes in the status of these species had occurred since October 2000. This list is much larger than that presented in Comarco Systems, Inc. (2000) and is not reiterated here.

Boggs Creek and Turkey Creek discharge off site to the East Fork of the White River. River otters, a State endangered species, are being reintroduced to Indiana. The otters are expanding from their original release sites into other watersheds including the East Fork of the White River [Indiana Department of Natural Resources (IDNR), 2004]. Also, the East Fork of the White River is the site of an ongoing study of lake sturgeon populations, another state endangered species (IDNR, 2004). Finally, spotted darters, a State species of special concern, has been found in the East Fork of the White River (IDNR, 2000). Other threatened, endangered, or special concern species also may be present in the water bodies just off site of Crane as well. For example, a survey of the freshwater mussel species present in the East Fork of the White River was initiated in 2003; however, results are not yet available.

8.2.1.2 Site-Specific Environmental Setting

Appendix J.1 presents the ecological assessment checklist, a figure presenting the different ecological habitats at the SWMU (Figure J-1), an aerial photograph of SWMU 8 that indicates the SWMU boundaries (Figure J-2), and an aerial photograph showing a 1-mile radius around SWMU 8 (Figure J-3).

SWMU 8 is located in the Load and Fill Area near the western boundary of NSWC Crane, approximately midway between the northern and southern boundaries of the facility. The SWMU is located within the Boggs and Turkey Creek Drainage Basin, which is one of five drainage basins that carry surface water off the installation and eventually drain into the East Fork of the White River and then to the Wabash River to the southwest (see Figure 1-2). Site features associated with SWMU 8 are included on Figure 1-3.

According to the ecological assessment checklist (Appendix J.1), the wooded area within the boundary of SWMU 8 is a sloping woodlot with trees that include black oak, red oak, sycamore, tulip poplar, black locust, red maple, black walnut, sassafras, hawthorn, flowering dogwood, and American elm. The only shrub/scrub vegetation present on the site is under the wooded area. There are several maintained grassy areas associated with buildings and transmission line corridors (Figure J-1).

An artificially created, unlined pond (Building 106 Pond) is located adjacent to the wooded area in SWMU 8 (see Figure J-1). The pond is approximately 0.1 acre in size and approximately 5 feet deep. As can be seen in Photo D in Appendix J.1, it is void of emergent or any other aquatic vegetation. There were also no macroinvertebrates, fish, birds, or mammals observed in or near the pond. In the past, the pond

received wastewater from Buildings 106 and 107. However, it does not currently receive discharge water or surface runoff, nor does it have a discharge point. The Marten County Soil Survey considers this site to be poor to very poor for supporting wetland plants and very poor for supporting wetland wildlife.

In the mid 1970s, a steel phosphatizing process was performed in Building 106 that involved the use of zinc phosphate. A cleaning process conducted in this building consisted of a caustic wash, a TCE degreaser, and a hydrochloric acid wash.

Prior to 1972, untreated wastewater was pumped into the Building 106 Pond which sometimes overflowed into the sanitary sewer. After 1972, the pond was connected to a neutralizing system that discharged to the sanitary sewer (NEESA, 1983). The solutions that discharged to the pond had an extremely high pH (11.0) and contained explosives, heavy metals, oil, and grease. Discharges into the floor drains that lead to the pond may have contained TCE, PCP, paint residue, and heavy metals.

Wood and metal boxes were refinished in Building 107. They were cleaned with TCE and PCP, and the overflow from this cleaning process flowed to the pond.

A former drum storage area was located south of Building 106 in an open area. The drums were believed to contain metals, organic solvents and fuels, pesticides, herbicides, and/or PCBs that may have spilled or leached into the surface soil.

Intermittent surface drainages flow south and southeast and converge to a single Main Stream that gains volume from other intermittent sources until it enters Boggs Creek. Some of the drainage ditches are only wet during and immediately after rain events. Appendix A presents photographs of many of the surface water and sediment sample locations that may have ponded water during dry periods.

8.2.2 Contaminants, Ecotoxicity, and Fate and Transport

Based on the historical site data and sampling, the following parameters are among the site-related chemical contaminants known to be present or potentially present in environmental media at SWMU 8:

- VOCs
- SVOCs
- Inorganics

8.2.2.1 Physical and Chemical Characteristics

Physical and chemical characteristics of contaminants may affect their mobility, transport, and bioavailability in the environment. These characteristics include bioaccumulation factors (BAFs), organic carbon partition coefficients, and octanol-water partition coefficients. The physical and chemical characteristics of the different chemical classes present in SWMU 8 media are presented in Appendix J.2.

8.2.3 Potential Exposure Pathways

Section 1.2 of this RFI describes the operational history, deposition mechanisms, and potential contaminant migration patterns for SWMU 8. Section 1.3 presents detailed descriptions of previous investigations and the potential sources of contamination for SWMU 8. The contaminants from these sources may have migrated to soil, sediment, surface water, and/or groundwater via various transport pathways (e.g., particulate emissions, runoff, leaks, direct discharge, etc.).

8.2.3.1 Surface Soil

Several groups of terrestrial ecological receptors can be exposed to contaminants in surface soil. Invertebrates such as earthworms are exposed to contaminants as they move through the soil and ingest soil particles while searching for food. Plants are exposed to contaminants via direct contact as contaminants are absorbed through the roots. Contaminants are then translocated to different parts of the plants (e.g., leaves, seeds). These pathways are evaluated in the SERA.

Small mammals may be exposed to contaminants in soil via several exposure routes. They may be exposed by direct contact as they search for food or burrow into the soil. Exposure of terrestrial wildlife to contaminants in the soil via dermal contact is unlikely to represent a major exposure pathway because fur, feathers, and chitinous exoskeletons are expected to minimize transfer of contaminants across dermal tissue. Therefore, the dermal pathway was not evaluated in the SERA. Small mammals also may be exposed to contaminants in the soil via incidental ingestion of soil and ingestion of plants and/or invertebrates that have accumulated contaminants from the soil. These pathways are evaluated in the SERA.

Larger predatory species such as the red fox and red-tailed hawk can be indirectly exposed to soil contaminants by ingesting small mammals that have accumulated contaminants from soil. These pathways were not evaluated in the SERA for the reasons discussed in Section 8.2.4.1.

8.2.3.2 Groundwater

Ecological receptors are not directly exposed to contaminants in groundwater at the site. Exposure to groundwater discharging as a seep or directly to a surface water body represents a complete exposure pathway and is evaluated as part of the surface water pathway.

8.2.3.3 Surface Water/Sediment

As mentioned above, contaminants in groundwater may discharge as a seep that flows into surface water or may discharge directly into a surface water body. Contaminants in soil may also enter the intermittent drainage channels at SWMU 8 via overland flow.

The aquatic habitat at SWMU 8 consists of small and intermittent drainage ditches and Tributaries that drain SWMU 8 water runoff to Boggs Creek. Although the small Tributaries are typically wet during rain events only, these drainage ways contribute water and sediments to Boggs Creek. Fish could be exposed to chemical contamination by direct contact with, and ingestion of, contaminated surface water or sediments. Piscivorous wildlife may consume fish that have accumulated chemicals from surface water and sediment. Although it is somewhat unlikely that piscivorous wildlife will obtain significant portions of their diet from these surface water sources, there is the possibility of several pools of standing water that may contain small fish. Therefore, this exposure pathway was evaluated in this SERA.

8.2.3.4 Air

Inhalation of particulates by mammals and birds is not considered a complete pathway at SWMU 8 because there are no activities causing air contamination. Also, inhalation pathways are not typically evaluated in SERAs because of the uncertainty inherent in estimating exposure levels and toxicological effects. Therefore, the air inhalation pathway is not evaluated in the SERA.

8.2.4 Endpoints

8.2.4.1 Assessment Endpoints

Assessment endpoints are explicit expressions of the environmental values that are to be protected (U.S. EPA, 1997c). The selection of these endpoints is based on the habitats present, the migration pathways of probable contaminants, and the relevant exposure routes for the receptors.

As already discussed in 8.2.1.2, the habitat at SWMU 8 consists of grassy and wooded areas, but much of the SWMU is covered by roads, parking areas, and buildings. The drainageways adjacent to the site are intermittent, but may have some pools throughout the year. Based on the habitats at SWMU 8, the assessment endpoints include protection of the following groups of receptors from adverse effects of contaminants on their growth, survival, and reproduction:

- Soil invertebrates
- Terrestrial vegetation
- Herbivorous birds and mammals
- Soil invertebrate-eating birds and mammals
- Piscivorous birds and mammals
- Carnivorous birds and mammals
- Benthic macroinvertebrates
- Fish
- Amphibians and reptiles

The following paragraphs discuss the reasons that the above assessment endpoints were selected for evaluation in the SERA.

Soil Invertebrates: Soil invertebrates are present in the soil at SWMU 8. They aid in the formation of soil and the redistribution and decomposition of organic matter in the soil, and they serve as a food source for higher trophic-level organisms. They also can accumulate bioaccumulative contaminants that can then be transferred to the higher trophic-level organisms that consume soil invertebrates.

Terrestrial Vegetation: Terrestrial vegetation at SWMU 8 consists of grasses, shrubs, and trees. They serve as a food source and provide shade and cover for many organisms, and they help to prevent soil erosion, among other important functions. They also can accumulate some contaminants that can then be transferred to the higher trophic-level organisms that consume plants.

Herbivorous Birds and Mammals: Herbivorous birds and mammals (i.e., animals that consume only plant tissue) forage in some portions of SWMU 8. Their role in the community is essential because, without them, higher trophic levels could not exist (Smith, 1966). They may be exposed to and accumulate contaminants present in the plants they consume.

Soil Invertebrate-Eating Birds and Mammals: Soil invertebrate-eating birds and mammals are present throughout the base in different terrestrial habitats (e.g., forested, open field) and are present at SWMU 8. These are considered first-level carnivores, and they serve as a food source for higher trophic-level carnivores. They may be exposed to and accumulate contaminants present in the food items they consume.

Piscivorous Birds and Mammals: Piscivorous birds and mammals are present throughout the base along the Tributaries and drainageways and are present at SWMU 8. These are considered second-level carnivores, and they serve as a food source for higher trophic-level carnivores. They may be exposed to and accumulate contaminants present in the food items they consume.

Carnivorous Birds and Mammals: Carnivorous birds and mammals consist of birds and mammals that consume other mammals and birds. Soil invertebrate-eating birds and mammals that are present throughout the base in different terrestrial habitats (e.g., forested, open field) are considered first-level carnivores and serve as a food source for higher trophic-level carnivores. Finally, carnivorous birds and mammals that feed on other birds and mammals are at the top of the food chain. The top carnivores typically are less densely distributed than the herbivores and first-level carnivores because they require a larger area to hunt for their food. All of the carnivores may be exposed to and accumulate contaminants that are present in the food items they consume.

Benthic Macroinvertebrates: Benthic macroinvertebrates are similar to soil invertebrates in that they serve as a food source for higher trophic-level organisms (i.e., fish, amphibians, birds, mammals). Their presence in the intermittent drainageways will be ephemeral because of a lack of suitable habitat and water flow.

Fish: Fish could be present in the drainageways leading away from SWMU 8 because there is the potential for pools of standing water to remain during dry periods. Fish may be exposed to and accumulate contaminants from the food items they consume or from the surface water in which they live.

Amphibians and Reptiles: Amphibians are expected to inhabit water bodies and the surrounding areas, and reptiles can inhabit both aquatic environments and terrestrial habitats. Amphibians and reptiles feed primarily on invertebrates, plants, fish, and/or small mammals. They are exposed to and can accumulate contaminants from the food items they consume or from the surface water, sediment, or surface soil in which they live.

Not all of the potential assessment endpoints listed above were evaluated in the SERA. As indicated in U.S. EPA guidance (U.S. EPA, 1997c), "it is not practical or possible to directly evaluate risks to all of the individual components of the ecosystem at a site. Instead, assessment endpoints focus the risk assessment on particular components of the ecosystem that could be adversely affected by contaminants from the site." Therefore, the SERA will focus on the endpoints that will tend to yield the highest risks, which should then account for endpoints that will have lower risks.

For example, large predatory species were not selected as assessment endpoints because, with the presence of many roads and paved areas, and with the small size of the site (approximately 5.8 acres), the contaminated area is much smaller than the home range of these animals. As shown in Figure 2-1, many of the samples collected in the contaminated area are under Buildings 106 and 107 or are in the gravel parking areas and roadways. These areas are not suitable habitat for the small birds and mammals that large predatory species consume. Samples were only collected in areas of suspected contamination. Because of the limited amount of food large predators would consume from the contaminated areas of SWMU 8, risks would be negligible. Also, omnivores were not selected as assessment endpoints because exposure to contaminants in plants is greatest for herbivores, and exposure to contaminants in animals is greatest for insectivores. Therefore, omnivores were protected by protecting herbivores and insectivores.

8.2.4.2 Measurement Endpoints

Measurement endpoints are estimates of measurable biological impacts (e.g., mortality, growth, and reproduction) that are used to evaluate the assessment endpoints. The following measures of effects were used to evaluate the assessment endpoints in the SERA:

- Soil screening values - Mortality, growth, and reproduction of plants and soil invertebrates were evaluated by comparing the measured concentrations of chemicals in surface soil to screening values designed to be protective of ecological receptors.

- Wildlife toxicity reference values (TRVs) - Mortality, reproductive, and/or developmental effects of birds and mammals were evaluated by comparing the estimated dose incurred (based on conservative and average assumptions) from ingestion of contaminants in surface water, sediment, surface soil, plants, and invertebrates to wildlife TRVs.

- Sediment screening values - Mortality and other adverse effects (e.g., growth, feeding rates, and behavioral changes) of benthic macroinvertebrates were evaluated by comparing the measured

concentrations of chemicals in sediment to screening values designed to be protective of ecological receptors.

- Surface water screening values - Mortality and other adverse effects (e.g., growth, feeding rates, and behavioral changes) of aquatic organisms were evaluated by comparing the measured concentrations of chemicals in surface water to screening values designed to be protective of ecological receptors.

8.2.4.3 Selection of Receptor Species

Many receptors in the soil environments at SWMU 8 are typically grouped into general categories such as invertebrates and vegetation. This is a reflection of the nature of the threshold values, effects values, or criteria typically used to characterize risk for such organisms. However, for vertebrate receptors, selection of a representative species is required so that risks incurred by intake through eating and drinking can be estimated to these upper-level species.

Ingestion is the primary route of exposure for most mammals and birds. The selection of species used to represent the receptor groups identified in Section 8.2.4.1 was based on considerations of their preferred habitat, body size, sensitivity to contaminants, home range, abundance, commercial or sport utilization, legal status, and functional role (e.g., predators). The availability of exposure parameters such as body mass, feeding rate, and drinking rate may also be a factor in selecting surrogate species. The following surrogate species were used in the food-chain modeling:

- Herbivorous mammal - meadow vole
- Herbivorous bird - bobwhite quail
- Insectivorous mammal - short tail shrew
- Insectivorous bird - American woodcock
- Piscivorous mammal - Mink
- Piscivorous bird - Belted kingfisher

Receptor profiles for each of these species are presented in Appendix J.3.

8.2.4.4 Conceptual Model

A conceptual model in problem formulation is a written description and visual representation of predicted relationships between ecological entities and the stressors to which they may be exposed. The conceptual model consists of two primary components: predicted relationships among stressor, exposure, and assessment endpoint response and a diagram that illustrates the relationships (U.S. EPA, 1998).

The primary sources of known or potential contamination at SWMU 8 were identified based on past operational practices and the physical characteristics of the site. As discussed in Section 1.0, the primary sources of contamination have been identified as floor drainage from the Building 106 caustic wash process, paint booths, and energetics from load and fill operations into the Building 106 Pond; floor drainage from the Building 107 box refinishing process and energetics from load and fill operations into the Building 106 Pond; floor drainage and overflow of oil stored in Buildings 106 and 107 into the Building 106 Pond; overflow from the Building 106 Pond onto surface soil and sediment; drainage from the Building 106 Pond into the surrounding tributaries/streams; and possible spills or leaching from storage drums onto the surface soil. The primary stressors to ecological receptors are contaminants in surface soil, surface water, and sediment. The primary receptors for contaminants in surface soil are plants, invertebrates, amphibians, and reptiles; secondary receptors are birds and mammals. The primary receptors for contaminants in surface water and sediment are fish, amphibians and reptiles, and aquatic/benthic invertebrates; secondary receptors are birds and mammals. Figure 8-5 presents the conceptual site model for SWMU 8.

8.3 ECOLOGICAL EFFECTS EVALUATION/SELECTION OF CONTAMINANTS OF POTENTIAL CONCERN

8.3.1 Ecological Effects Evaluation

The preliminary ecological effects evaluation is an investigation of the relationship between the magnitude of exposure to a chemical and the nature and magnitude of adverse effects resulting from exposure. In addition to being a toxicological evaluation, it may also include descriptions of apparent effects seen during the site visit (i.e., stressed vegetation, see Appendix J.1). Toxicity thresholds are usually expressed in units of concentration when the medium of concern is in intimate contact with the receptor, such as surface water for aquatic organisms or soil for soil invertebrates. For other receptors such as terrestrial vertebrates, toxicity data are typically available as doses, with units equal to mass of contaminant per unit of body mass per unit of time (usually mg/kg-day).

As the first step in the ecological effects evaluation, COPCs were selected by comparing contaminant concentrations in sediment, surface soil, and surface water samples to Region 5 ecological screening levels (ESLs) (U.S. EPA, 2003c). U.S. EPA has developed Ecological Soil Screening Levels (Eco-SSLs) for a few chemicals. These values were used in place of the Region 5 ESLs for soils because they are based on more recent data. U.S. EPA Water Quality Criteria (WQCs) were used for surface water if Region 5 ESLs were not available. The following presents the rules used in the selection of COPCs:

- A contaminant was retained as a COPC for risks to plants and invertebrates, aquatic organisms, and benthic invertebrates if the maximum detected concentration exceeded the associated ESL (or substituted screening level as described above) in surface soil, surface water, or sediment, respectively. Contaminants retained as COPCs are further evaluated as part of Step 3a of the eight-step ERA process.

- Calcium, magnesium, potassium, and sodium were not retained as COPCs in any medium because of their relatively low toxicity to ecological receptors and their high natural variability in concentrations. These inorganics are considered essential nutrients.

- Contaminants without ESLs (or substituted screening levels, as appropriate) were retained as COPCs for further evaluation as part of Step 3a of the eight-step ERA process.

An Ecological Effects Quotient (EEQ) approach was used to characterize the risk to ecological receptors. This approach characterizes potential effects by comparing exposure concentrations with effects data. The EEQs for terrestrial receptors were calculated as follows:

$$\mathrm{EEQ} = \frac{C_{ss}}{\mathrm{SSSL}}$$

where:

C_{ss} = Contaminant concentration in surface soil (µg/kg or mg/kg)

SSSL = Surface soil screening level (µg/kg or mg/kg)

The EEQs for the aquatic receptors were calculated as follows:

$$\mathrm{EEQ} = \frac{C_{sw}}{\mathrm{SWSL}} \text{ or } \frac{C_{sd}}{\mathrm{SDSL}}$$

where:

C_{sw} = Contaminant concentration in surface water (µg/L)

C_{sd} = Contaminant concentration in sediment (µg/kg or mg/kg)

SWSL = Surface water screening level (µg/L)

SDSL = Sediment screening level (µg/kg or mg/kg)

An EEQ of greater than 1.0 was considered to indicate potential risk. Such values do not necessarily indicate that an effect will occur but only that a low (i.e., conservative) threshold has been exceeded.

8.3.2 Selection of Contaminants of Potential Concern at SWMU 8

As discussed in Section 2.5.1, 45 surface soil samples were collected at SWMU 8. Seventeen of the surface soil samples were collected under Buildings 106 and 107; these samples do not represent habitat for ecological receptors. The remaining 28 surface soil samples were collected in grass or gravel areas where ecological habitat could potentially exist and were evaluated to determine the COPCs in surface soil. Four of the samples were collected near the Building 106 Pond. Figure 2-1 shows the surface soil sample locations included in the ecological COPC selection. These locations represent areas where ecological receptors could potentially be exposed to contaminants.

Sediment and surface water samples were collected from intermittent streams, drainage ditches, seeps, catch basins, and surface runoff locations throughout SWMU 8. As discussed in Section 2.5.3, 24 sediment samples were collected at SWMU 8. Five of the samples were collected from the Building 106 Pond, with samples at two different depths (0 to 12 inches and 12 to 24 inches) collected from locations 08SW/SD004 and 08SW/SD005. Twelve sediment samples were collected from the downgradient Tributaries and five sediment samples were collected from the downgradient Main Stream. Two upgradient samples (one Tributary and one Main Stream) were not used to select COPCs in sediment. As discussed in Section 2.5.2, 34 surface water samples were collected at SWMU 8. Six samples were collected from the Building 106 Pond, with samples at two different depths (surface and 5 feet below the surface) collected from locations 08SW/SD004 and 08SW/SD005. Fifteen surface water samples were collected from the downgradient Tributaries and nine surface water samples were collected from the downgradient Main Stream. Four upgradient samples (two Tributary and two Main Stream) were not used to select COPCs in surface water. Figure 2-2 shows the surface water and sediment sample locations included in the ecological COPC selection.

8.3.2.1 Surface Soil

Table 8-1 is the ecological surface soil screening table for the Building 106 Pond and shows the contaminants selected as COPCs for the surface soil pond samples. Table 8-2 is the ecological surface soil screening table for the grass and gravel samples and shows the contaminants selected as COPCs. VOCs, SVOCs, pesticides, PCBs, herbicides, energetics, and inorganics data were collected as part of the RFI. Only sample data collected in areas where potential ecological habitat exists were included in Tables 8-1 and 8-2 as discussed above. The maximum concentrations were used for initial screening. Chemicals selected as COPCs for plants, invertebrates, and wildlife have been highlighted in Tables 8-1 and 8-2.

For the Building 106 Pond, six inorganics were selected as COPCs because maximum detected concentrations exceeded associated ESLs. Additionally, one inorganic was selected as a COPC because no criteria are available. Aluminum and iron were not selected as COPCs because the pH detected in the soil at SWMU 8 [7.7 standard units (S.U.)] is at a level that is not toxic to plants or invertebrates (U.S. EPA, 2003c and 2003d). However, excavation is planned for the Building 106 Pond, which will remove all contaminated soil around the pond. Therefore, the Building 106 Pond soil was not evaluated further in this risk assessment.

For the grass and gravel samples, five inorganics were selected as COPCs because maximum detected concentrations exceeded associated ESLs. Additionally, one inorganic was selected as a COPC for further evaluation in Step 3a because no criteria are available. Aluminum and iron were not selected as COPCs because the pH detected in the soil at SWMU 8 (7.7 S.U.) is at a level that is not toxic to plants or invertebrates (U.S. EPA, 2003c and 2003d).

Four inorganics in surface soil were included in the food-chain model (Section 8.4.2) because they are considered bioaccumulative chemicals (U.S. EPA, 2000) (see Table 8-2).

8.3.2.2 Sediment

Tables 8-3, 8-4, and 8-5 are the ecological sediment screening tables for the Building 106 Pond, downgradient Tributary, and downgradient Main Stream samples, respectively. These tables show the contaminants selected as sediment COPCs for the respective sample groups. VOCs, SVOCs, PCBs, energetics, and inorganics data were collected as part of the RFI. The maximum concentrations were used for initial screening. Chemicals selected as COPCs for benthic invertebrates and piscivorous wildlife have been highlighted on Tables 8-3, 8-4, and 8-5.

For the Building 106 Pond samples, eleven VOCs, nine SVOCs, and four metals were selected as COPCs because maximum concentrations exceeded sediment ESLs. Also, one VOC, one SVOC, seven metals, and one miscellaneous parameter were selected as COPCs because criteria are not available. However, excavation is planned for the Building 106 Pond, which will remove all contaminated sediment from the pond. Therefore, Building 106 Pond sediment was not evaluated further in this risk assessment.

For the downgradient Tributary samples, three SVOCs and two metals were selected as COPCs because the maximum concentrations exceeded the sediment ESLs. Also, eight metals and one miscellaneous parameter were selected as COPCs because criteria are not available. Two SVOCs and three metals in the Tributary sediment samples were included in the food-chain model (Section 8.4.2) because they are considered bioaccumulative chemicals (U.S. EPA, 2000) (see Table 8-4).

For the downgradient Main Stream sediment samples, one SVOC and two metals were selected as COPCs because maximum concentrations exceeded sediment ESLs. Also, eight metals were selected as COPCs because criteria are not available. Three metals in the Main Stream sediment were included in the food-chain model (Section 8.4.2) because they are considered bioaccumulative chemicals (U.S. EPA, 2000) (see Table 8-5).

8.3.2.3 Surface Water

Tables 8-6, 8-7, and 8-8 are the ecological surface water screening tables for the Building 106 Pond, downgradient Tributary, and downgradient Main Stream samples, respectively. These tables show the contaminants selected as surface water COPCs for the respective sample groups. VOCs, SVOCs, PCBs, energetics, and inorganics data were collected as part of the RFI. The maximum concentrations were used for initial screening. Chemicals selected as COPCs for aquatic invertebrates and wildlife have been highlighted on Tables 8-6, 8-7, and 8-8.

For the Building 106 Pond samples, six VOCs, one SVOC, 10 total metals, and six dissolved metals were selected as COPCs because maximum concentrations exceeded surface water ESLs. Also, one VOC and one SVOC were selected as COPCs because criteria are not available. However, excavation is planned for the Building 106 Pond, which will remove all contaminated surface water from the pond. Therefore, Building 106 Pond surface water was not evaluated further in this risk assessment.

For the downgradient Tributary samples, one SVOC, 10 total metals, and three dissolved metals were selected as COPCs because maximum concentrations exceeded surface water ESLs. Five metals in

Tributary surface water were included in the food-chain model (Section 8.4.2) because they are considered bioaccumulative chemicals (U.S. EPA, 2000) (see Table 8-7).

For downgradient Main Stream samples, one total metal was selected as a COPC because the maximum concentration exceeded the surface water ESL.

8.3.2.4 Summary

A conservative ecological screening of surface soil, sediment, and surface water data collected as part of the RFI was conducted at SWMU 8. Based on the results of the evaluation, adequate information exists to determine that potential risks are possible for receptors exposed to COPCs. Therefore, the SERA advanced to Step 3a of the BERA – the refinement of the conservative exposure assumptions. The chemicals selected as COPCs were evaluated further in the Step 3a evaluation.

8.4 STEP 3A - REFINEMENT OF CONSERVATIVE EXPOSURE ASSUMPTIONS

Step 3a consists of refining the conservative exposure assumptions/concentrations made when evaluating potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors) and re-evaluating the analytical data using benchmarks that are more appropriate for the assessment endpoints. The objective of the Step 3a refinement was to better define those chemicals that contribute to potentially unacceptable levels of ecological risk, and to identify and eliminate from further consideration those COPCs that were retained because of the use of very conservative exposure scenarios. The Step 3a evaluation is designed to eliminate chemicals from further evaluation for certain groups of receptors. For example, a chemical might not be retained as a COPC in soil based on low risks to soil invertebrates but might be retained for evaluating risks to plants or wildlife. Chemicals are evaluated during Step 3a in order of terrestrial plants and invertebrates (Section 8.4.1.1), benthic invertebrates (Section 8.4.1.2), aquatic receptors (Section 8.4.1.3), and wildlife (Section 8.4.2).

Figures 8-2, 8-3, and 8-4 are flow charts that present the ERA process used to evaluate risks to ecological receptors from chemicals in soil, sediment, and surface water, respectively. The following sections describe the process for further evaluating chemicals initially selected as COPCs in soil, sediment, and surface water.

<u>Surface Soil</u>

Chemicals initially selected as COPCs in surface soil were carried through three independent flow paths: (1) to further evaluate risks to plants, (2) to further evaluate risks to invertebrates, and (3) to further

evaluate risks to wildlife (i.e., mammals and birds). This evaluation was conducted to determine whether there are potential risks to all three receptor groups (i.e., plants, invertebrates, and wildlife), or to only one or two of the receptor groups. This is important because if the site proceeds further in a BERA, the studies in the BERA should only focus on the receptors that are at potential risk. Because most of the Region 5 soil screening levels are based on risks to mammals or birds, potential risks to plants and invertebrates cannot be determined using these values. Therefore, the first step in the Step 3a evaluation was to compare maximum chemical concentrations in soil to "no-effects benchmarks" for plants and invertebrates, such as the U.S. EPA Eco-SSLs. Although some of the alternate benchmarks may be based on thresholds such as Effects Concentrations for 20 percent of the test population (EC_{20}s), samples with chemical concentrations less than the no-effects benchmarks are not expected to have significant effects. The following outlines decisions made based on these comparisons:

- If the concentration was less than the no-effects benchmark, it was concluded that the chemical is not causing an unacceptable risk to that receptor group, and the chemical was not evaluated further in Step 3a.

- If the chemical concentration was greater than the no-effects benchmark (or the chemical does not have a no-effects benchmark) and was greater than background concentrations, the chemical was further evaluated in Step 3a to determine if the risks are great enough to warrant additional evaluations [i.e., proceed to a BERA, develop cleanup levels, proceed to a corrective measures study (CMS), etc.].

- If the concentration was greater than the no-effects benchmark (or the chemical does not have a no-effects benchmark) but is less than background concentrations, it was concluded that the chemical is not causing an unacceptable site-related risk to that receptor group, and the chemical was not evaluated further in Step 3a.

Concurrent with the evaluation of risks to plants and invertebrates, bioaccumulative chemicals selected as COPCs were evaluated to determine if there are unacceptable risks to wildlife. Even though the conservative COPC screening level may have been based on risks to wildlife, risks to wildlife were further evaluated in Step 3a to determine potential risks under a less conservative exposure scenario. The first step in the process was to determine whether the COPC is bioaccumulative. A chemical was considered to be bioaccumulative, and thus carried through the food-chain model, if it was included in the list of important bioaccumulative chemicals in U.S. EPA (2000). Non-bioaccumulative chemicals were not carried through the food-chain model, and it was concluded that they were not causing an unacceptable risk to wildlife. The following outlines decisions made based on the results of the food-chain model:

- If the EEQ was less than 1.0 using average contaminant concentrations and exposure factors and the No Observable Adverse Effects Level (NOAEL) as the TRV, it was concluded that the chemical is not causing an unacceptable risk to wildlife, and the chemical was not evaluated further in Step 3a.

- If the EEQ was greater than 1.0 using average contaminant concentrations and exposure factors and the NOAEL as the TRV, and the concentration was greater than background concentrations, the chemical was further evaluated in Step 3a to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

- If the EEQ was greater than 1.0 using average contaminant concentrations and exposure factors and the NOAEL as the TRV, but the concentration of the chemical was less than background, it was concluded that the chemical is not causing an unacceptable site-related risk to wildlife, and the chemical was not evaluated further in Step 3a.

For chemicals evaluated further in Step 3a, other Step 3a factors described below were used to determine if the risks were great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

Sediment

Chemicals initially selected as COPCs in sediment were carried through two independent flow paths: (1) to further evaluate risks to invertebrates and (2) to further evaluate risks to piscivorous wildlife (i.e., mammals and birds). This further evaluation was conducted to determine if there are potential risks from that chemical to both receptor groups (i.e., invertebrates and wildlife), or to only one of the receptor groups. This is important because if the site proceeds further in a BERA, the studies in the BERA should only focus on the receptors that are at potential risk. Because many of the Region 5 sediment screening levels are based on equilibrium partitioning, maximum contaminant concentrations were compared to alternate lower effects levels in the following order of preference (as applicable):

- Consensus-Based Probable Effects Concentration (PEC) (MacDonald et al., 2000)
- Canadian Sediment Quality Guidelines [Ontario Ministers of the Environment (OMOE, 1993)
- Long and Morgan (1991) Effects-Range Low (ER-L) values
- Long et al. (1995) ER-L values
- Other values, as necessary and available

The following outlines decisions made based on these comparisons:

- If the concentration was less than the lower-effects benchmark and greater than the upgradient concentrations, it was concluded that the chemical is not causing an unacceptable risk to invertebrates, and the chemical was not evaluated further in Step 3a.

- If the concentration was greater than the lower-effects benchmark and greater than upgradient concentrations, the chemical was further evaluated in Step 3a to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

- If the concentration was greater than the lower-effects benchmark but less than upgradient concentrations, it was concluded that the chemical is not causing an unacceptable site-related risk to invertebrates, and the chemical was not evaluated further in Step 3a.

For chemicals evaluated further in Step 3a, the other factors described below were used to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

Concurrent with the evaluation of risks to sediment invertebrates, bioaccumulative chemicals selected as COPCs were evaluated to determine if there are unacceptable risks to wildlife. Even though the conservative COPC screening level may have been based on risks to wildlife, risks to wildlife were further evaluated in Step 3a to determine potential risks under an average exposure scenario. The first step in the process was to determine whether the COPC is bioaccumulative. A chemical was considered to be bioaccumulative, and thus carried through the food-chain model, if it was included in the list of important bioaccumulative chemicals in U.S. EPA (2000). Non-bioaccumulative chemicals were not carried through the food-chain model, and it was concluded that they were not causing an unacceptable risk to wildlife. The following outline decisions made based on the results of the food-chain model:

- If the EEQ was less than 1.0 using average contaminant concentrations and exposure factors and the NOAEL as the TRV, it was concluded that the chemical is not causing an unacceptable risk to wildlife, and the chemical was not evaluated further in Step 3a.

- If the EEQ was greater than 1.0 using average contaminant concentrations and exposure factors and the NOAEL as the TRV, and the concentration was greater than background concentrations, the

chemical was further evaluated in Step 3a to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

- If the EEQ was greater than 1.0 using average contaminant concentrations and exposure factors and the NOAEL as the TRV, but the concentration of the chemical is less than background, it was concluded that the chemical is not causing an unacceptable site-related risk to wildlife, and the chemical was not evaluated further in Step 3a.

For chemicals evaluated further in Step 3a, the other Step 3a factors described below were used to determine if the risks were great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

Surface Water

Chemicals selected as COPCs in surface water were carried through two independent flow paths: (1) to further evaluate risks to aquatic organisms and (2) to further evaluate risks to terrestrial wildlife (i.e., mammals and birds). This further evaluation was conducted to determine if there are potential risks from that chemical to both receptor groups (i.e., invertebrates and wildlife), or to only one of the receptor groups. This is important because if the site proceeds further in a BERA, the studies in the BERA should only focus on the receptors that are at potential risk. Organic chemicals initially selected as COPCs were evaluated directly in Step 3a. However, for inorganics, the following decisions were made:

- If the metal was either not detected in total metals samples, or was detected at concentrations less than the screening level in the total metals samples, it was concluded that the chemical is not causing an unacceptable risk to aquatic organisms, and the chemical was not evaluated further in Step 3a.

- If the metal was detected in total metals samples at concentrations greater than the screening level, and concentrations were greater than upgradient concentrations, it was concluded that the chemical may be causing an unacceptable risk to aquatic organisms, and the chemical was evaluated further in Step 3a.

- If the metal was detected in total metals samples at concentrations greater than the screening level but less than upgradient concentrations, it was concluded that the chemical is not causing an unacceptable risk to aquatic organisms, and the chemical was not evaluated further in Step 3a.

Concurrent with the evaluation of risks to aquatic organisms, chemicals retained as site-related COPCs were further evaluated to determine if there are unacceptable risks to terrestrial wildlife. The following outlines decisions made based on the results of the food-chain model:

- If the EEQ (see Section 8.4) was less than 1.0 (based on the surface water portion of the food-chain model) using average contaminant concentrations and exposure factors and the NOAEL as the TRV, it was concluded that the chemical is not causing an unacceptable risk to terrestrial wildlife.

- If the EEQ was greater than 1.0 (based on the surface water portion of the food-chain model) using average contaminant concentrations and exposure factors and the NOAEL as the TRV, and the chemical concentration was greater than upgradient concentrations, the chemical was further evaluated in Step 3a to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

- If the EEQ was greater than 1.0 using average contaminant concentrations and exposure factors and the NOAEL as the TRV, but the chemical concentration is less than upgradient concentrations, it was concluded that the chemical is not causing an unacceptable site-related risk to terrestrial wildlife.

For chemicals evaluated further in Step 3a, the other Step 3a factors described below were used to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS, etc.).

Other Step 3a Factors

For chemicals evaluated further in Step 3a, the following factors were evaluated, as appropriate, to determine if the risks are great enough to warrant additional evaluations (i.e., proceed to a BERA, develop cleanup levels, proceed to a CMS). All of these factors may not be discussed for each chemical and/or receptor group.

- Magnitude of criterion exceedance: Although the magnitude of the risks may not relate directly to the magnitude of a criterion exceedance, the magnitude of the criterion exceedance may be one item used in a lines-of-evidence approach to determine the need for further site evaluation. The greater the criterion exceedance, the greater the probability and concern that an unacceptable risk exists.

- Frequency of chemical detection and spatial distribution: A chemical detected at a low frequency typically is of less concern than a chemical detected at higher frequency, if toxicity and concentrations

and spatial areas represented by the data are similar. All else being equal, chemicals detected frequently were given greater consideration than those detected relatively infrequently. In addition, the spatial distribution of a chemical may be evaluated to determine the area that a sample represents.

- Contaminant bioavailability: Many contaminants (especially inorganics) are present in the environment in forms that are typically not bioavailable, and this limited bioavailability was considered when evaluating the exposures of receptors to site contaminants. Contaminants with generally less bioavailability are considered to be less toxic than the more bioavailable contaminants, all other factors being equal.

- Habitat: Although exceedances of criteria may occur, potential risks to ecological receptors may be minimal if there is little habitat for those receptors. Therefore, the extent of habitat was used qualitatively when considering additional evaluation. Areas with little habitat were less of a concern than areas with suitable habitat to support the receptors of interest.

- Alternate benchmarks: These benchmarks are used to further evaluate risks to specific groups of ecological receptors (e.g., plants, invertebrates) because, although ESLs are useful for initial screening, they are the most conservative values available for soil, sediment, and surface water evaluation. For example, the ESLs for soil may be based on risks to small mammals. Therefore, an exceedance of that ESL does not necessarily indicate that potential risks to plants or invertebrates exist, so other more appropriate benchmarks were used to evaluate potential risks to those receptors. Use of these alternate benchmarks was case specific.

In addition to the general Step 3a factors above, other factors were evaluated in Step 3a for each receptor group. The following sections discuss the other factors used, including specific alternate benchmarks.

Terrestrial Plants and Invertebrates: The alternate benchmarks used to further evaluate risks to plants and invertebrates are listed below. The ecological endpoint for each benchmark used in this step was provided in the SERA. For example, if a benchmark is based on a 25-percent reduction in growth to a lettuce plant, that information was noted in the discussion.

- Eco-SSL for plants (U.S. EPA, 2003c, 2003d, 2005a, and 2005b)

- Eco-SSL for invertebrates (U.S. EPA, 2003c, 2003d, 2005a, and 2005b)

- Canadian Soil Quality Guidelines (SQGs) [Canadian Council of Ministers of the Environment (CCME), 1997; Environment Canada (EC), 1999a and 1999b].

- Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision (Efroymson et al., 1997a).

- ORNL Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision (Efroymson et al., 1997b).

Additional sources of toxicity data from the literature were used to evaluate potential risks to terrestrial vegetation and invertebrates from contaminants in the surface soil.

Sediment: In addition to the Step 3a factors presented above, additional evaluations for sediment included comparing chemical concentrations in sediment to higher effects levels to show the probability of a range of possible effects. The higher effects levels used to further evaluate risks to benthic invertebrates were from the same sources listed in order of preference in the sediment subsection. A description of what the higher effects levels represent is provided in the Step 3a evaluation. For example, the PECs were intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms were expected to occur frequently (MacDonald et al., 2000).

Surface Water: In addition to the Step 3a factors presented above, additional evaluations for surface water include comparing chemical concentrations in surface water to acute water quality standards/criteria to show a range of possible effects. More emphasis was placed on dissolved inorganics concentrations (compared to total inorganics concentrations) because dissolved inorganics are a better indicator of potential bioavailability than are total inorganics. Also, emphasis was placed on average concentrations because at least some aquatic organisms (i.e., fish and other aquatic invertebrates) are exposed to average chemical concentrations as they swim in the water or as the water is transported downstream.

8.4.1 Terrestrial Plants, Terrestrial and Aquatic Invertebrates, and Fish

Potential risks to terrestrial plants, terrestrial and aquatic invertebrates, and fish from exposure to chemicals initially selected as COPCs were further evaluated as discussed above. The following subsections discuss whether COPCs are retained for further evaluation for soil invertebrates and terrestrial vegetation (Section 8.4.1.1), benthic invertebrates (Section 8.4.1.2), and aquatic organisms (Section 8.4.1.3). COPCs based on risk to upper-level receptors via the food chain are discussed in Section 8.4.2.

8.4.1.1 Soil Invertebrates and Terrestrial Vegetation – Surface Soil Risk

Risks to terrestrial plants and invertebrates resulting from exposure to the COPCs in surface soil were evaluated using the methodologies described above (Section 8.4). Table 8-9 presents a summary of some of the common alternate benchmarks available for surface soil COPCs, along with a summary of the Step 3a evaluation. The toxicological basis of the alternate benchmarks is presented below.

Cadmium

Cadmium was initially selected as a COPC because the maximum soil concentration of 0.55 mg/kg at location 08SB003 exceeded the U.S. EPA Eco-SSL of 0.36 mg/kg. Because the Eco-SSL used in the conservative COPC screening is based on risks to wildlife and not risks to plants and invertebrates, cadmium concentrations were compared to the following U.S. EPA Eco-SSLs for plants and soil invertebrates to evaluate risks to these receptors:

- Eco-SSL for plants – 32 mg/kg (U.S. EPA, 2005a)
- Eco-SSL for soil invertebrates – 140 mg/kg (U.S. EPA, 2005a)

The U.S. EPA Eco-SSL for plants (32 mg/kg) is the geometric mean of the maximum acceptable toxicant concentration (MATC) (based on growth) reported for 14 test species under six different test conditions of pH and percent organic matter (U.S. EPA, 2005a). The maximum cadmium detection is less than the Eco-SSL for plants; therefore, risks to plants are acceptable, and cadmium was not retained as a COPC for plants.

The U.S. EPA Eco-SSL for soil invertebrates (140 mg/kg) is the geometric mean of the MATC or Effects Concentration for 10 percent of the test population (EC_{10}) values (based on growth, population, or reproduction) reported for each of three test species evaluated under six separate test conditions of pH (U.S. EPA, 2005a). The maximum cadmium detection is less than the Eco-SSL for soil invertebrates;

therefore, risks to soil invertebrates are acceptable, and cadmium was not retained as a COPC for invertebrates.

Because cadmium is a bioaccumulative chemical, risks to wildlife from cadmium are evaluated in Section 8.4.2.

Copper

Copper was initially selected as a COPC because the maximum detected soil concentration of 13.2 mg/kg at location 08SB013 exceeded the Region 5 ESL of 5.4 mg/kg. However, the ESL is based on risks to wildlife (i.e., the masked shrew) and not risks to plants and invertebrates. Therefore, the following alternate benchmark was used to further evaluate risks to plants and soil invertebrates:

- Canadian SQG – 63 mg/kg (CCME, 1997)

The copper Canadian SQG of 63 mg/kg is the 25th percentile of effects and no-effects data distribution for plants and invertebrates, which is the 17th of 69 data points and corresponds to an effect on radish seedling emergence. Therefore, some studies showed effects less than 63 mg/kg, but many more studies did not show effects at this concentration. Copper concentrations less than the Canadian SQG of 63 mg/kg are expected to be protective of plants and invertebrates.

The maximum detected copper concentration is less than the SQG. Therefore, risks to plants and invertebrates from copper are acceptable, and copper is not retained as a COPC for further evaluation in this area.

Because copper is a bioaccumulative chemical, risks to wildlife from copper are evaluated in Section 8.4.2 of this SERA.

Lead

Lead was initially selected as a COPC because the maximum soil concentration of 31.1 mg/kg at location 08SB001 exceeded the lowest Eco-SSL of 11 mg/kg. Because the Eco-SSL used in the conservative COPC screening is based on risks to birds and not risks to plants and invertebrates, lead concentrations were compared to the following U.S. EPA Eco-SSLs for plants and soil invertebrates to evaluate risks to these receptors:

- Eco-SSL for plants – 120 mg/kg (U.S. EPA, 2005b)
- Eco-SSL for soil invertebrates – 1,700 mg/kg (U.S. EPA, 2005b)

The Eco-SSL for plants is the geometric mean of the MATC values for four test species under three different test conditions (pH of 4.0 to 6.3). The ecological endpoint for the derivation of the Eco-SSL for plants was growth. The maximum lead concentration is less than the Eco-SSL for plants; therefore, risks to plants are acceptable, and lead was not retained as a COPC for plants.

The Eco-SSL for soil invertebrates is the geometric mean of the MATC values for one test species *(Folsomia candida)* under three different test conditions (pH of 4.5 to 6.0) and is based on a reproductive endpoint. The maximum concentration of lead at SWMU 8 is less than this benchmark; therefore, risks to soil invertebrates are acceptable, and lead was not retained as a COPC for invertebrates.

Because lead is a bioaccumulative chemical, risks to wildlife from lead are evaluated in Section 8.4.2 of this SERA.

Manganese

The maximum manganese concentration of 522 mg/kg was detected at 08SB002. Manganese was initially selected as a COPC because no Region 5 ESL is available. The maximum background concentration for manganese at SWMU 8 is 3,040 mg/kg (Table 3-2). The maximum manganese concentration is less than this background level, so contamination is not site related. Therefore, potential risks to plants and soil invertebrates from manganese are not site related, and manganese was not retained as a COPC.

Vanadium

Vanadium was initially selected as a COPC because the maximum concentration of 40.5 mg/kg at location 08SB013 exceeded the lowest Eco-SSL of 7.8 mg/kg. Because the Eco-SSL is based on risks to birds and not risks to plants and invertebrates, the following alternate benchmark was used to evaluate risks to these receptors:

- Canadian SQG – 130 mg/kg (EC, 1999a)

The Canadian SQG corresponds to the 3rd of 10 data points, which is the 25th percentile based on seedling emergence by lettuce. The maximum vanadium concentration at SWMU 8 is less than the SQG, so risks to plants and invertebrates are acceptable and vanadium was not retained as a COPC.

Zinc

Zinc was initially selected as a COPC because the maximum soil concentration of 128 mg/kg at location 08SB001 exceeded the Region 5 ESL of 6.62 mg/kg. However, although the ESL is based on risks to invertebrates, the following alternate benchmark was used to further evaluate risks to plants and soil invertebrates:

- Canadian SQG – 200 mg/kg (EC, 1999b)

The Canadian SQG of 200 mg/kg is the lowest LOEC of the plants and invertebrates data set and is based on an effect on seedling emergence for radish (EC, 1999b). The weight-of-evidence method was not used to develop the SQG because greater than 50 percent of the "effects" data were dominated by median effective or median lethal concentrations (EC, 1999b). As presented in Appendix VI of the Canadian SQG document (EC, 1999b), all of the earthworm effects and no-effects data (with the exception of one test in one study) were equal to or greater than 200 mg/kg, indicating that earthworms appear to be less sensitive than plants.

The maximum zinc concentration at SWMU 8 is less than the SQG and so risks to plants and invertebrates are acceptable, and zinc was not retained as a COPC.

Because zinc is a bioaccumulative chemical, risks to wildlife from zinc are evaluated in Section 8.4.2.

Summary of Surface Soil Risk

During the Step 3a evaluation at SWMU 8, the following comparisons were conducted:

- Comparison of chemical concentrations in site samples to alternate toxicity information (for soil invertebrates and plants) and a discussion of the toxicity data.
- Comparison of chemical concentrations in site samples to background concentrations.

Based on these evaluations, it was determined that potential risks to plants and invertebrates from chemicals in the soil at SWMU 8 were acceptable, so no chemicals were retained as COPCs in the

surface soil for plants or invertebrates. Risks to wildlife from the bioaccumulative chemicals in the soil are evaluated in Section 8.4.2 of this SERA.

8.4.1.2 Benthic Invertebrates – Sediment Risk

Risks to benthic invertebrates resulting from exposure to the COPCs in sediment are evaluated using the methodologies described above (Section 8.4). Tables 8-10 and 8-11 present a summary of some of the common alternate benchmarks available for sediment COPCs in the Tributary and Main Stream, respectively, along with a summary of the Step 3a evaluation.

8.4.1.2.1 Tributary Sediment

Acenaphthylene

Acenaphthylene was initially selected as a COPC because the maximum detected concentration of 11 µg/kg at location 08SW/SD001 exceeded the Region 5 ESL of 5.87 µg/kg. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 44 µg/kg – ER-L (Long et al., 1995)

The ER-L is the lower 10th percentile of effects data for this chemical. Concentrations less than the ER-L represent a minimal-effects range that was intended to estimate conditions in which effects would be rarely observed. Although the ER-L is considered a marine benchmark, the values generally agreed within factors of two to three with freshwater effects-based criteria issued by Ontario (Persaud et al., 1993). The maximum detected concentration is less than this alternate benchmark. Also, according to Figure A-2 in Appendix A, this sample was collected in a drainage ditch that is most likely only wet during rain events, which is poor habitat for benthic invertebrates. Therefore, risks to benthic invertebrates are acceptable, and acenaphthylene was not retained as a COPC.

Because acenaphthylene is a bioaccumulative chemical, risks to wildlife from acenaphthylene are evaluated in Section 8.4.2.

bis(2-Ethylhexyl)phthalate

bis(2-Ethylhexyl)phthalate was initially selected as a COPC because the maximum detected concentration of 680 µg/kg at location 08SW/SD001 exceeded the Region 5 ESL of 182 µg/kg. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 750 µg/kg – Freshwater upper effects threshold (UET) (Buchman, 1999)

The maximum concentration is less than this benchmark. However, based on the Navy's agreement with U.S. EPA, a chemical will not be eliminated as a COPC based solely on its maximum concentration being less than a higher-effects level such as the UET.

Because bis(2-ethylhexyl)phthalate is considered a common laboratory contaminant and contamination is not likely site related, bis(2-ethylhexyl)phthalate is not retained as a COPC.

Pyrene

Pyrene was initially selected as a COPC because the maximum detected concentration of 210 µg/kg at location 08SW/SD001 exceeded the Region 5 ESL of 195 µg/kg. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 1,520 µg/kg – Consensus-based PEC (MacDonald et al., 2000)

Five sets of sediment quality guidelines were determined to be appropriate for calculating the consensus-based PECs for COCs in freshwater sediments. The consensus-based PECs are intended to show the concentrations of contaminants in freshwater sediment above which adverse effects are likely to occur. The maximum concentration of pyrene is less than the PEC value. Therefore, risks to benthic invertebrates are acceptable, and pyrene was not retained as a COPC.

Because pyrene is a bioaccumulative chemical, risks to wildlife from pyrene are evaluated in Section 8.4.2.

Aluminum

Aluminum was initially selected as a COPC because a Region 5 ESL was not available. The maximum concentration of 17,800 mg/kg was located at 08SW/SD011. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 25,500 mg/kg - Threshold Effects Level (TEL) (Buchman, 1999)

The TEL represents the concentration below which adverse effects on survival or growth of the amphipod *Hyalella azteca* are expected to occur only rarely in 28-day tests (MacDonald et al., 2000). The maximum concentration of 17,800 mg/kg is less than the TEL; therefore, risks to benthic invertebrates are acceptable, and aluminum was not retained as a COPC.

Antimony

Antimony was initially selected as a COPC because a Region 5 ESL was not available. The detected concentration of 0.92 mg/kg was located at 08SW/SD015. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 2 mg/kg – ER-L (Long and Morgan, 1991)

The ER-L is the lower 10th percentile of effects data and is based on biological effects to amphipod and bivalve larvae from San Francisco Bay and Commencement Bay sediments. The detected antimony concentration is less than this benchmark; therefore, risks to benthic invertebrates are acceptable, and antimony was not retained as a COPC.

Arsenic

Arsenic was initially selected as a COPC because the maximum concentration of 18.7 at location 08SW/SD015 exceeded the Region 5 ESL of 9.79 mg/kg. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 33 mg/kg – Consensus-based PEC (MacDonald et al., 2000)

Five sets of sediment quality guidelines were determined to be appropriate for calculating the consensus-based PECs for COCs in freshwater sediments. The consensus-based PECs are intended to show the concentrations of contaminants in freshwater sediment above which adverse effects are likely to occur. The maximum arsenic concentration is less than the PEC; therefore, risks to benthic invertebrates are acceptable, and arsenic was not retained as a COPC.

Because arsenic is a bioaccumulative chemical, risks to wildlife from arsenic are evaluated in Section 8.4.2.

Barium

Barium was initially selected as a COPC because a Region 5 ESL was not available. The maximum concentration of 133 mg/kg was located at 08SW/SD015. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 48 mg/kg - Apparent Effects Threshold (AET) (Buchman, 1999)

The maximum detected SWMU 8 concentration is greater than this benchmark. The concentration of barium in upgradient sediment sample 08SD013010006 is 64.8 mg/kg (Table 3-31). The maximum concentration is only two times the upgradient concentration. The concentration of barium in Tributary sample 08SD011010006 (58.9 mg/kg) is less than the upgradient concentration. Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates.

The maximum barium concentration detected in the surface soil (123 mg/kg) was less than the maximum background soil concentration for Soil Group 3 (153 mg/kg) (Table 3-2), so soil contamination is not site related. Because surface runoff from soil is the major pathway for contaminants to enter sediment, the sediment contamination is probably not site related. Therefore, risks to benthic invertebrates are acceptable, and barium was not retained as a COPC.

Beryllium

Beryllium was initially selected as a COPC because a Region 5 ESL was not available. The maximum concentration of 2.2 mg/kg was located at 08SW/SD015. Alternate screening levels were not available for beryllium. The concentration of beryllium in upgradient sediment sample 08SD013010006 is 0.27 mg/kg (Table 3-31). The maximum detected SWMU 8 concentration is an order of magnitude greater than this concentration. The concentration of beryllium in Tributary sample 08SD011010006 (0.5 mg/kg) is approximately two times greater than the concentration in the upgradient sample. Because of the variability of beryllium concentrations in Tributary sediment, alternate lines of evidence were used to evaluate risks to benthic invertebrates.

The maximum beryllium concentration detected in the surface soil (0.78 mg/kg) was greater than the maximum background soil concentration for Soil Group 3 (0.49 mg/kg) (Table 3-2), so soil contamination might be site related. Because surface runoff from soil is the major pathway for contaminants to enter sediment, the sediment contamination also might be site related. For the reasons discussed above, risks

to benthic invertebrates cannot be ruled out. Therefore, beryllium was retained as a COPC for further evaluation.

Chromium

Chromium was initially selected as a COPC because the maximum concentration of 60.4 mg/kg at location 08SW/SD015 was greater than the Region 5 ESL of 43.4 mg/kg. The following alternate screening level was used to further evaluate risks to benthic invertebrates:

- 111 mg/kg – Consensus-based PEC (MacDonald et al., 2000)

Five sets of sediment quality guidelines were determined to be appropriate for calculating the consensus-based PECs for COCs in freshwater sediments. The consensus-based PECs are intended to show the concentrations of contaminants in freshwater sediment above which adverse effects are likely to occur. The maximum detected SWMU 8 concentration is less than the PEC and only slightly greater than the Region 5 ESL; therefore, risks to benthic invertebrates are acceptable, and chromium was not retained as a COPC.

Because chromium is a bioaccumulative chemical, risks to wildlife from chromium are evaluated in Section 8.4.2.

Iron

Iron was initially selected as a COPC because a Region 5 ESL is not available. The maximum concentration of 71,900 mg/kg was located at 08SW/SD015. Alternate screening levels are not available for iron. The concentration of iron in upgradient sediment sample 08SD13010006 is 11,800 mg/kg (Table 3-31). The maximum detected SWMU 8 concentration is greater than this concentration. The concentration of iron in Tributary sample 08SD011010006 (18,200 mg/kg) is slightly greater than the upgradient concentration. Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates.

The maximum iron concentration detected in the surface soil (32,400 mg/kg) was less than the maximum background soil concentration for Soil Group 3 (36,200 mg/kg) (Table 3-2), so soil contamination is not site-related. Because surface runoff from soil is the major pathway for contaminants to enter sediment, the sediment contamination is probably not site related. In addition, iron is generally not considered to be

toxic to ecological receptors. Therefore, risks to benthic invertebrates are acceptable, and iron was not retained as a COPC.

Manganese

Manganese was initially selected as a COPC because a Region 5 ESL is not available. The maximum concentration of 3,130 mg/kg was located at 08SW/SD015. The following alternate screening level was available to help evaluate risks to benthic invertebrates:

- 460 mg/kg – Canadian Lowest Effects Level (LEL) (OMOE, 1993)

The maximum detected SWMU 8 concentration is greater than this benchmark. Also, the concentration of manganese in upgradient sediment sample 08SD013010006 is 290 mg/kg (Table 3-31). The maximum concentration is an order of magnitude greater than this concentration. The concentration of manganese in Tributary sample 08SD011010006 (336 mg/kg) is only slightly greater than the upgradient concentration. Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates.

The concentration of manganese in surface soil at the site (522 mg/kg) is less than the maximum background soil concentration for Soil Group 3 (3,040 mg/kg), so soil contamination is not site related. Because surface runoff from soil is the major pathway for contaminants to enter sediment, the sediment contamination is probably not site related. In addition, manganese is generally not considered to be toxic to ecological receptors. Therefore, risks to benthic invertebrates are acceptable, and manganese was not retained as a COPC.

Selenium

Selenium was initially selected as a COPC because a Region 5 ESL is not available. The maximum concentration of 0.75 mg/kg was located at 08SW/SD015. The following alternate benchmark was used to further evaluate risks to benthic invertebrates.

- 1.0 mg/kg - AET (Buchman, 1999)

The maximum detected SWMU 8 concentration is less than this benchmark. However, a chemical will not be eliminated as a COPC based solely on its maximum concentration being less than a higher-effects level such as the AET. The concentration of selenium in upgradient sample 08SD013010006 is

0.21 mg/kg (Table 3-31). The maximum concentration is greater than this concentration. The concentration of selenium in Tributary sample 08SD011010006 (0.22 mg/kg) is only slightly greater than the upgradient concentration. Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates.

Selenium was not detected in surface soil at the site. Because surface runoff from soil is the major pathway for contaminants to enter sediment, the sediment contamination is probably not site related. Therefore, risks to benthic invertebrates are acceptable, and selenium was not retained as a COPC.

Vanadium

Vanadium was initially selected as a COPC because a Region 5 ESL is not available. The maximum concentration of 53.1 mg/kg was located at 08SW/SD015. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 57 mg/kg — AET (Buchman, 1999)

The maximum detected SWMU 8 concentration is less than this benchmark. However, based on the Navy's agreement with U.S. EPA, a chemical will not be eliminated as a COPC based solely on its maximum concentration being less than a higher-effects level such as the AET. The maximum vanadium concentration in sediment is slightly less than the concentration in upgradient sediment sample 08SD01301006 (56.4 mg/kg) (Table 3-31), so contamination is probably not site related. Therefore, risks to benthic invertebrates are acceptable, and vanadium was not retained as a COPC.

Perchlorate

Perchlorate was initially selected as a COPC because a Region 5 ESL is not available. The maximum concentration of 0.24 mg/kg was located at 08SW/SD003. Alternate screening levels are also not available for perchlorate. The chronic benchmark for perchlorate effects to *Chironomus tentans* in freshwater is 83.1 mg/L (Parsons, 2002). Although this is a surface water value, the maximum concentration detected in sediment is much lower (0.24 mg/kg). Therefore, although risks to benthic invertebrates cannot be ruled out because of a lack of sediment toxicity data, potential site-related risks from perchlorate are not great enough to warrant carrying perchlorate further through the BERA process. Risks to benthic invertebrates are acceptable, and perchlorate was not retained as a COPC.

8.4.1.2.2 Main Stream Sediment

bis(2-Ethylhexyl)phthalate

bis(2-Ethylhexyl) phthalate was retained as a COPC because the detected concentration of 210 mg/kg at location 08SW/SD009 was greater than the Region 5 ESL of 182 mg/kg. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 750 mg/kg — UET (Buchman, 1999)

The maximum detected SWMU 8 concentration is less than this benchmark. However, based on the Navy's agreement with U.S. EPA, a chemical will not be eliminated as a COPC based solely on its maximum concentration being less than a higher effects level such as the UET. bis(2-Ethylhexyl) phthalate was detected in one of five samples, and the detected concentration is only slightly greater than the Region 5 ESL. Also, bis(2-Ethylhexyl)phthalate is often a common laboratory contaminant, so contamination might not be site related. Therefore, risks to benthic invertebrates are acceptable, and bis(2-Ethylhexyl)phthalate was not retained as a COPC.

Aluminum

Aluminum was initially selected as a COPC because a Region 5 ESL was not available. The detected concentration of 11,800 mg/kg was located at 08SW/SD014. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 25,500 mg/kg — TEL (Buchman, 1999)

The TEL represents the concentration below which adverse effects on survival or growth of the amphipod *Hyalella azteca* are expected to occur only rarely in 28-day tests (MacDonald et al., 2000). The maximum concentration is less than the TEL and the concentration in upgradient sample 08SD010010006 (19,600 mg/kg) (Table 3-32). Therefore, risks to benthic invertebrates are acceptable, and aluminum is not retained as a COPC.

Antimony

Antimony was initially selected as a COPC because a Region 5 ESL was not available. The detected concentration of 1.4 mg/kg was located at 08SW/SD014. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 2 mg/kg — ER-L (Long and Morgan, 1991)

The ER-L is the lower 10th percentile of effects data and is based on biological effects to amphipod and bivalve larvae from San Francisco Bay and Commencement Bay sediments. The detected antimony concentration is less than this benchmark and is slightly less than the concentration in upgradient sample 08SD010010006 (2.2 mg/kg) (Table 3-32). Therefore, risks to benthic invertebrates are acceptable, and antimony was not retained as a COPC.

Arsenic

Arsenic was initially selected as a COPC because the maximum concentration of 19.7 at location 08SW/SD014 exceeded the Region 5 ESL of 9.79 mg/kg. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 33 mg/kg – Consensus-based PEC (MacDonald et al., 2000)

Five sets of sediment quality guidelines were determined to be appropriate for calculating the consensus-based PECs for COCs in freshwater sediments. The consensus-based PECs are intended to show the concentrations of contaminants in freshwater sediment above which adverse effects are likely to occur. The maximum SWMU 8 arsenic concentration is less than the PEC and the concentration in upgradient sample 08SD010010006 (27.6 mg/kg) (Table 3-32). Therefore, risks to benthic invertebrates are acceptable, and arsenic was not retained as a COPC.

Because arsenic is a bioaccumulative chemical, risks to wildlife from arsenic are evaluated in Section 8.4.2.

Barium

Barium was initially selected as a COPC because a Region 5 ESL was not available. The detected concentration of 83.3 mg/kg was located at 08SW/SD014. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 48 mg/kg — AET (Buchman, 1999)

The maximum detected SWMU 8 concentration is greater than this benchmark. However, the maximum barium concentration in sediment is less than the concentration detected in upgradient sample 08SD010010006 (247 mg/kg) (Table 3-32), so contamination is not likely site related. Therefore, risks to benthic invertebrates are acceptable, and barium was not retained as a COPC.

Beryllium

Beryllium was initially selected as a COPC because a Region 5 ESL was not available. The maximum concentration of 1.6 mg/kg was located at 08SW/SD014. Alternate screening levels were not available for beryllium. The maximum concentration is less than the concentration of beryllium in upgradient sediment sample 08SD010010006 (3.1 mg/kg) (Table 3-32), so contamination is probably not site related. Therefore, risks to benthic invertebrates are acceptable, and beryllium was not retained as a COPC.

Chromium

Chromium was initially selected as a COPC because the detected concentration of 61.2 mg/kg at location 08SW/SD014 was greater than the Region 5 ESL of 43.4 mg/kg. The following alternate screening level was used to further evaluate risks to benthic invertebrates:

- 111 mg/kg – Consensus-based PEC (MacDonald et al., 2000)

Five sets of sediment quality guidelines were determined to be appropriate for calculating the consensus-based PECs for COCs in freshwater sediments. The consensus-based PECs are intended to show the concentrations of contaminants in freshwater sediment above which adverse effects are likely to occur. The maximum concentration is less than the PEC and the concentration detected in upgradient sample 08SD010010006 (132 mg/kg) (Table 3-32). Therefore, risks to benthic invertebrates are acceptable, and chromium was not retained as a COPC.

Because chromium is a bioaccumulative chemical, risks to wildlife from chromium are evaluated in Section 8.4.2.

Iron

Iron was initially selected as a COPC because a Region 5 ESL is not available. The detected concentration of 71,400 mg/kg was at location 08SW/SD014. Alternate screening levels are also not available for iron. The maximum iron concentration in SWMU 8 sediment is less than the concentration in upgradient sample 08SD010010006 (120,000 mg/kg) (Table 3-32), so contamination is probably not site

related. In addition, iron is generally not considered to be toxic to ecological receptors. Therefore, risks to benthic invertebrates are acceptable, and iron was not retained as a COPC.

Manganese

Manganese was initially selected as a COPC because a Region 5 ESL is not available. The detected concentration of 1,790 mg/kg was at location 08SW/SD014. The following alternate screening level was used to further evaluate risks to benthic invertebrates:

- 460 mg/kg – Canadian LEL (OMOE, 1993)

Although the maximum detected SWMU 8 manganese concentration in sediment is greater than this benchmark, it is less than the concentration in upgradient sample 08SD010010006 (7,160 mg/kg) (Table 3-32), so manganese contamination is probably not site related. In addition, manganese is generally not considered to be toxic to ecological receptors. Therefore, risks to benthic invertebrates are acceptable, and manganese was not retained as a COPC.

Selenium

Selenium was initially selected as a COPC because a Region 5 ESL is not available. The detected concentration of 0.59 mg/kg was located at 08SW/SD014. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 1.0 mg/kg — AET (Buchman, 1999)

The maximum detected SWMU 8 concentration is less than this benchmark. However, based on the Navy's agreement with U.S. EPA, a chemical will not be eliminated as a COPC based solely on its maximum concentration being less than a higher-effects level such as the AET. The maximum selenium concentration in sediment is less than the concentration in upgradient sample 08SD010010006 (1.3 mg/kg) (Table 3-32), so contamination is probably not site related. Therefore, risks to benthic invertebrates are acceptable, and selenium was not retained as a COPC.

Vanadium

Vanadium was initially selected as a COPC because a Region 5 ESL is not available. The detected concentration of 54.3 mg/kg was at location 08SW/SD014. The following alternate benchmark was used to further evaluate risks to benthic invertebrates:

- 57 mg/kg — AET (Buchman, 1999)

The maximum detected SWMU 8 concentration is slightly less than this benchmark. However, based on the Navy's agreement with U.S. EPA, a chemical will not be eliminated as a COPC based solely on its maximum concentration being less than a higher-effects level such as the AET. The detected vanadium concentration in sediment is less than the concentration in upgradient sediment sample 08SD010010006 (99.3 mg/kg) (Table 3-32), so contamination is probably not site related. Therefore, risks to benthic invertebrates are acceptable, and vanadium was not retained as a COPC.

8.4.1.2.3 Summary of Sediment Risk

In summary, chemicals initially selected as COPCs were further evaluated in Step 3a, the first step of the BERA. Concentrations of COPCs were then compared to alternate sediment toxicity data. Other Step 3a factors as discussed in Section 8.4 were also considered for the initial COPCs. Because risks to benthic invertebrates in Tributary sediment could not be ruled out, beryllium was retained as a COPC for further evaluation in a BERA.

8.4.1.3 Aquatic Organisms – Surface Water Risk

Tables 8-12 and 8-13 present summaries of some of the common alternate benchmarks used to refine the list of COPCs in Tributary and Main Stream surface water samples as part of the evaluation. Although results are given for both total and dissolved metals, an emphasis is placed on filtered samples because they represent the bioavailable portion of the inorganics (U.S. EPA, 1992) and are most indicative of the level of direct risk to aquatic receptors. The summary of upgradient surface water comparisons is presented in Appendix G.

Water quality standards (WQSs) for surface water have been developed for Indiana (IDEM, 1998). In addition, U.S. EPA has established ambient water quality criteria (AWQCs) for several contaminants (U.S. EPA, 2002f). IDEM WQSs and AWQCs were reviewed. The AWQCs were used first for further evaluating chemicals initially selected as COPCs, where appropriate, because the AWQC have been updated more recently than the WQSs. However, in the absence of AWQCs, the IDEM WQSs were also used. Other, non-regulatory surface water screening values were also used to evaluate the data, where necessary. The following sections discuss these values, as appropriate.

8.4.1.3.1 Tributary Surface Water

bis(2-Ethylhexyl)phthalate

bis(2-Ethylhexyl)phthalate was initially selected as a COPC in surface water because the detected concentration of 1.0 µg/L at 15SW/SD015 exceeded the Region 5 ESL of 0.3 µg/L. The following alternate screening level was used to further evaluate risks to aquatic organisms:

- 3.0 µg/L – Tier II Secondary Chronic Value (Suter & Tsao, 1996)

This alternate benchmark was developed so that aquatic benchmarks could be established with fewer data than are required for the AWQC. It is based on several studies of aquatic invertebrates (Suter & Tsao, 1996). The maximum detected SWMU 8 concentration is less than this benchmark; therefore, risks are acceptable, and bis(2-Ethylhexyl)phthalate was not retained as a COPC.

Aluminum

Aluminum was initially selected as a COPC in unfiltered and filtered metals samples because the maximum concentrations (25,800 µg/L and 213 µg/L, respectively) exceeded the screening level of 87 µg/L, which is the chronic AWQC (U.S. EPA, 2002f).

Aluminum concentrations were greater than the screening level in two of the eight filtered metals samples. The maximum dissolved aluminum concentration was at 08SP002, which is a seep location. According to Figure A-2 in Appendix A and the field sample log sheets in Appendix C, suspended solids were very high at this location (greater than 1,000 NTU). There are also large differences in the aluminum concentrations between the unfiltered samples and the filtered samples at all surface water sample locations (see Table 3-25) that are likely due to high suspended solids in the samples. Although the samples were filtered, the solids in the sample may still be contributing to the high metals concentrations. Also, because aquatic organisms are exposed to water across the site, the average concentration is a better representation of site contamination. The average filtered aluminum concentration (57.3 µg/L) is less than the AWQC. For these reasons, risks to aquatic organisms are acceptable, and aluminum was not retained as a COPC.

Cadmium

Cadmium was initially selected as a COPC in unfiltered and filtered metals samples because the maximum concentrations (1.1 µg/L and 0.28 µg/L, respectively) at locations 08SP002 and 08SW/SD003,

respectively, exceeded the Region 5 ESLs of 0.23 µg/L and 0.21 µg/L (based on water hardness), respectively.

Cadmium concentrations were greater than the screening level in two of the eight filtered samples. The cadmium detections only slightly exceed the screening level. Also, because aquatic organisms are exposed to water across the site, the average concentration is a better representation of site contamination. The average dissolved cadmium concentration (0.119 µg/L) is less than the screening level. For these reasons, risks to aquatic organisms are acceptable, and cadmium was not retained as a COPC.

Cobalt

Cobalt was initially selected as a COPC in unfiltered metals samples because the maximum concentration (52.4 µg/L) at location 08SP002 exceeded the Region 5 ESL of 24 µg/L.

All of the dissolved cobalt detections were less than the screening level. The maximum total cobalt concentration is the only detection that exceeds the screening level. This is a seep sample, and according to Figure A-2 in Appendix A and the field sample log sheets in Appendix C, there were very high suspended solids (greater than 1,000 NTU) that could have caused high metals detections. For these reasons, risks to aquatic organisms are acceptable, and cobalt was not retained as a COPC.

Copper

Copper was initially selected as a COPC in unfiltered metals samples because the maximum concentration (28.4 µg/L) at location 08SP002 exceeded the Region 5 ESL of 7.84 µg/L.

All of the dissolved copper detections were less than the screening level. The maximum total copper concentration is the only detection that is greater than the screening level. This is a seep sample, and according to Figure A-2 in Appendix A and the field sample log sheets in Appendix C, there were very high suspended solids (greater than 1,000 NTU) that could have caused high metals detections. For these reasons, risks to aquatic organisms are acceptable, and copper was not retained as a COPC.

Iron

Iron was initially selected as a COPC in unfiltered metals samples because the maximum concentration (29,000 µg/L) at location 08SP002 exceeded the chronic WQC of 1,000 µg/L (U.S. EPA, 2002f).

All of the dissolved iron detections were less than the screening level. Three of the eight total iron detections were greater than the WQC. The maximum total iron concentration was detected in a seep sample with very high suspended solids (greater than 1,000 NTU) (see Figure A-2 in Appendix A and field sample log sheets in Appendix C). The high solids most likely account for the high iron concentration in this sample, because the filtered sample had a much lower iron concentration. For these reasons, risks to aquatic organisms are acceptable, and iron was not retained as a COPC.

Lead

Lead was initially selected as a COPC in unfiltered metals samples because the maximum concentration (29.8 µg/L) at location 08SP002 exceeded the Region 5 ESL of 2.46 µg/L (U.S. EPA, 2003c).

All of the dissolved lead detections were less than the screening level. Three of the eight total lead detections were greater than the screening level. The maximum total lead concentration was detected in a seep sample with very high suspended solids (greater than 1,000 NTU) (see Figure A-2 in Appendix A and field sample log sheets in Appendix C). The high solids most likely account for the high lead concentration in this sample because the filtered sample had a much lower lead concentration. For these reasons, risks to aquatic organisms were acceptable, and lead was not retained as a COPC.

Manganese

Manganese was initially selected as a COPC in unfiltered and filtered surface water samples because the maximum concentrations (6,200 µg/L and 3,190 µg/L) at location 08SP002 exceeded the screening level of 443 µg/L, which is based on the water hardness (IDEM, 2001).

Two of the sample locations had dissolved manganese concentrations that exceeded the screening level. The U.S. EPA 1986 Quality Criteria for Water (the Gold Book) indicates that because tolerance values range from 1.5 mg/L to over 1,000 mg/L, manganese is not considered to be a problem in fresh waters (U.S. EPA, 1986). The maximum detected manganese concentration is less than this range. Therefore, risks to aquatic organisms are acceptable, and manganese is not retained as a COPC.

Mercury

Mercury was initially selected as a COPC in unfiltered metals samples because the detected concentration (0.068 µg/L) at location 08SP002 exceeded the Region 5 ESL of 0.0013 µg/L (U.S. EPA, 2003c).

Mercury was not detected in the filtered samples. The only total mercury concentration that exceeded the screening level was in a seep sample that had high suspended solids (greater than 1,000 NTU) (see Figure A-2 in Appendix A and field sample log sheets in Appendix C). The high solids likely account for the high level of mercury in the sample because mercury was not detected when the sample was filtered. Therefore, risks to aquatic organisms are acceptable, and mercury was not retained as a COPC.

Nickel

Nickel was initially selected as a COPC in unfiltered metals samples because the maximum concentration (47.3 µg/L) at location 08SP002 exceeded the Region 5 ESL of 43.9 µg/L (U.S. EPA, 2003c).

Nickel concentrations in filtered samples were less than the screening level. The maximum total nickel concentration is the only sample that detection exceeded the screening level, and it was only a slight exceedance. The location of the maximum detection is a seep sample with high suspended solids (greater than 1,000 NTU) (see Figure A-2 in Appendix A and field sample log sheets in Appendix C). Because nickel was not detected in filtered samples, risks to aquatic organisms are acceptable, and nickel was not retained as a COPC.

Vanadium

Vanadium was initially selected as a COPC in unfiltered metals samples because the maximum concentration (39.8 µg/L) at location 08SP002 exceeded the Region 5 ESL of 12 µg/L (U.S. EPA, 2003c).

Vanadium was not detected in filtered samples. The maximum total vanadium concentration is the only detection that exceeded the screening level. The location of the maximum detection is a seep sample with high suspended solids (greater than 1,000 NTU) (see Figure A-2 in Appendix A and field sample log sheets in Appendix C). The high solids likely caused the vanadium concentration to exceed the screening level because vanadium was not detected in the filtered sample. Therefore, risks to aquatic organisms are acceptable, and vanadium was not retained as a COPC.

8.4.1.3.2 Main Stream Surface Water

Aluminum

Aluminum was initially selected as a COPC because the maximum concentration in unfiltered metals samples (710 µg/L) located at 08SW009 exceeded the AWQC of 87 µg/L (U.S. EPA, 2002).

Aluminum was not detected in filtered samples. Also, the upgradient total aluminum concentration at location 08SW/SD010 (517µg/L) (Table 3-26) is similar to the maximum total aluminum concentration, so contamination is not likely to be site related. For these reasons, risks to aquatic organisms are acceptable, and aluminum was not retained as a COPC.

8.4.1.3.3 Summary of Surface Water Risk

In summary, chemicals initially selected as COPCs were further evaluated in Step 3a, the first step of the BERA. Concentrations of COPCs were then compared to the alternate aquatic toxicity data. Other Step 3a factors as discussed in Section 8.4 were also considered for the initial COPCs. No chemicals were retained as surface water COPCs for further evaluation in a BERA.

8.4.2 Food-Chain Modeling

The above-mentioned alternate benchmark values are not designed to evaluate risks to terrestrial wildlife via the ingestion of the soil, sediment, surface water, plants, and invertebrates. Therefore, a terrestrial intake model was used to estimate exposure of terrestrial receptors to COPCs. As presented in Tables 8-2, 8-4, 8-5, 8-7, and 8-8, food-chain modeling was conducted on chemicals considered to be bioaccumulative [i.e., included in the list of important bioaccumulative chemicals in U. S. EPA (2000)] and that also exceeded Region 5 ESLs, which do take into account risks to wildlife. If the chemical concentration was less than the ESL or if the chemical is not bioaccumulative, it was not carried through the food-chain model. Tables 8-2 (surface soil), 8-4 and 8-5 (sediment), and 8-7 and 8-8 (surface water) list the chemicals retained for food-chain modeling. As noted previously, pond surface soil, sediment, and surface water samples were not evaluated for risks to terrestrial receptors because the Building 106 Pond will be excavated and contamination will be removed.

8.4.2.1 Food-Chain Modeling Methodology

Risk to terrestrial receptors as a result of exposure to COPCs in the soil, sediment, and surface water was determined by estimating the total chronic daily intake (CDI) (see below) and comparing the CDI to TRVs representing acceptable daily doses in mg/kg-day. The TRVs were developed from NOAELs and lowest observable adverse effect levels (LOAELs) obtained from wildlife studies, when available. The majority of the TRVs came from the ORNL Toxicological Benchmarks for Wildlife: 1996 Revision (Sample et al., 1996).

For avian species, the NOAEL (or LOAEL) for the test species was used as the NOAEL (or LOAEL) for the surrogate species in accordance with Sample et al. (1996) or other sources used. For mammalian

species, the NOAEL (or LOAEL) from one species was adjusted to a NOAEL (or LOAEL) for the surrogate species using the following modified body weight scaling equation (from Sample et al., 1996):

$$NOAEL_w = NOAEL_t*(bw_t/bw_w)$$

Where: $NOAEL_w$ = no-observed-adverse-effect level for the surrogate wildlife species
$NOAEL_t$ = no-observed-adverse-effect level for the test species
bw_t = body weight of the test species
bw_w = body weight of the surrogate test species

Based on more recent publications (Sample and Arenal 1999), U.S. EPA Region 5 has indicated that the use of the metabolic scaling factor may not be appropriate for toxicity/body weight extrapolation factors. Therefore, U.S. EPA recommended that the toxicity/body weight calculation be performed without the use of the scaling factor of 0.25. The body weight scaling is performed because studies have shown that for mammals, numerous physiological functions such as metabolic rate and responses to toxic chemicals are a function of body size (Sample et al., 1996).

Appendix J.4 presents the derivation of the TRVs. Table J.4-1 shows the test species body weights used for body weight scaling and exposure factors for surrogate wildlife. Tables J.4-2 (maximum mammal TRVs with body weight scaling), J.4-3 (average mammal TRVs with body weight scaling), and J.4-4 (bird TRVs) present the TRVs as they were used in the food-chain modeling. Table J.4-5 shows the sources of the TRVs. If a subchronic study was used to develop the TRV, the final value was multiplied by a factor of 0.1 to account for uncertainty between subchronic and chronic effects. If a LOAEL study was used to develop the NOAEL TRV, the LOAEL was multiplied by a factor of 0.1 to obtain the NOAEL.

COPC intake for wildlife exposed to the COPCs in surface soil, sediment, and surface water was estimated as daily dose (mg/kg-day) using exposure equations. The contaminant concentrations in surface soil, sediment, and surface water were used to calculate CDI doses. The following equations present the CDI equations that were used in calculating a total daily dose for the surrogate species selected for modeling:

$$\text{Dose, surface soil/sediment (mg/kg - day)} = \frac{(SC * SI)}{BW}$$

$$\text{Dose, surface water (mg/kg - day)} = \frac{(SW * WI)}{BW}$$

$$\text{Dose, food (mg/kg - day)} = \frac{(FC * FI)}{BW}$$

$$\text{Total CDI (mg/kg - day)} = [\text{Dose (surface soil/sediment)} + \text{Dose (surface water)} + \text{Dose (food)}] * H$$

Where:
- SC = Soil/sediment concentration (mg/kg)
- SI = Incidental soil/sediment ingestion rate (kg/day)
- BW = Body weight (kg)
- SW = Surface water concentration (mg/L)
- WI = Surface water ingestion rate (L/day)
- FC = Food concentration (mg/kg)
- FI = Food ingestion rate (kg/day)
- H = Home range/contaminated area (assume = 1 for maximum exposure)

For organic constituents in surface soil and inorganics in surface soil and sediment, the contaminant concentration of prey items for insectivorous, herbivorous, and piscivorous species (e.g., earthworms, vegetation, and fish) is calculated using the following equation:

$$FC = SC * BAF$$

Where:
- FC = Contaminant concentration in food (e.g., earthworms and vegetation) (kg/day)
- SC = Contaminant concentration in surface soil/sediment (mg/kg)
- BAF = Soil to plant or soil/sediment to invertebrate bioaccumulation factor (unitless)

For organic constituents in sediment, the contaminant concentration of fish for piscivorous species is calculated using the following equation:

$$FC = \frac{SC * BAF * \%Lipids}{\%TOC}$$

Where:
- FC = Contaminant concentration in food (e.g., fish) (kg/day)
- SC = Contaminant concentration in sediment (mg/kg)
- BAF = Sediment to fish bioaccumulation factor (unitless)
- %Lipids = Percent lipids in fish (see Appendix J.5)
- %TOC = Average percent total organic carbon in sediment (assumed 1 percent because TOC data were not available for sediment)

Contaminant concentrations in food items were calculated using BAFs from the following published sources:

- Plant BAFs (Organics): Toxicity and Chemical-Specific Factors Database (ORNL, 2002).
- Plant BAFs (Inorganics): Empirical Model for the Uptake of Inorganic Chemicals from Soil by Plants (ORNL, 1998a).
- Soil Invertebrate BAFs: Development and Validation of Bioaccumulation Models for Earthworms (Sample et al., 1998).
- Fish Biota Sediment Accumulation Factors (BSAFs) (organics): The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, Volume 1:National Sediment Quality Survey (U.S. EPA, 1997d).
- Sediment Invertebrate BSAFs (Inorganics): Biota Sediment Accumulation Factors for Invertebrates: Review and Recommendations for the Oak Ridge Reservation (ORNL, 1998b).

Table J.2-1 in Appendix J.2 presents chemical-specific BAFs, BSAFs, and other BAF data used in this SERA. A default value of 1.0 was used for the BAF if chemical-specific data were not available in the above sources. Because sediment-to-fish BSAFs were not available for inorganic chemicals, the sediment-to-invertebrate BSAFs from ORNL (1998b) were used to estimate tissue concentrations of inorganics in food items for the mink and belted kingfisher.

The lower bound of the threshold effects is based on consistently conservative assumptions and NOAEL toxicity values (U.S. EPA, 1997d). This bound presents the greatest potential risks. The upper bound is based on observed impacts or predictions that ecological effects could occur and is developed using assumptions consistent with those used in the lower bound and LOAEL toxicity values (U.S. EPA, 1997b). This bound presents the average potential risk. These conservative and less conservative exposure scenarios were calculated to provide the overall range of potential risks to ecological receptors.

The exposure assumptions (e.g., ingestion rates and body weight) were obtained from the Wildlife Exposure Factors Handbook (U.S. EPA, 1993c). Studies conducted in Indiana or surrounding states were used, when available, to estimate the exposure factors. If only one value was available for a given exposure parameter, the value was used regardless of where the study was conducted. The exposure

parameters from U.S. EPA (1993c) are wet weight values; however, the BAFs presented in the above sources estimate the tissue concentrations in dry weight. Therefore, the exposure parameters from U.S. EPA (1993) were converted to dry weight values for the food-chain model calculations. Table 8-14 presents the exposure parameters used in the SERA, and Appendix J.3 presents the values used to calculate the exposure parameters and how they were calculated. Table J.3-1 in Appendix J.3 shows the exposure parameters used for the food-chain modeling.

An EEQ approach was used to characterize risk to terrestrial receptors. This approach characterizes the potential effects by comparing exposure concentrations with effects data. An EEQ of greater than 1.0 is considered indicative of a potential risk. The EEQ is not an expression of probability, and the meaning of values greater than 1.0 must be interpreted in light of attendant uncertainties in risk management.

The EEQ for the terrestrial wildlife model was calculated as follows:

$$\text{EEQ} = \frac{\text{Total CDI}}{\text{TRV}}$$

Where:	EEQ	= Ecological effects quotient (unitless)
	Total CDI	= Total daily intake dose (mg/kg-day)
	TRV	= Toxicity reference value (NOAEL or LOAEL) (mg/kg-day)

8.4.2.2 Results and Discussion

Appendix J.6 presents the food-chain modeling calculations. Separate discussions are provided below for evaluations of potential risk to herbivorous and insectivorous receptors. Tables 8-15 and 8-16 present the EEQs under both the conservative and average exposure scenarios, respectively, for herbivorous and insectivorous receptors. Tables 8-17 and 8-18 present the EEQs under conservative and average scenarios, respectively, for piscivorous receptors for the Tributaries. Tables 8-19 and 8-20 present the EEQs under conservative and average exposure scenarios, respectively, for piscivorous receptors for the Main Stream. Table 8-21 presents a summary of the Step 3a evaluation for terrestrial wildlife.

<u>Herbivorous Receptors</u>

Under the conservative food-chain scenario, all NOAEL-based EEQs were less than 1.0 (Table 8-15); therefore, risks to herbivorous receptors at SWMU 8 (i.e., meadow vole and short-tailed shrew) are acceptable.

Insectivorous Receptors

Under the conservative food-chain scenario, COPCs with EEQs greater than 1.0 for representative insectivorous receptors included cadmium, lead, mercury, and zinc for the woodcock (Table 8-15). Under the average food-chain scenario, a NOAEL-based EEQ for zinc exceeded 1.0 for the woodcock (Table 8-16).

The bird NOAEL and LOAEL for zinc were developed from a study in which no adverse effects were observed among hens consuming 48 and 228 mg/kg zinc, but egg hatchability was less than 20 percent of controls among hens consuming 2,028 mg/kg zinc (Sample et al., 1996). Because the study was greater than 10 weeks in duration and considered exposure during reproduction, the 228 mg/kg dose was considered a chronic NOAEL (14.5 mg/kg-day) and the 2,028 mg/kg dose was considered a chronic LOAEL (131 mg/kg-day).

Using the maximum background concentration for zinc, the food-chain NOAEL EEQ is also greater than 1.0 and is similar to the EEQ using the site data. Therefore, site-related risks to insectivorous birds from zinc are only slightly greater than background risks. Furthermore, the greatest zinc concentration (128 mg/kg) was found in the sample from location 15SS001. This sample location is near Building 107 and a gravel lot (see Figure A-2 in Appendix A), so insectivorous birds are unlikely to obtain a significant amount of food from this area. All other detections of zinc in surface soil are less than the maximum zinc concentration in the background samples (60.2 mg/kg). Because only one zinc detection in a small area is elevated compared to background concentrations, risks to insectivorous birds are acceptable, and zinc is not retained as a COPC for further evaluation.

Piscivorous Receptors (Tributary)

Because there are only intermittent pools of surface water in the drainage ditches and Tributaries at SWMU 8, fish are often absent. Therefore, piscivorous wildlife will not obtain a significant portion of their food from these water bodies, and a site use factor (SUF) of 10 percent was used to evaluate the risks to piscivorous wildlife. The SUF of 10 percent is considered conservative because it is not likely that piscivorous wildlife will obtain even 10 percent of their food from these areas.

Under both the conservative and average food-chain model scenarios, the NOAEL-based EEQs for arsenic were greater than 1.0 for the mink (Tables 8-17 and 8-18). No EEQs based on the LOAEL were greater than 1.0 under the less conservative food-chain model scenario.

As discussed above, body weight scaling was used to convert TRVs for the test species to TRVs for the surrogate wildlife species. According to Sample et al. (1996), body weight scaling may be conservative when the mouse is used as the test species to extrapolate the TRV for a larger mammal. A NOAEL for the mink has not been developed for arsenic. Because the mouse was used as the test species, it is likely that the TRV calculated for the mink with body weight scaling is conservative. Therefore, because the NOAEL EEQ for arsenic in the less conservative food-chain model is slightly greater than 1.0 with an EEQ of 2.0, actual risks to mink from arsenic are not likely considering that the TRV is probably very conservative. Therefore, arsenic is not retained as a COPC in sediment for risks to wildlife.

Piscivorous Wildlife (Main Stream)

Because there are only intermittent pools of surface water in the drainage ditches and Tributaries at SWMU 8, fish are often absent. Therefore, piscivorous wildlife will not obtain a significant portion of their food from these water bodies, and an SUF of 10 percent was used to evaluate the risks to piscivorous wildlife. The SUF of 10 percent is considered conservative because it is not likely that piscivorous wildlife will obtain even 10 percent of their food from these areas.

Under both the conservative and average food-chain model scenario, the NOAEL-based EEQs for arsenic were greater than 1.0 for the mink (Tables 8-19 and 8-20). No EEQs based on the LOAEL were greater than 1.0 under the less conservative food-chain model scenario.

As discussed above, body weight scaling was used to convert TRVs for the test species to TRVs for the surrogate wildlife species. According to Sample et al. (1996), body weight scaling may be conservative when the mouse is used as the test species to extrapolate the TRV for a larger mammal. A NOAEL for the mink has not been developed for arsenic. Because the mouse was used as the test species, it is likely that the TRV calculated for the mink with body weight scaling is conservative. Therefore, because the NOAEL EEQ for arsenic in the less conservative food-chain model is slightly greater than 1.0 with an EEQ of 3.3, actual risks to mink from arsenic are not likely considering that the TRV is probably very conservative. Therefore, arsenic is not retained as a COPC in sediment for risks to wildlife.

8.5 ECOLOGICAL RISK UNCERTAINTY ANALYSIS

This section discusses some of the uncertainties associated with the SWMU 8 SERA.

8.5.1 Measurement and Assessment Endpoints

Measurement endpoints are used to evaluate the assessment endpoints selected for the SERA. For the SERA, the measures of effects are not the same as the assessment endpoints. Therefore, the measures are used to predict effects to the assessment endpoints by selecting surrogate species that were evaluated. For example, a decrease in reproduction of a shrew is used to assess a decrease in reproduction of the small mammal population. However, predicting a decrease in reproduction of a shrew may either underprotect or overprotect the small mammal population based on differences in ingestion rates, toxicity, food preferences, home ranges, etc. between different species.

Risks to reptiles and amphibians are not quantitatively evaluated because exposure factors are not established for most species, and toxicity data are very limited. Using aquatic organisms as a surrogate species, risks to amphibians exposed to surface water are possible. Potential risks to reptiles cannot be evaluated in this SERA because of a lack of toxicity and exposure data (see below for a discussion of potential risks to the timber rattlesnake).

As discussed in Section 8.2.1.1, several endangered and threatened species or species of special concern are present at NSWC Crane and potentially may inhabit SWMU 8. Risks to these species were not specifically calculated, so the uncertainties of not calculating risks to these species are presented here. As discussed above, risks to carnivorous mammals and birds were not evaluated because the contaminated portions of SWMU 8 represent only a small portion of these receptors' home ranges. For this reason, significant risks are not expected from exposure to chemicals at SWMU 8; therefore, unacceptable risks to the bobcat, bald eagle, Northern harrier, and osprey, and to carnivorous reptiles such as the timber rattlesnake are also not expected, although there is uncertainty with this conclusion because risks were not quantitatively evaluated. Loggerhead shrikes and the sedge wren consume mostly aboveground insects such as caterpillars, beetles, spiders, and flies, as opposed to the worms that are consumed by the American woodcock in the food-chain model. Because worms are in direct contact with soil, it is expected that they would have greater levels of contaminants at SWMU 8 than aboveground insects; therefore, risks to the woodcock from consuming worms are expected to be greater than risks to the loggerhead shrike and sedge wren from consuming aboveground insects. Because there are no risks for the woodcock, risks are not expected for birds that consume aboveground insects. The American bittern is a marshland bird that feeds on fish, frogs, eels, insects, and water snakes. The Tributaries at SWMU 8 do not provide preferred habitat (marshes) for the bittern, so it is not likely that they will be present in this area. As mentioned in Section 8.2.1.1, the presence of the Indiana bat has not been documented at or surrounding SWMU 8.

Finally, there are uncertainties in risks to reptiles because there is a lack of exposure factors for reptiles and a lack of reptile toxicity data for the detected chemicals. As discussed in Section 8.2.1.1, one threatened reptilian species is listed as potentially present at NSWC Crane. Based on the preferred habitat of the timber rattlesnake and the ecology of SWMU 8, this species may potentially inhabit areas of the site. Risks to carnivorous reptiles were not specifically calculated; however, risks are unlikely based on using insectivorous birds and mammals as surrogates.

8.5.2 Exposure Characterization

The contaminant dose to terrestrial wildlife is calculated using an equation that incorporates ingestion rates, body weights, BAFs, and other exposure factors. These exposure factors are obtained from literature studies or predicted using various equations. Ingestion rates and body weights vary among species, especially among species inhabiting different areas. This was taken into account when selecting exposure parameters from U.S. EPA (1993c), and an attempt was made to minimize the uncertainties associated with the exposure characterization by selecting exposure parameters from studies conducted in Indiana and surrounding states.

Bioaccumulation of contaminants into various biological media (e.g., plants, invertebrates, small mammals) depends on characteristics of the media such as pH, organic carbon, etc. Therefore, actual BAFs at the site may be different than those used in the SERA or obtained from the literature. BAFs for estimating concentrations of selenium in sediment invertebrate tissue were not available, so a BAF of 1.0 was used for the food-chain models for the mink and kingfisher.

Also, the bioavailability of contaminants reported in toxicity studies is typically greater than the bioavailability of contaminants in environmental media. Typically, highly bioavailable forms of chemicals are used when conducting toxicity tests and/or conducting dosing studies for wildlife. For example, many of the toxicity tests used to develop screening levels for inorganics use highly bioavailable forms of metals, such as metal salts, which in many cases are much more toxic than equivalent concentrations of the inorganics in field-collected soils (Allen, 2002).

There is uncertainty in the chemical data collected at the site. Measured levels of chemicals are only estimates of the true site chemical concentrations. At SWMU 8, samples were deliberately biased toward known or suspected high concentrations, so predicted doses are probably higher than actual doses. Whereas this is a conservative approach in predicting exposure concentrations, actual exposure of ecological receptors to chemical concentrations at SWMU 8 is likely overestimated. In particular, wildlife that typically roam over multiple sample locations are unlikely to obtain all their food from within the most

contaminated areas at SWMU 8. Also, because the contaminated areas occupy only a very small portion of the overall ecological habitat at SWMU 8, a discussion of the overall risks to ecological receptors was included in the SERA. An SUF of 10 percent was used to evaluate risks to piscivorous receptors because there are only intermittent drainageways and Tributaries on site as indicated earlier in this SERA.

Seventeen of the surface soil samples were collected under Building 106 and Building 107. There is no habitat at these locations for plants, invertebrates, or terrestrial birds and mammals. These samples were removed from the data set and were not evaluated. There is uncertainty in removing these samples from the data set in the event that the buildings are removed in the future. Four surface soil, three sediment, and three surface water samples were collected from the Building 106 Pond area. There are currently plans to excavate this pond, which would remove the contaminated soil, sediment, and surface water. COPC selection tables were produced for these samples, but because the contamination will be removed and risks are not expected, they were not evaluated further. Twenty-four surface soil samples were collected in gravel/vegetated areas where habitat could exist (Table 8-2).

As noted on Figure A-2 in Appendix A, surface water was present at the surface water/sediment sampling locations during the sampling event. However, the water at many locations was turbid, indicating the samples were collected after a rain event because sediment was still suspended in the water. Also, many of the locations only have water intermittently and will not contain significant amounts of water between rain events, so aquatic organisms will be limited to small pools of water when other stretches of the Tributaries are dry. Therefore, this needs to be taken into account when making risk management decisions at the site.

8.5.3 Ecological Effects Data

Toxicological data for a few of the chemicals detected at SWMU 8 are limited or do not exist. This was the case for several COPCs in surface soil, sediment, and surface water but it did not affect the outcome of the risk assessment because the chemicals without toxicity data were evaluated using the other Step 3a factors discussed in Section 8.4.

Several alternative benchmark values were used to gain a better understanding of the relationship of the maximum concentrations of the selected COPCs to the overall ecological assessment of the site. There is some uncertainty involved when using these alternative benchmarks; however, attempts have been made to lessen the uncertainties by providing the toxicological basis of the alternate benchmarks when they were used.

8.5.4 Risk Characterization

Risks are possible if an EEQ is greater than or equal to 1.0 regardless of the magnitude of the EEQ. However, the magnitude of effects to ecological receptors cannot be inferred based on the magnitude of the EEQ. Rather, an EEQ greater than 1.0 simply indicates that the dose used to derive the toxicity reference value was exceeded.

There is uncertainty in the determination that the arsenic NOAEL for the mink is conservative. According to Sample et al. (1996), the use of mice as a test species to extrapolate the TRV for larger mammals is considered conservative. One reason is that mice may be more sensitive to arsenic than larger mammals. Because there is insufficient information to quantify this, it is considered conservative to use the mouse data to estimate benchmarks for larger wildlife species.

TOC data were not available for sediment at SWMU 8 for calculating risk to piscivorous wildlife from organic chemicals. A value of 1.0 percent was used as a default value.

Finally, there is uncertainty in how the predicted risks to a species at a site translate into risk to the population in the area as a whole.

8.6 ECOLOGICAL RISK SUMMARY AND CONCLUSIONS

A SERA was performed for SWMU 8, Building 106 Pond Area. Several chemicals were retained as COPCs as a result of the initial screening of surface soil, sediment, and surface water sample results. These chemicals were further evaluated, and data were scrutinized as a part of the Step 3a refinement. Tables 8-9 through 8-13 present summaries of the Step 3a evaluation including overall conclusions as to whether chemicals initially selected as COPCs are retained as COPCs after the refined evaluation. Table 8-21 summarizes the Step 3a evaluation for chemicals with NOAEL EEQs greater than 1.0 in the average food-chain model.

In summary, the list of chemicals initially selected as COPCs were further evaluated in Step 3a, the first step of the BERA. After a review of alternate toxicity information (based on soil invertebrates, plants, and aquatic receptors) for the initial COPCs was conducted, maximum and average concentrations were compared to the alternate toxicity information. For the soil and gravel surface soil samples, no chemicals were retained as COPCs because all concentrations were less than alternate benchmarks or soil

background values. For the pond surface soil samples, several concentrations were greater than the screening levels, but because the pond will be excavated, these analytes were not retained as COPCs.

Similarly, the list of chemicals initially selected as COPCs in sediment and surface water were further evaluated in Step 3a, the first step of the BERA. After a review of alternate toxicity information (based on aquatic organisms) and other Step 3a factors, maximum and average concentrations of COPCs were compared to the alternate toxicity information. No chemicals were retained as COPCs for further evaluation for benthic and aquatic organisms, largely because concentrations were less than alternate screening levels and upgradient concentrations, because concentrations in surface soil were not site-related, and because analytes were less than screening levels in filtered samples.

The chemicals selected as COPCs for risks to wildlife were also further evaluated in Step 3a. No chemicals were retained as COPCs for further evaluation for several reasons. For the woodcock, although the zinc NOAEL EEQ was greater than 1.0 for site soil concentrations, the NOAEL EEQ was also greater than 1.0 using background zinc concentrations. Also, the location of the maximum zinc concentration has poor habitat for insectivorous birds. For the mink, a SUF of 10 percent was used, which in itself is likely conservative. Also, the body weight scaling used for large mammals is conservative. Because the NOAEL EEQs are only slightly greater than 1.0 for the Tributary and Main Stream, risks are acceptable.

TABLE 8-1

ECOLOGICAL COPC SELECTION - POND SURFACE SOIL SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Plants/Soil Invertebrates	COPC for Food-Chain Modeling	Rationale for COPC Selection
Volatile Organics (ug/kg)											
ACETONE	2/4	2 J	5 J	2.01	3.5	08SS0080002	2500	0.002	NO	NO	BSL
Semivolatile Organics (ug/kg)											
ACENAPHTHYLENE	1/4	22	22	6.96	22	08SS0090002	682000	0.00003	NO	NO	BSL
ANTHRACENE	1/4	7 J	7 J	3.21	7	08SS0090002	1480000	0.000005	NO	NO	BSL
BENZO(A)ANTHRACENE	3/4	4 J	44	14.5	18.7	08SS0090002	5210	0.008	NO	NO	BSL
BENZO(A)PYRENE	3/4	6 J	91	27	35.3	08SS0090002	1520	0.06	NO	NO	BSL
BENZO(B)FLUORANTHENE	3/4	7 J	94	27.8	36.3	08SS0090002	59800	0.002	NO	NO	BSL
BENZO(G,H,I)PERYLENE	2/4	16 J	140 J	40	78	08SS0090002	119000	0.001	NO	NO	BSL
BENZO(K)FLUORANTHENE	2/4	8	55	16.7	31.5	08SS0090002	148000	0.0004	NO	NO	BSL
CHRYSENE	3/4	6 J	65	19.8	25.7	08SS0090002	4730	0.01	NO	NO	BSL
DIBENZO(A,H)ANTHRACENE	1/4	37 J	37 J	10.7	37	08SS0090002	18400	0.002	NO	NO	BSL
FLUORANTHENE	2/4	9	29	10.5	19	08SS0090002	122000	0.0002	NO	NO	BSL
INDENO(1,2,3-CD)PYRENE	2/4	10 J	91 J	26.2	50.5	08SS0090002	109000	0.0008	NO	NO	BSL
PHENANTHRENE	2/4	8	16	6.99	12	08SS0090002	45700	0.0004	NO	NO	BSL
PYRENE	2/4	8	42	13.5	25	08SS0090002	78500	0.0005	NO	NO	BSL
Inorganics (mg/kg)											
ALUMINUM	4/4	17600 J	24500 J	20350	20350	08SS0060002	pH [2,3]	NA	NO	NO	BSL
ARSENIC	4/4	5.8 J	8 J	6.43	6.43	08SS0060002	18 [2]	0.44	NO	NO	BSL
BARIUM	4/4	65.3 J	130 J	87.2	87.2	08SS0060002	330 [2]	0.39	NO	NO	BSL
BERYLLIUM	4/4	0.53 J	0.89 J	0.673	0.673	08SS0060002	21 [2]	0.04	NO	NO	BSL
CADMIUM	2/4	0.46 J	0.67 J	0.353	0.565	08SS0090002	0.36 [2]	1.86	YES	YES	ASL/BIO
CALCIUM	4/4	1550 J	15700 J	5345	5345	08SS0090002	NA	NA	NO	NO	NUT
CHROMIUM	4/4	17.9 J	21.4 J	19.4	19.4	08SS0090002	26 [2]	0.82	NO	NO	BSL
COBALT	4/4	6.8 J	11.5 J	8.2	8.2	08SS0060002	13 [2]	0.88	NO	NO	BSL
COPPER	4/4	11.7 J	27.9 J	17.2	17.2	08SS0090002	5.4	5.17	YES	YES	ASL/BIO
IRON	4/4	16700 J	24300 J	19400	19400	08SS0060002	pH [2,4]	NA	NO	NO	BSL
LEAD	4/4	12.8 J	87.7 J	36.6	36.6	08SS0090002	11 [2]	7.97	YES	YES	ASL/BIO
MAGNESIUM	4/4	1650 J	2290 J	2008	2008	08SS0060002	NA	NA	NO	NO	NUT
MANGANESE	4/4	201 J	412 J	271	271	08SS0060002	NA	NA	YES	NO	NC/NONBIO
MERCURY	4/4	0.017 J	0.029 J	0.0248	0.0248	08SS0070002	0.1	0.29	NO	NO	BSL
NICKEL	4/4	12.6 J	15.4 J	14.5	14.5	08SS0080002	13.6	1.13	YES	YES	ASL/BIO
POTASSIUM	4/4	1190 J	1700 J	1440	1440	08SS0060002	NA	NA	NO	NO	NUT
SODIUM	1/4	81.3 J	81.3 J	39	81.3	08SS0080002	NA	NA	NO	NO	NUT
VANADIUM	4/4	28.6 J	36.8 J	32.2	32.2	08SS0060002	7.8 [2]	4.72	YES	NO	ASL/NONBIO
ZINC	4/4	36.9 J	68.5 J	47.7	47.7	08SS0090002	6.62	10.3	YES	YES	ASL/BIO

Notes:
Field duplicate samples are excluded from these summaries because they are considered field quality control samples.
NA - Not applicable
ESL - Ecological Screening Level
COPC - Chemical of potential concern
J - Estimated concentration
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = Threshold Value.
2 - U.S. EPA Ecological Soil Screening Level.
3 - Aluminum is only considered a COPC when the soil pH is less than 5.5. Because the detected soil pH at this site is 7.7, aluminum was not retained as a COPC.
4 - Iron is not expected to be toxic to plants with a soil pH between 5 and 8. Because the detected soil pH at this site is 7.7, iron was not retained as a COPC.

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-2

ECOLOGICAL COPC SELECTION - GRASS AND GRAVEL SURFACE SOIL SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Plants/Soil Invertebrates	COPC for Food-Chain Modeling	Rationale for COPC Selection
Volatile Organics (ug/kg)											
2-BUTANONE	4/23	2 J	4 J	0.938	3	08SS0390002	89600	0.00004	NO	NO	BSL
ACETONE	5/16	1 J	64 J	7.05	15.8	08SS0320002	2500	0.03	NO	NO	BSL
METHYLENE CHLORIDE	3/23	1 J	4 J	0.752	2.33	08SS0180002	4050	0.001	NO	NO	BSL
Semivolatile Organics (ug/kg)											
ACENAPHTHYLENE	1/8	100	100	14.2	100	08SS0050002	682000	0.0001	NO	NO	BSL
ANTHRACENE	1/8	33	33	5.82	33	08SS0050002	1480000	0.00002	NO	NO	BSL
BENZO(A)ANTHRACENE	2/8	4 J	480	61.9	242	08SS0050002	5210	0.09	NO	NO	BSL
BENZO(A)PYRENE	1/8	560	560	71.7	560	08SS0050002	1520	0.37	NO	NO	BSL
BENZO(B)FLUORANTHENE	1/8	640	640	81.7	640	08SS0050002	59800	0.01	NO	NO	BSL
BENZO(G,H,I)PERYLENE	1/8	560	560	71.7	560	08SS0050002	119000	0.005	NO	NO	BSL
BENZO(K)FLUORANTHENE	1/8	430	430	55.4	430	08SS0050002	148000	0.003	NO	NO	BSL
CHRYSENE	2/8	5 J	640	82.1	323	08SS0050002	4730	0.14	NO	NO	BSL
DIBENZO(A,H)ANTHRACENE	1/8	170	170	22.9	170	08SS0050002	18400	0.009	NO	NO	BSL
FLUORANTHENE	2/8	6 J	540	69.7	273	08SS0050002	122000	0.004	NO	NO	BSL
INDENO(1,2,3-CD)PYRENE	1/8	430	430	55.4	430	08SS0050002	109000	0.004	NO	NO	BSL
NAPHTHALENE	1/8	9	9	2.82	9	08SS0050002	99.39	0.09	NO	NO	BSL
PHENANTHRENE	2/8	18	91	15.1	54.5	08SS0050002	45700	0.002	NO	NO	BSL
PYRENE	3/8	5 J	690	89.5	235	08SS0050002	78500	0.009	NO	NO	BSL
Inorganics (mg/kg)											
ALUMINUM	8/8	19200 J	28200 J	23738	23738	08SS0110002	pH [2,3]	NA	NO	NO	BSL
ARSENIC	8/8	3.8 J	7.9 J	6.01	6.01	08SS0030002	18 [2]	0.44	NO	NO	BSL
BARIUM	8/8	56.9 J	123 J	91.9	91.9	08SS0120002	330 [2]	0.37	NO	NO	BSL
BERYLLIUM	6/8	0.55 J	0.78 J	0.566	0.673	08SS0030002	21 [2]	0.04	NO	NO	BSL
CADMIUM	2/8	0.47 J	0.55 J	0.223	0.51	08SS0030002	0.36 [2]	1.53	YES	YES	ASL/BIO
CALCIUM	8/8	1180 J	5090 J	2230	2230	08SS0050002	NA	NA	NO	NO	NUT
CHROMIUM	8/8	19 J	24.7 J	21.6	21.6	08SS0030002	26 [2]	0.95	NO	NO	BSL
COBALT	8/8	3.9 J	7.7 J	5.65	5.65	08SS0020002, 08SS0050002	13 [2]	0.59	NO	NO	BSL
COPPER	8/8	5.5 J	13.2 J	9.38	9.38	08SS0130002	5.4	2.44	YES	YES	ASL/BIO
IRON	8/8	15700 J	32400 J	22050	22050	08SS0030002	pH [2,4]	NA	NO	NO	BSL
LEAD	8/8	8.5 J	31.1 J	15.3	15.3	08SS0010002	11 [2]	2.83	YES	YES	ASL/BIO
MAGNESIUM	8/8	1690 J	2970 J	2055	2055	08SS0130002	NA	NA	NO	NO	NUT
MANGANESE	8/8	64.1 J	522 J	233	233	08SS0020002	NA	NA	YES	NO	NC/NONBIO
MERCURY	6/8	0.007 J	0.033 J	0.0121	0.015	08SS0130002	0.1	0.33	NO	NO	BSL
NICKEL	8/8	7.6 J	11.3 J	9.38	9.38	08SS0030002	13.6	0.83	NO	NO	BSL
POTASSIUM	8/8	985 J	1990 J	1302	1302	08SS0130002	NA	NA	NO	NO	NUT
SODIUM	6/8	61.1 J	124 J	78.9	95.4	08SS0130002	NA	NA	NO	NO	NUT
TIN	5/8	0.2 J	0.45 J	0.323	0.346	08SS0130002	7.62	0.06	NO	NO	BSL
VANADIUM	8/8	29.4 J	40.5 J	34.2	34.2	08SS0130002	7.8 [2]	5.19	YES	NO	ASL/NONBIO
ZINC	8/8	19.4 J	128 J	44	44	08SS0010002	6.62	19.3	YES	YES	ASL/BIO
Miscellaneous Parameters											
CATION EXCHANGE CAPACITY (MEQ/1)	1/1	12	12	12	12	08SS0140002	NA	NA	NA	NA	NA
PH (S.U.)	1/1	7.7	7.7	7.7	7.7	08SS0140002	NA	NA	NA	NA	NA
TOTAL ORGANIC CARBON (MG/KG)	1/1	2200	2200	2200	2200	08SS0140002	NA	NA	NA	NA	NA

TABLE 8-2

ECOLOGICAL COPC SELECTION - GRASS AND GRAVEL SURFACE SOIL SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Notes:
Field duplicate samples are excluded from these summaries because they are considered to be field quality control samples.
NA - Not applicable
S.U. - Standard Units
ESL - Ecological screening level
COPC - Chemical of potential concern
MEQ - Milliequivalent
J - Estimated concentration
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = threshold value.
2 - U.S. EPA Ecological Soil Screening Level.
3 - Aluminum is only considered a COPC when the soil pH is less than 5.5. Because the detected soil pH at this site is 7.7, aluminum was not retained as a COPC.
4 - Iron is not expected to be toxic to plants with a soil pH between 5 and 8. Because the detected soil pH at this site is 7.7, iron was not retained as a COPC.

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-3

ECOLOGICAL COPC SELECTION - POND SEDIMENT SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Benthic Invertebrates	COPC for Food-Chain Modeling	Rationale for COPC Selection
Volatile Organics (ug/kg)											
1,1,1-TRICHLOROETHANE	3/5	178 J	17300000 J	4780037	7966726	08SD004021224	213	81221	YES	NO	ASL/NONBIO
1,1-DICHLOROETHANE	5/5	5 J	1100000 J	308056	308056	08SD004021224	0.575	1913043	YES	NO	ASL/NONBIO
1,1-DICHLOROETHENE	4/5	14 J	1500000 J	364039	455048	08SD004021224	19.4	77320	YES	NO	ASL/NONBIO
2-BUTANONE	1/5	870 J	870 J	3679	870	08SD012010006	42.4	20.5	YES	NO	ASL/NONBIO
4-METHYL-2-PENTANONE	1/5	40 J	40 J	3513	40.0	08SD012010006	25.1	1.59	YES	NO	ASL/NONBIO
ACETONE	1/5	210 J	210 J	3551	210	08SD012010006	9.9	21.2	YES	NO	ASL/NONBIO
CARBON DISULFIDE	1/5	14 J	14 J	3506	14.0	08SD005021224	23.9	0.59	NO	NO	BSL
CHLOROETHANE	3/5	220 J	59880 J	21036	35048	08SD004010012	NA	NA	YES	NO	NC/NONBIO
CIS-1,2-DICHLOROETHENE	4/5	2300	390000 J	138260	172825	08SD004021224	654	596	YES	NO	ASL/NONBIO
ETHYLBENZENE	1/5	6 J	6 J	3506	6.00	08SD012010006	175	0.03	NO	NO	BSL
TOLUENE	5/5	15 J	95000 J	31020	31020	08SD004021224	1220	77.9	YES	NO	ASL/NONBIO
TOTAL XYLENES	3/5	15 J	550	3618	200	08SD005010012	433	1.27	YES	NO	ASL/NONBIO
TRANS-1,2-DICHLOROETHENE	2/5	25 J	51000 J	12207	25513	08SD004021224	654	78.0	YES	NO	ASL/NONBIO
TRICHLOROETHENE	4/5	2100 J	27800000 J	6625220	8281525	08SD004021224	112	248214	YES	NO	ASL/NONBIO
VINYL CHLORIDE	1/5	54	54	3514	54.0	08SD005021224	202	0.27	NO	NO	BSL
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	3/4	14	230 J	119	158	08SD004010012, 08SD004021224	20.2	11.4	YES	NO	ASL/NONBIO
3&4-METHYLPHENOL	3/5	280 J	1200 J	537	860	08SD004021224	52.4	22.9	YES	NO	ASL/NONBIO
ACENAPHTHENE	3/4	6 J	120 J	42.4	50.0	08SD004021224	6.71	17.9	YES	YES	ASL/BIO
ACENAPHTHYLENE	1/4	25 J	25 J	19.2	25.0	08SD005010012	5.87	4.26	YES	YES	ASL/BIO
BENZO(A)ANTHRACENE	2/4	21 J	74 J	36.1	47.5	08SD005010012	108	0.69	NO	NO	BSL
BENZO(A)PYRENE	2/4	18	94	40.4	56.0	08SD005010012	150	0.63	NO	NO	BSL
BENZO(B)FLUORANTHENE	1/4	100	100	37.9	100	08SD005010012	10400	0.01	NO	NO	BSL
BENZO(G,H,I)PERYLENE	2/4	28	160	59.4	94.0	08SD005010012	170	0.94	NO	NO	BSL
BENZO(K)FLUORANTHENE	1/4	46	46	24.4	46.0	08SD005010012	240	0.19	NO	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	5/5	170 J	35000 J	8684	8684	08SD004021224	182	192	YES	NO	ASL/NONBIO
BUTYL BENZYL PHTHALATE	1/5	210 J	210 J	136	210	08SD005021224	1970	0.11	NO	NO	BSL
CHRYSENE	2/4	27 J	140 J	54.1	83.5	08SD005010012	166	0.84	NO	NO	BSL
DI-N-BUTYL PHTHALATE	2/5	180 J	590 J	215	385	08SD004021224	1114	0.53	NO	NO	BSL
FLUORANTHENE	2/4	26 J	110 J	46.4	68.0	08SD005010012	423	0.26	NO	NO	BSL
FLUORENE	3/4	5 J	130 J	46.9	56.0	08SD004021224	77.4	1.68	YES	YES	ASL/BIO
INDENO(1,2,3-CD)PYRENE	2/4	18	110	44.4	64.0	08SD005010012	200	0.55	NO	NO	BSL
ISOSAFROLE	1/5	250 J	250 J	141	250	08SD005010012	NA	NA	YES	NO	NC/NONBIO
NAPHTHALENE	4/4	5 J	360 J	156	156	08SD004021224	176	2.05	YES	NO	ASL/NONBIO
PHENANTHRENE	4/4	33 J	2000 J	718	718	08SD004021224	204	9.80	YES	YES	ASL/BIO
PHENOL	1/5	650 J	650 J	203	650	08SD004021224	49.1	13.2	YES	NO	ASL/NONBIO
PYRENE	2/4	35 J	180 J	66.1	108	08SD005010012	195	0.92	NO	NO	BSL
Inorganics (mg/kg)											
ALUMINUM	1/1	5630	5630	5630	5630	08SD012010006	NA	NA	YES	NO	NC/NONBIO
ARSENIC	1/1	2.5 J	2.5 J	2.50	2.50	08SD012010006	9.79	0.26	NO	NO	BSL
BARIUM	1/1	49.1 J	49.1 J	49.1	49.1	08SD012010006	NA	NA	YES	NO	NC/NONBIO
BERYLLIUM	1/1	0.2 J	0.2 J	0.200	0.200	08SD012010006	NA	NA	YES	NO	NC/NONBIO
CADMIUM	1/1	2	2	2.00	2.00	08SD012010006	0.99	2.02	YES	YES	ASL/BIO
CALCIUM	1/1	2550 J	2550 J	2550	2550	08SD012010006	NA	NA	NO	NO	NUT
CHROMIUM	1/1	26.5 J	26.5 J	26.5	26.5	08SD012010006	43.4	0.61	NO	NO	BSL
COBALT	1/1	2.9 J	2.9 J	2.90	2.90	08SD012010006	50	0.06	NO	NO	BSL
COPPER	1/1	32.8 J	32.8 J	32.8	32.8	08SD012010006	31.6	1.04	YES	YES	ASL/BIO
IRON	1/1	8360 J	8360 J	8360	8360	08SD012010006	NA	NA	YES	NO	NC/NONBIO
LEAD	1/1	45.8 J	45.8 J	45.8	45.8	08SD012010006	35.8	1.28	YES	YES	ASL/BIO
MAGNESIUM	1/1	743 J	743 J	743	743	08SD012010006	NA	NA	NO	NO	NUT
MANGANESE	1/1	79.6 J	79.6 J	79.6	79.6	08SD012010006	NA	NA	YES	NO	NC/NONBIO
MERCURY	1/1	0.033 J	0.033 J	0.0330	0.0330	08SD012010006	0.174	0.19	NO	NO	BSL
NICKEL	1/1	5 J	5 J	5.00	5.00	08SD012010006	22.7	0.22	NO	NO	BSL
POTASSIUM	1/1	482 J	482 J	482	482	08SD012010006	NA	NA	NO	NO	NUT
TIN	1/1	3.9 J	3.9 J	3.90	3.90	08SD012010006	NA	NA	YES	NO	NC/NONBIO
VANADIUM	1/1	13.6 J	13.6 J	13.6	13.6	08SD012010006	NA	NA	YES	NO	NC/NONBIO
ZINC	1/1	236 J	236 J	236	236	08SD012010006	121	1.95	YES	YES	ASL/BIO

TABLE 8-3

ECOLOGICAL COPC SELECTION - POND SEDIMENT SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Benthic Invertebrates	COPC for Food-Chain Modeling	Rationale for COPC Selection
Miscellaneous Parameters (mg/kg)											
PERCHLORATE	4/4	0.52	1.7 J	0.910	0.910	08SD004021224	NA	NA	YES	NO	NC/NONBIO

Notes:
Field duplicate samples are excluded from these summaries because they are considered to be field quality control samples.
NA - Not applicable
ESL - Ecological screening level
COPC - Chemical of potential concern
J - Estimated concentration
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = threshold value.

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-4

ECOLOGICAL COPC SELECTION - DOWNGRADIENT TRIBUTARY SEDIMENT SAMPLES
SWMU 8- BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Benthic Invertebrates	COPC for Food-Chain Modeling	Rationale for COPC Selection
Volatile Organics (ug/kg)											
1,1,1-TRICHLOROETHANE	1/7	2 J	2 J	0.851	2.00	08SD007010006	213	0.009	NO	NO	BSL
TRICHLOROETHENE	2/7	2 J	4 J	1.34	3.00	08SD006010006	112	0.04	NO	NO	BSL
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	1/5	6 J	6 J	2.85	6.00	08SD001010006	20.2	0.30	NO	NO	BSL
ACENAPHTHYLENE	1/5	11	11	3.85	11.0	08SD001010006	5.87	1.87	YES	YES	ASL/BIO
ANTHRACENE	1/5	10	10	3.65	10.0	08SD001010006	57.2	0.17	NO	NO	BSL
BENZO(A)ANTHRACENE	1/5	51 J	51 J	11.9	51.0	08SD001010006	108	0.47	NO	NO	BSL
BENZO(A)PYRENE	1/5	69	69	15.5	69.0	08SD001010006	150	0.46	NO	NO	BSL
BENZO(B)FLUORANTHENE	1/5	140	140	29.7	140	08SD001010006	10400	0.01	NO	NO	BSL
BENZO(G,H,I)PERYLENE	1/5	120	120	25.7	120	08SD001010006	170	0.71	NO	NO	BSL
BENZO(K)FLUORANTHENE	1/5	67	67	15.1	67.0	08SD001010006	240	0.28	NO	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	4/12	240 J	680	178	450	08SD001010006	182	3.74	YES	NO	ASL/NONBIO
CHRYSENE	1/5	100 J	100 J	21.7	100	08SD001010006	166	0.60	NO	NO	BSL
DI-N-BUTYL PHTHALATE	1/12	130 J	130 J	50.6	130	08SD002020006	1114	0.12	NO	NO	BSL
DIBENZO(A,H)ANTHRACENE	1/5	20	20	5.65	20.0	08SD001010006	33	0.61	NO	NO	BSL
FLUORANTHENE	1/5	85	85	18.7	85.0	08SD001010006	423	0.20	NO	NO	BSL
INDENO(1,2,3-CD)PYRENE	1/5	81	81	17.9	81.0	08SD001010006	200	0.41	NO	NO	BSL
NAPHTHALENE	1/5	8 J	8 J	3.25	8.00	08SD001010006	176	0.05	NO	NO	BSL
PHENANTHRENE	2/5	10	36	10.4	23.0	08SD001010006	204	0.18	NO	NO	BSL
PYRENE	4/5	6 J	210 J	46.6	57.8	08SD001010006	195	1.08	YES	YES	ASL/BIO
Inorganics (mg/kg)											
ALUMINUM	2/2	12800	17800	15300	15300	08SD011010006	NA	NA	YES	NO	NC/NONBIO
ANTIMONY	1/2	0.92 J	0.92 J	0.533	0.920	08SD015010006	NA	NA	YES	NO	NC/NONBIO
ARSENIC	2/2	5.1 J	18.7 J	11.9	11.9	08SD015010006	9.79	1.91	YES	YES	ASL/BIO
BARIUM	2/2	58.9 J	133 J	96.0	96.0	08SD015010006	NA	NA	YES	NO	NC/NONBIO
BERYLLIUM	2/2	0.5	2.2	1.35	1.35	08SD015010006	NA	NA	YES	NO	NC/NONBIO
CADMIUM	2/2	0.2 J	0.86	0.530	0.530	08SD015010006	0.99	0.87	NO	NO	BSL
CALCIUM	2/2	1710 J	7450 J	4580	4580	08SD015010006	NA	NA	NO	NO	NUT
CHROMIUM	2/2	16.9 J	60.4 J	38.7	38.7	08SD015010006	43.4	1.39	YES	YES	ASL/BIO
COBALT	2/2	5.3 J	27.8 J	16.6	16.6	08SD015010006	50	0.56	NO	NO	BSL
COPPER	2/2	8.7 J	15.9 J	12.3	12.3	08SD015010006	31.6	0.50	NO	NO	BSL
IRON	2/2	18200 J	71900 J	45050	45050	08SD015010006	NA	NA	YES	NO	NC/NONBIO
LEAD	2/2	9.8 J	34.9 J	22.4	22.4	08SD015010006	35.8	0.97	NO	NO	BSL
MAGNESIUM	2/2	1740 J	1880 J	1810	1810	08SD015010006	NA	NA	NO	NO	NUT
MANGANESE	2/2	336 J	3130 J	1733	1733	08SD015010006	NA	NA	YES	NO	NC/NONBIO
MERCURY	2/2	0.022 J	0.029 J	0.0255	0.0255	08SD011010006	0.174	0.17	NO	NO	BSL
NICKEL	2/2	11.3 J	17.1 J	14.2	14.2	08SD015010006	22.7	0.75	NO	NO	BSL
POTASSIUM	2/2	788 J	1410 J	1099	1099	08SD011010006	NA	NA	NO	NO	NUT
SELENIUM	2/2	0.22 J	0.75 J	0.485	0.485	08SD015010006	NA	NA	YES	YES	NC/BIO
VANADIUM	2/2	28.6 J	53.1 J	40.9	40.9	08SD015010006	NA	NA	YES	NO	NC/NONBIO
ZINC	2/2	26.3 J	93.3 J	59.8	59.8	08SD015010006	121	0.77	NO	NO	BSL
Miscellaneous Parameters (mg/kg)											
PERCHLORATE	2/5	0.11 J	0.24	0.102	0.175	08SD003010006	NA	NA	YES	NO	NC/NONBIO

Notes:
Field duplicate samples are excluded from these summaries because they are considered to be field quality control samples.
NA - Not applicable
ESL - Ecological screening level
COPC - Chemical of potential concern
J - Estimated concentration
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = threshold value.

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-5

ECOLOGICAL COPC SELECTION - DOWNGRADIENT MAIN STREAM SEDIMENT SAMPLES
SWMU 8- BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Benthic Invertebrates	COPC for Food- Chain Modeling	Rationale for COPC Selection
Volatile Organics (ug/kg)											
1,1,1-TRICHLOROETHANE	1/3	2 J	2 J	1.08	2.00	08SD009010006	213	0.009	NO	NO	BSL
TRICHLOROETHENE	1/3	3 J	3 J	1.42	3.00	08SD008010006	112	0.03	NO	NO	BSL
Semivolatile Organics (ug/kg)											
2-METHYLNAPHTHALENE	1/2	13	13	7.49	13.0	08SD009010006	20.2	0.64	NO	NO	BSL
BENZO(A)ANTHRACENE	2/2	9	12	10.5	10.5	08SD009010006	108	0.11	NO	NO	BSL
BENZO(A)PYRENE	2/2	10	10	10.0	10.0	08SD008010006, 08SD009010006	150	0.07	NO	NO	BSL
BENZO(B)FLUORANTHENE	2/2	11	13	12.0	12.0	08SD009010006	10400	0.001	NO	NO	BSL
BENZO(G,H,I)PERYLENE	2/2	13	14	13.5	13.5	08SD008010006	170	0.08	NO	NO	BSL
BENZO(K)FLUORANTHENE	2/2	9	10	9.50	9.50	08SD008010006	240	0.04	NO	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	1/5	210 J	210 J	76.1	210	08SD009010006	182	1.15	YES	NO	ASL/NONBIO
CHRYSENE	2/2	11	12	11.5	11.5	08SD009010006	166	0.07	NO	NO	BSL
FLUORANTHENE	2/2	10	13	11.5	11.5	08SD008010006	423	0.03	NO	NO	BSL
INDENO(1,2,3-CD)PYRENE	2/2	10	11	10.5	10.5	08SD009010006	200	0.06	NO	NO	BSL
NAPHTHALENE	1/2	6 J	6 J	3.99	6.00	08SD009010006	176	0.03	NO	NO	BSL
PHENANTHRENE	1/2	14	14	8.07	14.0	08SD008010006	204	0.07	NO	NO	BSL
PYRENE	2/2	18 J	25 J	21.5	21.5	08SD008010006	195	0.13	NO	NO	BSL
Inorganics (mg/kg)											
ALUMINUM	1/1	11800	11800	11800	11800	08SD014010006	NA	NA	YES	NO	NC/NONBIO
ANTIMONY	1/1	1.4 J	1.4 J	1.40	1.40	08SD014010006	NA	NA	YES	NO	NC/NONBIO
ARSENIC	1/1	19.7 J	19.7 J	19.7	19.7	08SD014010006	9.79	2.01	YES	YES	ASL/BIO
BARIUM	1/1	83.3 J	83.3 J	83.3	83.3	08SD014010006	NA	NA	YES	NO	NC/NONBIO
BERYLLIUM	1/1	1.6	1.6	1.60	1.60	08SD014010006	NA	NA	YES	NO	NC/NONBIO
CADMIUM	1/1	0.79	0.79	0.790	0.790	08SD014010006	0.99	0.80	NO	NO	BSL
CALCIUM	1/1	1540 J	1540 J	1540	1540	08SD014010006	NA	NA	NO	NO	NUT
CHROMIUM	1/1	61.2 J	61.2 J	61.2	61.2	08SD014010006	43.4	1.41	YES	YES	ASL/BIO
COBALT	1/1	18.9 J	18.9 J	18.9	18.9	08SD014010006	50	0.38	NO	NO	BSL
COPPER	1/1	11.6 J	11.6 J	11.6	11.6	08SD014010006	31.6	0.37	NO	NO	BSL
IRON	1/1	71400 J	71400 J	71400	71400	08SD014010006	NA	NA	YES	NO	NC/NONBIO
LEAD	1/1	27.6 J	27.6 J	27.6	27.6	08SD014010006	35.8	0.77	NO	NO	BSL
MAGNESIUM	1/1	855 J	855 J	855	855	08SD014010006	NA	NA	NO	NO	NUT
MANGANESE	1/1	1790 J	1790 J	1790	1790	08SD014010006	NA	NA	YES	NO	NC/NONBIO
MERCURY	1/1	0.04 J	0.04 J	0.0400	0.0400	08SD014010006	0.174	0.23	NO	NO	BSL
NICKEL	1/1	17.5 J	17.5 J	17.5	17.5	08SD014010006	22.7	0.77	NO	NO	BSL
POTASSIUM	1/1	735 J	735 J	735	735	08SD014010006	NA	NA	NO	NO	NUT
SELENIUM	1/1	0.59 J	0.59 J	0.590	0.590	08SD014010006	NA	NA	YES	YES	NC/BIO
VANADIUM	1/1	54.3 J	54.3 J	54.3	54.3	08SD014010006	NA	NA	YES	NO	NC/NONBIO
ZINC	1/1	59.3 J	59.3 J	59.3	59.3	08SD014010006	121	0.49	NO	NO	BSL

Notes:
Field duplicate samples are excluded from these summaries because they are considered to be field quality control samples.
NA - Not applicable
ESL - Ecological screening level
COPC - Chemical of potential concern
J - Estimated concentration
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = threshold value.

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-6

ECOLOGICAL COPC SELECTION - POND SURFACE WATER SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detected	Region 5 ESL	Ecological Effects Quotient	COPC for Aquatic Invertebrates	COPC for Wildlife	Rationale for COPC Selection
Volatile Organics (ug/L)											
1,1,1-TRICHLOROETHANE	5/6	13	200	51	61.2	08SW00402	76	2.63	YES	NO	ASL/NONBIO
1,1-DICHLOROETHANE	6/6	1.9	99	33.7	33.7	08SW00402	47	2.11	YES	NO	ASL/NONBIO
1,1-DICHLOROETHENE	3/6	1.4	7.7	1.84	3.53	08SW00402	65	0.12	NO	NO	BSL
2-BUTANONE	2/6	1.6 J	7200	1200	3601	08SW01201	2200	3.27	YES	NO	ASL/NONBIO
2-HEXANONE	1/6	0.9 J	0.9 J	0.358	0.9	08SW01201	99	0.009	NO	NO	BSL
4-METHYL-2-PENTANONE	1/6	530	530	88.5	530	08SW01201	170	3.12	YES	NO	ASL/NONBIO
ACETONE	5/6	1.5 J	440 J	77.6	93.1	08SW01201	1700	0.26	NO	NO	BSL
CHLOROETHANE	6/6	1.6	89	34.9	34.9	08SW00402	NA	NA	YES	NO	NC/NONBIO
CIS-1,2-DICHLOROETHENE	6/6	6.3	140	51.7	51.7	08SW00402	970	0.14	NO	NO	BSL
ETHYLBENZENE	1/6	11	11	1.96	11	08SW01201	14	0.79	NO	NO	BSL
TOLUENE	2/6	3	110	18.9	56.5	08SW01201	253	0.43	NO	NO	BSL
TOTAL XYLENES	1/6	57	57	9.63	57	08SW01201	27	2.11	YES	NO	ASL/NONBIO
TRANS-1,2-DICHLOROETHENE	2/6	0.5 J	4.4	0.917	2.45	08SW00402	970	0.005	NO	NO	BSL
TRICHLOROETHENE	5/6	4.7	590	103	124	08SW00402	47	12.6	YES	NO	ASL/NONBIO
VINYL CHLORIDE	6/6	0.7 J	40	12.7	12.7	08SW00402	930	0.043	NO	NO	BSL
Semivolatile Organics (ug/L)											
1,4-DIOXANE	4/5	4 J	5	3.90	4.75	08SW00401, 08SW00402, 08SW00502	22000	0.0002	NO	NO	BSL
2-METHYLNAPHTHALENE	1/4	0.9	0.9	0.244	0.9	08SW00402	330	0.003	NO	NO	BSL
2-METHYLPHENOL	1/2	4 J	4 J	2.25	4	08SW01201	67	0.06	NO	NO	BSL
3&4-METHYLPHENOL	1/2	7	7	3.75	7	08SW01201	62	0.11	NO	NO	BSL
ACENAPHTHENE	1/4	0.37 J	0.37 J	0.112	0.37	08SW00402	38	0.01	NO	NO	BSL
ACETOPHENONE	1/5	7	7	1.8	7	08SW01201	NA	NA	YES	NO	NC/NONBIO
BENZYL ALCOHOL	1/5	3 J	3 J	1	3	08SW01201	8.6	0.35	NO	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	2/5	1 J	2 J	0.905	1.5	08SW01201	0.3	6.67	YES	NO	ASL/NONBIO
NAPHTHALENE	1/4	0.34 J	0.34 J	0.104	0.34	08SW00402	13	0.03	NO	NO	BSL
PHENANTHRENE	1/4	1.42 J	1.42 J	0.374	1.42	08SW00402	3.6	0.39	NO	NO	BSL
PHENOL	1/2	7	7	3.75	7	08SW01201	180	0.04	NO	NO	BSL
Total Metals (ug/L)											
ALUMINUM	5/5	328 J	6780 J	1665	1665	08SW01201	87 [2]	77.9	YES	NO	ASL/NONBIO
ANTIMONY	1/5	3.1 J	3.1 J	0.767	3.1	08SW01201	80	0.04	NO	NO	BSL
ARSENIC	1/5	20.6 J	20.6 J	4.37	20.6	08SW01201	148	0.14	NO	NO	BSL
BARIUM	5/5	94.8 J	450 J	174	174	08SW01201	220	2.05	YES	NO	ASL/NONBIO
BERYLLIUM	1/5	0.32 J	0.32 J	0.072	0.32	08SW01201	3.6	0.09	NO	NO	BSL
CADMIUM	2/5	2.4 J	9.5	2.45	5.95	08SW01201	0.43 [3]	22.1	YES	YES	ASL/BIO
CALCIUM	5/5	61600 J	240000 J	99640	99640	08SW01201	NA	NA	NO	NO	NUT
CHROMIUM	5/5	1.1 J	73.4	20.5	20.5	08SW01201	145.01 [3]	0.51	NO	NO	BSL
COBALT	5/5	0.48 J	24.8	5.5	5.5	08SW01201	24	1.03	YES	NO	ASL/NONBIO
COPPER	5/5	2 J	184 J	39.7	39.7	08SW01201	16.06 [3]	11	YES	YES	ASL/BIO
IRON	5/5	938 J	31100	7494	7494	08SW01201	1000 [2]	31.1	YES	NO	ASL/NONBIO
LEAD	5/5	1.2 J	171	40.4	40.4	08SW01201	7.14 [3]	24	YES	YES	ASL/BIO
MAGNESIUM	5/5	8490 J	12400	9638	9638	08SW01201	NA	NA	NO	NO	NUT
MANGANESE	5/5	158 J	4310	1007	1007	08SW01201	925 [3,4]	4.66	YES	NO	ASL/NONBIO
NICKEL	5/5	1.3	22.9	6.02	6.02	08SW01201	89.29 [3]	0.26	NO	NO	BSL
POTASSIUM	5/5	3470 J	6900	4316	4316	08SW01201	NA	NA	NO	NO	NUT
SELENIUM	1/5	0.63 J	0.63 J	0.207	0.63	08SW01201	5	0.13	NO	NO	BSL
SODIUM	5/5	25200 J	52900 J	32520	32520	08SW01201	NA	NA	NO	NO	NUT
TIN	1/1	31.2 J	31.2 J	31.2	31.2	08SW01201	180	0.17	NO	NO	BSL
VANADIUM	1/5	12.8	12.8	3.02	12.8	08SW01201	12	1.07	YES	NO	ASL/NONBIO
ZINC	2/5	93 J	1700 J	363	897	08SW01201	205.27 [3]	8.3	YES	YES	ASL/BIO

TABLE 8-6

ECOLOGICAL COPC SELECTION - POND SURFACE WATER SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detected	Region 5 ESL	Ecological Effects Quotient	COPC for Aquatic Invertebrates	COPC for Wildlife	Rationale for COPC Selection
Dissolved Metals (ug/L)											
ALUMINUM, FILTERED	1/5	113 J	113 J	30.2	113	08SW00401-F	87 [2]	1.30	YES	NO	ASL/NONBIO
ARSENIC, FILTERED	1/5	5.8 J	5.8 J	1.32	5.8	08SW01201-F	148	0.04	NO	NO	BSL
BARIUM, FILTERED	5/5	81.1 J	234 J	123	123	08SW01201-F	220	1.06	YES	NO	ASL/NONBIO
CADMIUM, FILTERED	4/5	0.15 J	0.61 J	0.283	0.348	08SW00402-F	0.38 [3]	1.61	YES	YES	ASL/BIO
CALCIUM, FILTERED	5/5	57300	106000 J	69440	69440	08SW01201-F	NA	NA	NO	NO	NUT
CHROMIUM, FILTERED	2/5	0.73 J	4.5 J	1.35	2.62	08SW00402-F	124.71 [3]	0.04	NO	NO	BSL
COBALT, FILTERED	5/5	0.41 J	8.3	2.07	2.07	08SW01201-F	24	0.35	NO	NO	BSL
COPPER, FILTERED	4/5	1.1 J	2.3 J	1.5	1.7	08SW00402-F	15.41 [3]	0.15	NO	NO	BSL
IRON, FILTERED	5/5	452 J	7000	1960	1960	08SW01201-F	1000 [2]	7.0	YES	NO	ASL/NONBIO
LEAD, FILTERED	5/5	0.14 J	5.5 J	1.55	1.55	08SW00402-F	4.99 [3]	1.10	YES	YES	ASL/BIO
MAGNESIUM, FILTERED	5/5	8040 J	11600	9244	9244	08SW01201-F	NA	NA	NO	NO	NUT
MANGANESE, FILTERED	5/5	88.2 J	2960	700	700	08SW01201-F	925 [3,4]	3.20	YES	NO	ASL/NONBIO
NICKEL, FILTERED	5/5	4.7 J	6	5.18	5.18	08SW01201-F	89.02 [3]	0.07	NO	NO	BSL
POTASSIUM, FILTERED	5/5	2870 J	4730	3474	3474	08SW01201-F	NA	NA	NO	NO	NUT
SELENIUM, FILTERED	1/5	0.15 J	0.15 J	0.168	0.15	08SW01201-F	5	0.03	NO	NO	BSL
SODIUM, FILTERED	5/5	19300 J	57400 J	30140	30140	08SW01201-F	NA	NA	NO	NO	NUT
THALLIUM, FILTERED	4/5	0.1 J	0.11 J	0.105	0.108	08SW00402-F, 08SW00502-F	10	0.01	NO	NO	BSL
TIN, FILTERED	1/1	1.1 J	1.1 J	1.1	1.1	08SW01201-F	180	0.006	NO	NO	BSL
ZINC, FILTERED	4/5	4.2 J	22 J	8.91	10.7	08SW00402-F	202.4 [3]	0.11	NO	NO	BSL
Field Parameters											
DISSOLVED OXYGEN (MG/L)	1/1	3.88	3.88	3.88	3.88	08SW00403	NA	NA	NA	NA	NA
DISSOLVED OXYGEN - METER (MG/L)	4/4	2.64	8.27	5.97	5.97	08SW00502	NA	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	5/5	-103	145	-0.82	-0.82	08SW00403	NA	NA	NA	NA	NA
PH (S.U.)	5/5	7.1	7.42	7.21	7.21	08SW00403	NA	NA	NA	NA	NA
SPECIFIC CONDUCTANCE (MS/CM)	5/5	0.294	0.42	0.333	0.333	08SW00402	NA	NA	NA	NA	NA
TEMPERATURE (°C)	5/5	5.85	11.4	7.13	7.13	08SW00403	NA	NA	NA	NA	NA
TURBIDITY (NTU)	5/5	6.9	21	14	14	08SW00502	NA	NA	NA	NA	NA

Notes:
Field duplicate samples are excluded from these summaries because they are considered to be field quality control samples.
S.U. - Standard Units
NTU - Nephelometric turbidity units
NA - Not applicable
ESL - Ecological screening level
COPC - Chemical of potential concern
MV - Millivolt
ms/cm - Milli Siemens per centimeter
J - Estimated Concentration
°C - Degrees Celcius
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = threshold value.
2 - USEPA Water Quality Criteria (2002).
3 - Based on water hardness of 189 mg/L.
4 - IDEM Water Quality Criteria (2001).

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-7

ECOLOGICAL COPC SELECTION - TRIBUTARY SURFACE WATER SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Aquatic Invertebrates	COPC for Wildlife	Rationale for COPC Selection
Volatile Organics (ug/L)											
1,1,1-TRICHLOROETHANE	4/17	0.9 J	13	1.26	4.88	08SW00601	76	0.17	NO	NO	BSL
1,1-DICHLOROETHANE	4/17	1.4	30	3.84	15.8	08SP00202	47	0.64	NO	NO	BSL
1,1-DICHLOROETHENE	3/17	1.1	5.6	0.759	3.6	08SP00201	65	0.09	NO	NO	BSL
2-BUTANONE	3/17	0.9 J	10	1.04	4.73	08SW00302	2200	0.005	NO	NO	BSL
4-METHYL-2-PENTANONE	1/17	0.6 J	0.6 J	0.271	0.6	08SW00302	170	0.004	NO	NO	BSL
ACETONE	4/17	2.6 J	52 J	4	16.2	08SW00302	1700	0.03	NO	NO	BSL
CIS-1,2-DICHLOROETHENE	6/17	1.4	7.9	1.24	3.23	08SW00601	970	0.008	NO	NO	BSL
TRICHLOROETHENE	8/17	0.6 J	34	3.16	6.55	08SW00601	47	0.72	NO	NO	BSL
VINYL CHLORIDE	1/17	0.8 J	0.8 J	0.188	0.8	08SW00302	930	0.0009	NO	NO	BSL
Semivolatile Organics (ug/L)											
1,4-DIOXANE	4/8	3 J	6	2.74	5	08SW00302, 08SW00702	22000	0.0003	NO	NO	BSL
BIS(2-ETHYLHEXYL)PHTHALATE	1/7	1 J	1 J	0.564	1	08SW01501	0.3	3.33	YES	NO	ASL/NONBIO
Total Metals (ug/L)											
ALUMINUM	7/8	282 J	25800 J	3733	4265	08SP00201	87 [2]	297	YES	NO	ASL/NONBIO
ARSENIC	2/8	2.5 J	7.5 J	1.39	5	08SP00201	148	0.05	NO	NO	BSL
BARIUM	8/8	48 J	207 J	96.1	96.1	08SP00201	220	0.94	NO	NO	BSL
BERYLLIUM	1/8	1.1 J	1.1 J	0.15	1.1	08SP00201	3.6	0.31	NO	NO	BSL
CADMIUM	4/8	0.07 J	1.1	0.229	0.383	08SP00201	0.23 [3]	4.78	YES	YES	ASL/BIO
CALCIUM	8/8	24700 J	96000 J	65975	65975	08SP00201	NA	NA	NO	NO	NUT
CHROMIUM	8/8	0.32 J	23.8	4.05	4.05	08SP00201	72.99 [3]	0.33	NO	NO	BSL
COBALT	8/8	0.13 J	52.4	7.21	7.21	08SP00201	24	2.18	YES	NO	ASL/NONBIO
COPPER	5/8	2.1 J	28.4 J	5.29	7.52	08SP00201	7.84 [3]	3.6	YES	YES	ASL/BIO
IRON	8/8	93.2	29000	4349	4349	08SP00201	1000 [2]	29.0	YES	NO	ASL/NONBIO
LEAD	5/8	0.43 J	29.8	4.74	7.49	08SP00201	2.46 [3]	12.1	YES	YES	ASL/BIO
MAGNESIUM	8/8	4850 J	23600	11838	11838	08SW00302	NA	NA	NO	NO	NUT
MANGANESE	8/8	6.2 J	6200	909	909	08SP00201	443 [3,4]	14.0	YES	NO	ASL/NONBIO
MERCURY	1/8	0.068 J	0.068 J	0.0216	0.068	08SP00201	0.0013	52.3	YES	YES	ASL/BIO
NICKEL	8/8	0.79 J	47.3	9.06	9.06	08SP00201	43.94 [3]	1.08	YES	YES	ASL/BIO
POTASSIUM	8/8	976	3110	1750	1750	08SP00201	NA	NA	NO	NO	NUT
SELENIUM	2/8	0.2 J	0.58 J	0.17	0.39	08SP00201	5	0.12	NO	NO	BSL
SODIUM	8/8	7210 J	70200 J	21953	21953	08SW00302	NA	NA	NO	NO	NUT
THALLIUM	1/8	0.46 J	0.46 J	0.0974	0.46	08SP00201	10	0.05	NO	NO	BSL
TIN	1/4	0.41 J	0.41 J	0.131	0.41	08SP00201	180	0.002	NO	NO	BSL
VANADIUM	3/8	1.9 J	39.8	5.91	14.8	08SP00201	12	3.32	YES	NO	ASL/NONBIO
ZINC	5/8	9.7 J	79.8 J	23.9	33.5	08SP00201	100.9 [3]	0.79	NO	NO	BSL
Dissolved Metals (ug/L)											
ALUMINUM, FILTERED	2/8	186	213	57.3	200	08SP00201-F	87 [2]	2.45	YES	NO	ASL/NONBIO
ARSENIC, FILTERED	1/8	1.9 J	1.9 J	0.356	1.9	08SW00302-F	148	0.01	NO	NO	BSL
BARIUM, FILTERED	8/8	40 J	131 J	76.3	76.3	08SW00302-F	220	0.60	NO	NO	BSL
CADMIUM, FILTERED	4/8	0.05 J	0.28 J	0.119	0.193	08SW00301-F	0.21 [3]	1.33	YES	YES	ASL/BIO
CALCIUM, FILTERED	8/8	22700	104000 J	66213	66213	08SP00201-F	NA	NA	NO	NO	NUT
CHROMIUM, FILTERED	4/8	0.22 J	0.58 J	0.341	0.375	08SW00302-F	62.78 [3]	0.01	NO	NO	BSL
COBALT, FILTERED	8/8	0.12 J	7.4	1.51	1.51	08SP00201-F	24	0.31	NO	NO	BSL
COPPER, FILTERED	4/8	1.6 J	1.9 J	1.28	1.73	08SW00601-F	7.53 [3]	0.25	NO	NO	BSL
IRON, FILTERED	8/8	30.7 J	798	356	356	08SW00302-F	1000 [2]	0.80	NO	NO	BSL
LEAD, FILTERED	6/8	0.13 J	0.66 J	0.272	0.352	08SW00302-F	2.02 [3]	0.33	NO	NO	BSL

TABLE 8-7

ECOLOGICAL COPC SELECTION - TRIBUTARY SURFACE WATER SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Aquatic Invertebrates	COPC for Wildlife	Rationale for COPC Selection
Dissolved Metals (ug/L) (continued)											
MANGANESE, FILTERED	8/8	0.88 J	3190	523	523	08SP00201-F	443 [3,4]	7.20	YES	NO	ASL/NONBIO
NICKEL, FILTERED	8/8	0.38 J	15.5 J	4.95	4.95	08SW00301-F	43.81 [3]	0.35	NO	NO	BSL
POTASSIUM, FILTERED	8/8	941	1920	1314	1314	08SW00302-F	NA	NA	NO	NO	NUT
SELENIUM, FILTERED	2/8	0.13 J	0.14 J	0.159	0.135	08SP00201-F	5	0.03	NO	NO	BSL
SODIUM, FILTERED	8/8	6020 J	73000 J	21649	21649	08SW00302-F	NA	NA	NO	NO	NUT
THALLIUM, FILTERED	4/8	0.05 J	0.16 J	0.0844	0.0975	08SW00301-F	10	0.02	NO	NO	BSL
ZINC, FILTERED	8/8	4.6 J	22.6 J	9.85	9.85	08SW00301-F	99.49 [3]	0.23	NO	NO	BSL
Miscellaneous Parameters (mpn)											
TOTAL COLIFORM	1/1	>2419.2	>2419.2	2419	2419	08SP00201	NA	NA	NA	NA	NA
Field Parameters											
DISSOLVED OXYGEN (MG/L)	9/9	5.88	15.81	9.54	9.54	08SW00201	NA	NA	NA	NA	NA
DISSOLVED OXYGEN - METER (MG/L)	3/3	11.36	12.41	12	12	08SW00701	NA	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	13/13	-2	203	104	104	08SP00202	NA	NA	NA	NA	NA
PH (S.U.)	13/13	6.85	8.73	7.64	7.64	08SW00201	NA	NA	NA	NA	NA
SPECIFIC CONDUCTANCE (MS/CM)	13/13	0.109	0.609	0.34	0.34	08SW00301	NA	NA	NA	NA	NA
TEMPERATURE (°C)	13/13	6.02	13.41	10.3	10.3	08SP00202	NA	NA	NA	NA	NA
TURBIDITY (NTU)	13/13	1.4	34	8.21	8.21	08SW00101	NA	NA	NA	NA	NA

Notes:
Field duplicate samples are excluded from these summaries because they are considered to be field quality control samples.
S.U. - Standard Units
NTU - Nephelometric turbidity units
NA - Not applicable
ESL - Ecological screening level
COPC - Chemical of potential concern
Mv - Millivolt
ms/cm - Milli Siemens per centimeter
J - Estimated concentration
°C - Degrees Celcius
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = threshold value.
2 - U.S. EPA Water Quality Criteria (2002).
3 - Based on water hardness of 81.6 mg/L.
4 - IDEM Water Quality Criteria (2001).

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-8

ECOLOGICAL COPC SELECTION - DOWNGRADIENT MAIN STREAM SURFACE WATER SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Mean Concentration[1]	Average of Concentrations Detected	Sample with Maximum Detection	Region 5 ESL	Ecological Effects Quotient	COPC for Aquatic Invertebrates	COPC for Wildlife	Rationale for COPC Selection
Volatile Organics (ug/L)											
ACETONE	2/9	1.1 J	2.4 J	0.583	1.75	08SW02101	1700	0.001	NO	NO	BSL
Total Metals (ug/L)											
ALUMINUM	3/5	56.7 J	710 J	287	467	08SW00901	87 [2]	8.16	YES	NO	ASL/NONBIO
BARIUM	5/5	35.6 J	69.1 J	53.1	53.1	08SW00802	220	0.31	NO	NO	BSL
CADMIUM	3/5	0.06 J	0.07 J	0.048	0.0633	08SW00902	0.28 [3]	0.25	NO	NO	BSL
CALCIUM	5/5	32200 J	59400 J	46420	46420	08SW00902	NA	NA	NO	NO	NUT
CHROMIUM	5/5	0.39 J	0.97 J	0.674	0.674	08SW00801	90.4 [3]	0.01	NO	NO	BSL
COBALT	4/5	0.12 J	0.27 J	0.169	0.2	08SW00902	24	0.01	NO	NO	BSL
COPPER	2/5	0.99 J	1 J	0.968	0.995	08SW00801	9.8 [3]	0.10	NO	NO	BSL
IRON	5/5	28.4 J	588 J	254	254	08SW00901	1000 [2]	0.59	NO	NO	BSL
LEAD	3/5	0.07 J	0.13 J	0.148	0.0967	08SW00802	3.43 [3]	0.04	NO	NO	BSL
MAGNESIUM	5/5	6210 J	11400	8510	8510	08SW00802	NA	NA	NO	NO	NUT
MANGANESE	5/5	7.3 J	156	49	49	08SW00902	557 [3,4]	0.28	NO	NO	BSL
NICKEL	5/5	0.26 J	1.3	0.762	0.762	08SW00901	54.79 [3]	0.02	NO	NO	BSL
POTASSIUM	5/5	1030 J	1430	1214	1214	08SW00902	NA	NA	NO	NO	NUT
SODIUM	5/5	14200 J	28700 J	20620	20620	08SW00802	NA	NA	NO	NO	NUT
Dissolved Metals (ug/L)											
BARIUM, FILTERED	5/5	31.5 J	65 J	50.4	50.4	08SW00902-F	220	0.30	NO	NO	BSL
CADMIUM, FILTERED	2/5	0.04 J	0.14 J	0.052	0.09	08SW00801-F	0.26 [3]	0.54	NO	NO	BSL
CALCIUM, FILTERED	5/5	31200	58700 J	45640	45640	08SW00902-F	NA	NA	NO	NO	NUT
CHROMIUM, FILTERED	3/5	0.2 J	0.47 J	0.317	0.37	08SW01401-F	77.72 [3]	0.01	NO	NO	BSL
COBALT, FILTERED	3/5	0.14 J	0.21 J	0.118	0.167	08SW00902-F	24	0.009	NO	NO	BSL
COPPER, FILTERED	2/5	0.74 J	0.84 J	0.736	0.79	08SW00901-F	9.41 [3]	0.09	NO	NO	BSL
IRON, FILTERED	4/5	7.1 J	245 J	100	125	08SW00901-F	1000 [1]	0.25	NO	NO	BSL
LEAD, FILTERED	5/5	0.1 J	0.27 J	0.177	0.177	08SW00902-F	2.68 [3]	0.10	NO	NO	BSL
MAGNESIUM, FILTERED	5/5	6250 J	10900	8354	8354	08SW00802-F	NA	NA	NO	NO	NUT
MANGANESE, FILTERED	5/5	1.8 J	137	38.8	38.8	08SW00902-F	557 [3,4]	0.25	NO	NO	BSL
NICKEL, FILTERED	5/5	0.36 J	2.7 J	1.39	1.39	08SW00801-F, 08SW00901-F	54.62 [3]	0.05	NO	NO	BSL
POTASSIUM, FILTERED	5/5	770 J	1380	1088	1088	08SW00902-F	NA	NA	NO	NO	NUT
SODIUM, FILTERED	5/5	12200 J	27900 J	19340	19340	08SW00802-F	NA	NA	NO	NO	NUT
THALLIUM, FILTERED	2/5	0.11 J	0.12 J	0.078	0.115	08SW00901-F	10	0.01	NO	NO	BSL
ZINC, FILTERED	3/5	1.2 J	2.2 J	1.34	1.6	08SW00902-F	124 [3]	0.02	NO	NO	BSL
Field Parameters											
DISSOLVED OXYGEN (MG/L)	4/4	5.16	9.3	7.21	7.21	08SW00803	NA	NA	NA	NA	NA
DISSOLVED OXYGEN - METER (MG/L)	2/2	12.99	13.54	13.3	13.3	08SW00901	NA	NA	NA	NA	NA
OXIDATION REDUCTION POTENTIAL (MV)	6/6	32.3	187	134	134	08SW02101	NA	NA	NA	NA	NA
PH (S.U.)	6/6	6.88	7.45	7.21	7.21	08SW00801	NA	NA	NA	NA	NA
SPECIFIC CONDUCTANCE (MS/CM)	6/6	0.267	0.347	0.316	0.316	08SW00803	NA	NA	NA	NA	NA
TEMPERATURE (°C)	6/6	4.68	10.39	8.09	8.09	08SW00803	NA	NA	NA	NA	NA
TURBIDITY (NTU)	6/6	0.75	13	6.53	6.53	08SW00903	NA	NA	NA	NA	NA

TABLE 8-8

ECOLOGICAL COPC SELECTION - DOWNGRADIENT MAIN STREAM SURFACE WATER SAMPLES
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Notes:
Field duplicate samples are excluded from these summaries because they are considered to be field quality control samples.
S.U. - Standard Units
NTU - Nephelometric turbidity units
NA - Not applicable
ESL - Ecological screening level
COPC - Chemical of potential concern
MV - Milivolt
ms/cm - Milli Siemens per centimeter
J - Estimated concentration
°C - Degrees Celcius
1 - Mean concentrations incorporate TV/2 for non-detect values where TV = threshold value.
2 - U.S. EPA Water Quality Criteria (2002).
3 - Based on water hardness of 106 mg/L.
4 - IDEM Water Quality Criteria (2001).

Rationale:
ASL = Above Screening Level
BSL = Below Screening Level
NC = No Screening Level Available
BIO = Bioaccumulative Chemical
NONBIO = Nonbioaccumulative Chemical
NUT = Essential Nutrient

TABLE 8-9

STEP 3A EVALUATION FOR RISKS TO PLANTS AND INVERTEBRATES
GRASS AND GRAVEL SURFACE SOIL COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration	Ecological Screening Level (ESL)[1]	Maximum EEQ[2]	Number of Samples > ESL[3]	Step 3a Evaluation[4]						Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						Alternate Benchmarks					Other Step 3a Factors Considered in Evaluation		
						Eco-SSL (soil inverts)	Eco-SSL (plants)	Canadian SQG[4]	ORNL Benchmarks[5]				
									Plants	Earthworms			
Inorganics (mg/kg)													
CADMIUM	2/8	0.55	0.36[6]	1.53	2	140	32	3.8	4	20	- Maximum concentration less than alternate benchmarks.	Acceptable	No
COPPER	8/8	13.2	5.4	2.44	8	NA	NA	63	100	60	- Maximum concentration less than alternate benchmarks.	Acceptable	No
LEAD	8/8	31.1	11[6]	2.83	6	1,700	120	70	50	500	- Maximum concentration less than alternate benchmarks.	Acceptable	No
MANGANESE	8/8	522	NA	NA	NA	NA	NA	NA	500	NA	- Maximum concentration less than background.	Acceptable	No
VANADIUM	8/8	40.5	7.8[6]	5.19	8	NA	NA	130	2	NA	- Maximum concentration less than alternate benchmarks.	Acceptable	No
ZINC	8/8	128	6.62	19.30	8	NA	NA	200	50	100	- Maximum concentration less than alternate benchmarks.	Acceptable	No

Footnotes:
1 - ESL is the Region 5 Ecological Screening Level, unless a U.S. EPA Ecological Soil Screening Level is available, as noted.
2 - Maximum EEQ = Maximum detection divided by the screening level.
3 - Number of samples with concentrations greater than the screening level.
4 - See Section 8.4.1.1 for a more detailed Step 3a evaluation.
5 - Canadian and ORNL benchmarks were used only in the absence of Eco-SSLs.
6 - U.S. EPA Ecological Soil Screening Level

EEQ = Ecological Effects Quotient
NA = Not available or not applicable
SQG = Soil Quality Guideline
Eco-SSL = U.S. EPA Ecological Soil Screening Level
ORNL = Oak Ridge National Laboratory

TABLE 8-10

STEP 3A EVALUATION FOR RISKS TO BENTHIC INVERTEBRATES
TRIBUTARY SEDIMENT COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration	Screening Level	Maximum EEQ[1]	Number of Samples > Screening Level[2]	Step 3a Evaluation					Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						Alternate Benchmarks				Other Step 3a Factors Considered in Evaluation[3]		
						Consensus-Based PEC[4]	Canadian LEL[5]	ER-L[6]	ER-L[7]			
Semivolatiles (ug/kg)												
ACENAPHTHYLENE	1/5	11	5.87	1.87	1	NA	NA	NA	44	- Sample with maximum concentration is in a drainage ditch that is not wet year round. - Poor habitat for benthic invertebrates.	Acceptable	NO
BIS(2-ETHYLHEXYL)PHTHALATE	4/12	680	182	3.74	4	NA	NA	NA	NA	- Maximum concentration is less than the freshwater UET (Buchman, 1999). - Bis(2-ethylhexyl)phthalate is generally considered a lab contaminant.	Acceptable	NO
PYRENE	4/5	210	195	1.08	1	1,520	490	350	665	- Maximum concentration is less than the PEC.	Acceptable	NO
Inorganics (mg/kg)												
ALUMINUM	2/2	17,800	NA	NA	NA	NA	NA	NA	NA	- Maximum concentration is less than the TEL of 25,500 mg/kg (Buchman, 1999).	Acceptable	NO
ANTIMONY	1/2	0.92	NA	NA	NA	NA	NA	2	2	- Maximum concentration is less than the ER-L from Long and Morgan.	Acceptable	NO
ARSENIC	2/2	18.7	9.79	1.91	1	33	6	33	8.2	- Maximum concentration is less than the PEC.	Acceptable	NO
BARIUM	2/2	133	NA	NA	NA	NA	NA	NA	NA	- Maximum concentration is less than the saltwater AET of 48 mg/kg (Buchman, 1999). - Maximum concentration is two times greater than the concentration in upgradient sample 08SD013010006 (64.8 mg/kg). - Concentration of barium in Tributary sample 08SD011010006 (58.9 mg/kg) is less than the concentration in the upgradient sample. - Because of variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates. - Maximum barium concentration in surface soil is less than maximum background soil concentration, so soil contamination is not site related. - Because surface runoff from soil is major pathway to sediment, sediment contamination is also probably not site related.	Acceptable	NO
BERYLLIUM	2/2	2.2	NA	NA	NA	NA	NA	NA	NA	- Alternate screening levels not available for beryllium. - The maximum concentration is an order of magnitude greater than the concentration in upgradient sediment sample 08SD013010006 (0.27 mg/kg). - The concentration of beryllium in Tributary sample 08SD011010006 (0.5 mg/kg) is approximately 2 times greater than the concentration in the upgradient sample. - Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates. - The maximum beryllium concentration in surface soil is greater than the maximum background soil concentration, so soil contamination might be site related. - Because surface runoff from soil is major pathway to sediment, sediment contamination also might be site related. - Due to the reasons discussed above, risks to benthic invertebrates from beryllium cannot be ruled out.	Unacceptable	YES
CHROMIUM	2/2	60.4	43.4	1.39	1	111	26	80	81	- Maximum concentration is less than the PEC.	Acceptable	NO

TABLE 8-10

STEP 3A EVALUATION FOR RISKS TO BENTHIC INVERTEBRATES
TRIBUTARY SEDIMENT COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration	Screening Level	Maximum EEQ[1]	Number of Samples > Screening Level[2]	Step 3a Evaluation					Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						Alternate Benchmarks				Other Step 3a Factors Considered in Evaluation[3]		
						Consensus-Based PEC[4]	Canadian LEL[5]	ER-L[6]	ER-L[7]			
Inorganics (mg/kg) (continued)												
IRON	2/2	71,900	NA	NA	NA	NA	NA	NA	NA	- A Region 5 ESL is not available for iron. - The maximum concentration is greater than the concentration in upgradient sample 08SD013010006 (11,800 mg/kg). - The concentration of iron in Tributary sample 08SD011010006 (18,200 mg/kg) is slightly greater than the concentration in the upgradient sample. - Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates. - The maximum iron concentration in surface soil is less than the maximum background soil concentration, so soil contamination is not site related. - Because surface runoff from soil is major pathway to sediment, sediment contamination is also probably not site related.	Acceptable	NO
MANGANESE	2/2	3,130	NA	NA	NA	NA	460	NA	NA	- The maximum concentration is greater than the Canadian LEL. - The maximum concentration is greater than the concentration in upgradient sample 08SD013010006 (290 mg/kg). - The concentration of manganese in Tributary sample 08SD011010006 (336 mg/kg) is slightly greater than the concentration in the upgradient sample. - Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates. - The maximum manganese concentration in surface soil is less than the maximum background soil concentration, so soil contamiantion is not site related. - Because surface runoff from soil is major pathway to sediment, sediment contamination is also probably not site related.	Acceptable	NO
SELENIUM	2/2	0.75	NA	NA	NA	NA	NA	NA	NA	- Maximum concentration is less than the saltwater AET of 1.0 mg/kg (Buchman, 1999). - The maximum concentration is greater than the concentration in upgradient sample 08SD013010006 (0.21 mg/kg). - Concentration of selenium in Tributary sample 08SD011010006 (0.22 mg/kg) is slightly greater than the concentration in the upgradient sample. - Because of the variability in sediment concentrations, alternate lines of evidence were used to evaluate risks to benthic invertebrates. - Selenium was not detected in the surface soil. - Because surface runoff from soil is major pathway to sediment, sediment contamination is also probably not site related.	Acceptable	NO

TABLE 8-10

STEP 3A EVALUATION FOR RISKS TO BENTHIC INVERTEBRATES
TRIBUTARY SEDIMENT COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration	Screening Level	Maximum EEQ[1]	Number of Samples > Screening Level[2]	Step 3a Evaluation					Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						Alternate Benchmarks				Other Step 3a Factors Considered in Evaluation[3]		
						Consensus-Based PEC[4]	Canadian LEL[5]	ER-L[6]	ER-L[7]			
Inorganics (mg/kg) (continued)												
VANADIUM	2/2	53.1	NA	NA	NA	NA	NA	NA	NA	- The maximum concentration is less than the saltwater AET of 57 mg/kg (Buchman, 1999). - The concentration of vanadium in upgradient sample 08SD013010006 (56.4 mg/kg) is greater than the maximum sediment concentration, so contamination is not likely site related.	Acceptable	NO
Miscellaneous Parameters (mg/kg)												
PERCHLORATE	2/5	0.24	NA	NA	NA	NA	NA	NA	NA	- Chronic benchmark for perchlorate effects to *Chironomus tentans* in freshwater is 83.1 mg/L (Parsons, 2002). - Although this is a surface water benchmark, concentration in sediment is much lower. - Risks cannot be ruled out because of lack of toxicity data, but potential site-related risks are not great enough to warrant carrying perchlorate further through the BERA process.	Acceptable	NO

Footnotes:
1 Maximum EEQ = Maximum detection divided by the screening level.
2 Number of samples with concentrations greater than the screening level.
3 See Section 8.4.1.2 for a more detailed Step 3a Evaluation.
4 MacDonald et al. (2000).
5 Canadian Sediment Guidelines (OMOE, 1993).
6 Long and Morgan (1991).
7 Long et al. (1995).

Acronyms:

EEQ = Ecological Effects Quotient
ER-L = Effects Range-Low
LEL = Lowest Effects Level
NA = Not available or not applicable
PEC = Probable Effect Concentration
UET = Upper effects threshold
TEL = Threshold effects level
AEL = Apparent effects threshold
ESL = Ecological screening levels

TABLE 8-11

STEP 3A EVALUATION FOR RISKS TO BENTHIC INVERTEBRATES
MAIN STREAM SEDIMENT COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration (mg/kg)	Screening Level (mg/kg)	Maximum EEQ[1]	Number of Samples > Screening Level[2]	Step 3a Evaluation					Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						Alternate Benchmarks				Other Step 3a Factors Considered in Evaluation[3]		
						Consensus-Based PEC[4]	Canadian LEL[5]	ER-L[6]	ER-L[7]			
Semivolatiles (ug/kg)												
BIS(2-ETHYLHEXYL)PHTHALATE	1/5	210	182	1.15	1	NA	NA	NA	NA	- The maximum concentration is less than the freshwater UET of 750 mg/kg (Buchman, 1999). - The detected concentration is only slightly greater than the Region 5 ESL. - Bis(2-ethylhexyl)phthalate is generally considered a lab contaminant.	Acceptable	NO
Inorganics (mg/kg)												
ALUMINUM	1/1	11800	NA	NA	NA	NA	NA	NA	NA	- The maximum concentration is less than the TEL of 25,500 mg/kg (Buchman, 1999). - The maximum concentration is less than the upgradient aluminum concentration in sample 08SD010010006 (19,600 mg/kg).	Acceptable	NO
ANTIMONY	1/1	1.4	NA	NA	NA	NA	NA	2	2	- The maximum concentration is less than the ER-L (Long & Morgan).	Acceptable	NO
ARSENIC	1/1	19.7	9.79	2.01	1	33	6	33	8.2	- The maximum concentration is less than the PEC. - The maximum cocnentration is less than the upgradient arsenic concentration in sample 08SD010010006 (27.6 mg/kg).	Acceptable	NO
BARIUM	1/1	83.3	NA	NA	NA	NA	NA	NA	NA	- The maximum concentration is less than the upgradient barium concentration in sample 08SD010010006 (247 mg/kg).	Acceptable	NO
BERYLLIUM	1/1	1.6	NA	NA	NA	NA	NA	NA	NA	- Alternate screening levels not available for beryllium. - Maximum concentration is less than the concentration in upgradient sediment sample 08SD010010006 (31 mg/kg). - Contamination probably not site-related.	Acceptable	NO
CHROMIUM	1/1	61.2	43.4	1.41	1	111	26	80	81	- The maximum concentration is less than the PEC. - The maximum concentration is less than the upgradient chromium concentration in sample 08SD010010006 (132 mg/kg).	Acceptable	NO
IRON	1/1	71400	NA	NA	NA	NA	NA	NA	NA	- The maximum concentration is less than the upgradient iron concentration in sample 08SD010010006 (120,000 mg/kg).	Acceptable	NO
MANGANESE	1/1	1790	NA	NA	NA	NA	460	NA	NA	- The maximum concentration is less than the upgradient manganese concentration in sample 08SD010010006 (7,160 mg/kg).	Acceptable	NO
SELENIUM	1/1	0.59	NA	NA	NA	NA	NA	NA	NA	- The maximum concentration is less than the saltwater AET of 1.0 mg/kg (Buchman, 1999). - The maximum concentration is less than the upgradient selenium concentration in sample 08SD010010006 (1.3 mg/kg).	Acceptable	NO
VANADIUM	1/1	54.3	NA	NA	NA	NA	NA	NA	NA	- The maximum concentration is less than the saltwater AET of 57 mg/kg (Buchman, 1999). - The maximum concentration is less than the upgradient vanadium concentration in sample 08SD010010006 (99.3 mg/kg).	Acceptable	NO

TABLE 8-11

STEP 3A EVALUATION FOR RISKS TO BENTHIC INVERTEBRATES
MAIN STREAM SEDIMENT COPCs
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Footnotes:
1 - Maximum EEQ = Maximum detection divided by the screening level.
2 - Number of samples with concentrations greater than the screening level.
3 - See Section 8.4.1.2 for a more detailed Step 3a Evaluation.
4 - MacDonald et al. (2000).
5 - Canadian Sediment Guidelines (OMOE, 1993).
6 - Long and Morgan (1991).
7 - Long et al. (1995).

Acronyms:
EEQ = Ecological Effects Quotient
ER-L = Effects Range-Low
LEL = Lowest Effects Level
NA = Not Available or Not Applicable
PEC = Probable Effect Concentration
UET = Upper Effects Threshold
TEL = Threshold Effects Level

TABLE 8-12

COMPARISON OF COPCs IN TRIBUTARY SURFACE WATER TO ESLS AND ALTERNATE BENCHMARKS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration	Screening Level	Maximum EEQ[1]	Number of Samples > Screening Level[2]	Step 3a Evaluation				Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						WQC		ORNL	Other Step 3a Factors Considered in Evaluation[3]		
						Chronic	Acute	Aquatic			
Semivolatile Organics (ug/L)											
BIS(2-ETHYLHEXYL)PHTHALATE	1/7	1	0.3	3.33	1	NA	NA	3	- Maximum concentration was less than the ORNL aquatic benchmark. - Detected in one of seven samples.	Acceptable	NO
Inorganics (ug/L)											
ALUMINUM, TOTAL ALUMINUM, DISSOLVED	7/8 2/8	25,800 213	87 87	297 2.45	7 2	87 87	750 750	NA NA	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - The filtered sample has a much lower aluminum concentration than the unfiltered sample. - The average surface water concentration is a better representation of site contamiantion. - The average filtered aluminum concentration (57.3 mg/kg) is less than the AWQC.	Acceptable	NO
CADMIUM, TOTAL CADMIUM, DISSOLVED	4/8 4/8	1.1 0.28	0.23 0.23	4.78 1.22	1 1	0.25 0.25	2 2	NA NA	- Filtered samples are more indicative of the level of risk to aquatic receptors. - Two of eight filtered samples slightly exceed the screening level. - The average surface water concentration is a better representation of site contamiantion. - The average dissolved cadmium concentration (0.119 ug/L) is less than the screening level.	Acceptable	NO
COBALT, TOTAL	8/8	52.4	24	2.18	1	NA	NA	23	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - All dissolved cobalt concentrations are less than the screening level.	Acceptable	NO
COPPER, TOTAL	5/8	28.4	7.84	3.62	1	9	13	NA	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - All dissolved copper concentrations are less than the screening level.	Acceptable	NO
IRON, TOTAL	8/8	29000	1000	29	3	1000	NA	NA	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - All dissolved iron concentrations are less than the screening level.	Acceptable	NO

TABLE 8-12

COMPARISON OF COPCs IN TRIBUTARY SURFACE WATER TO ESLS AND ALTERNATE BENCHMARKS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration	Screening Level	Maximum EEQ[1]	Number of Samples > Screening Level[2]	Step 3a Evaluation				Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						WQC		ORNL	Other Step 3a Factors Considered in Evaluation[3]		
						Chronic	Acute	Aquatic			
Inorganics (ug/L) (Continued)											
LEAD, TOTAL	5/8	29.8	2.46	12.1	3	2.5	65	NA	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - All dissolved lead concentrations are less than the screening level.	Acceptable	NO
MANGANESE, TOTAL MANGANESE, DISSOLVED	8/8 8/8	6,200 3,190	443 443	14.0 7.2	2 2	NA NA	NA NA	120 120	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - The concentration of manganese in the filtered sample at 08SP002 was about half the concentration in the total metals sample. - Because tolerance values reported range from 1.5 mg/L to over 1,000 mg/L, manganese is not considered a problem in freshwater (U.S. EPA, 1986). - Maximum dissolved manganese concentration is less than this range.	Acceptable	NO
MERCURY, TOTAL	1/8	0.068	0.0013	52.3	1	0.77	1.4	1.3	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - Mercury was not detected in filtered samples.	Acceptable	NO
NICKEL, TOTAL	8/8	47.3	43.94	1.08	1	52	470	NA	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - All dissolved nickel concentrations are less than the screening level.	Acceptable	NO
VANADIUM, TOTAL	3/8	39.8	12	3.32	1	NA	NA	20	- The location of the maximum concentration is a seep with high turbidity. - Filtered samples are more indicative of the level of direct risk to aquatic receptors. - All dissolved vanadium concentrations are less than the screening level.	Acceptable	NO

Footnotes:
1 - Maximum EEQ = Maximum detection divided by the screening level.
2 - Number of samples with concentrations greater than the screening level.
3 - See Section 8.4.1.3 for a more detailed Step 3a Evaluation.

Acronyms:
AWQC = Ambient Water Quality Criteria
EEQ = Ecological Effects Quotient
NA = Not available or not applicable
ORNL = Oak Ridge National Laboratory
WQC = U.S. EPA Water Quality Criteria

TABLE 8-13

COMPARISON OF COPCs IN MAIN STREAM SURFACE WATER TO ESLs AND ALTERNATE BENCHMARKS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection	Maximum Detected Concentration	Screening Level	Maximum EEQ[1]	Number of Samples > Screening Level[2]	Step 3a Evaluation				Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
						WQC		ORNL	Other Step 3a Factors Considered in Evaluation[3]		
						Chronic	Acute	Aquatic			
Inorganics (ug/L)											
ALUMINUM, TOTAL	3/5	710	87	8	2	87	750	NA	- Filtered samples are more indicative of the level of direct risk to aquatic receptors. - Aluminum was not detected in filtered metals samples.	Acceptable	NO

Footnotes:
1 Maximum EEQ = Maximum detection divided by the screening level.
2 Number of samples with concentrations greater than the screening level.
3 See Section 8.4.1.3 for a more detailed Step 3a Evaluation.

Acronyms:
EEQ = Ecological Effects Quotient
NA = Not available or not applicable
ORNL = Oak Ridge National Laboratory
WQC = U.S. EPA Water Quality Criteria

TABLE 8-14

EXPOSURE PARAMETERS FOR THE TERRESTRIAL WILDLIFE MODEL
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, INDIANA

	Conservative Inputs		Average Inputs		
Species/Exposure Inputs	**Value**	**Units**	**Value**	**Units**	**Source**
Meadow Vole					
Body Weight = BW	3.290E-02	kg	3.663E-02	kg	U.S. EPA, 1993
Food Ingestion Rate = If	1.920E-03	kg/day	1.785E-03	kg/day	U.S. EPA, 1993
Water Ingestion Rate = Iw	7.700E-03	L/day	6.400E-03	L/day	U.S. EPA, 1993
Soil Ingestion Rate - Is (3.2%, 1.2%)	6.144E-05	kg/day	2.142E-05	kg/day	U.S. EPA, 2005
Home Range = HR	Assume 100% on site		1.640E-01	acres	U.S. EPA, 1993
Short-Tailed Shrew					
Body Weight = BW	1.525E-02	kg	1.687E-02	kg	U.S. EPA, 1993
Food Ingestion Rate = If	2.592E-03	kg/day	1.648E-03	kg/day	U.S. EPA, 1993
Water Ingestion Rate = Iw	4.300E-03	L/day	3.800E-03	L/day	U.S. EPA, 1993
Soil Ingestion Rate - Is (3%, 0.9%)	7.776E-05	kg/day	1.483E-05	kg/day	U.S. EPA, 2005
Home Range = HR	Assume 100% on site		9.700E-01	acres	U.S. EPA, 1993
American Woodcock					
Body Weight = BW	1.660E-01	kg	1.895E-01	kg	U.S. EPA, 1993
Food Ingestion Rate = If	3.032E-02	kg/day	2.526E-02	kg/day	U.S. EPA, 1993
Water Ingestion Rate = Iw	1.900E-02	L/day	1.900E-02	L/day	U.S. EPA, 1993
Soil Ingestion Rate - Is(16.4%, 6.4%)	4.972E-03	kg/day	1.617E-03	kg/day	U.S. EPA, 2005
Home Range = HR	Assume 100% on site		6.133E+01	acres	U.S. EPA, 1993
Bobwhite Quail					
Body Weight = BW	1.620E-01	kg	1.770E-01	kg	U.S. EPA, 1993
Food Ingestion Rate = If	2.460E-03	kg/day	2.160E-03	kg/day	U.S. EPA, 1993
Water Ingestion Rate = Iw	2.310E-02	L/day	1.840E-02	L/day	U.S. EPA, 1993
Soil Ingestion Rate - Is (13.9%, 6.1%)	3.419E-04	kg/day	1.318E-04	kg/day	U.S. EPA, 2005
Home Range = HR	Assume 100% on site		2.860E+01	acres	U.S. EPA, 1993
Mink					
Body Weight = BW	8.730E-01	kg	1.351E+00	kg	U.S. EPA, 1993
Food Ingestion Rate = If	5.245E-02	kg/day	4.638E-02	kg/day	U.S. EPA, 1993
Water Ingestion Rate = Iw	5.100E-02	kg/day	3.780E-02	kg/day	U.S. EPA, 1993
Sediment Ingestion Rate - Is (4.3%, 1.3%)	2.255E-03	kg/day	6.029E-04	kg/day	U.S. EPA, 2005
Home Range = HR	Assume 100% on site		3.484E+01	acres	U.S. EPA, 1993
Belted Kingfisher					
Body Weight = BW	1.360E-01	kg	1.520E-01	kg	U.S. EPA, 1993
Food Ingestion Rate = If	1.895E-02	kg/day	1.723E-02	kg/day	U.S. EPA, 1993
Water Ingestion Rate = Iw	1.870E-02	L/day	1.670E-02	L/day	U.S. EPA, 1993
Sediment Ingestion Rate - Is (3.3%)	6.254E-04	kg/day	5.684E-04	kg/day	Beyer, 1994
Home Range = HR	Assume 100% on site		1.160E+00	km	U.S. EPA, 1993

Notes:
WW = Wet weight
DW = Dry weight

The food ingestion rate was converted from wet weight to dry weight by multiplying by the percent solids in the food they consume as follows.
- Vole and Quail - 15% solids in vegetation.
- Shrew and Woodcock - 16% solids in earthworms.
- Mink and Kingfisher - 25% solids in fish.

TABLE 8-15

TERRESTRIAL WILDLIFE MODEL-MAXIMUM CONCENTRATIONS, MAXIMUM BAF, AND MAXIMUM EXPOSURE PARAMETERS
SWMU 8 - BUILDING 106 POND
NSWC CRANE, INDIANA

	Meadow Vole		Short-Tailed Shrew		American Woodcock		Bobwhite Quail	
Parameter	**NOAEL EEQ**	**LOAEL EEQ**	**NOAEL EEQ**	**LOAEL EEQ**	**NOAEL EEQ**	**LOAEL EEQ**	**NOAEL EEQ**	**LOAEL EEQ**
Inorganics								
CADMIUM	1.4E-02	1.4E-03	2.4E-01	2.4E-02	2.8E+00	2.1E-01	2.0E-02	1.4E-03
COPPER	1.7E-03	1.3E-03	5.8E-03	4.5E-03	8.7E-02	6.6E-02	3.3E-03	2.5E-03
LEAD	1.3E-02	1.3E-03	5.6E-02	5.6E-03	8.5E+00	8.5E-01	2.6E-01	2.6E-02
MERCURY	1.2E-02	2.4E-03	7.0E-02	1.4E-02	2.0E+01	2.0E+00	4.0E-01	4.0E-02
NICKEL	2.7E-03	1.3E-03	1.3E-02	6.3E-03	1.3E-01	9.4E-02	3.5E-03	2.5E-03
ZINC	9.7E-03	4.8E-03	9.6E-02	4.8E-02	2.1E+01	2.3E+00	2.6E-01	2.9E-02

Notes:
Cells are shaded black if the EEQ is greater than 1.0
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

TABLE 8-16

TERRESTRIAL WILDLIFE MODEL-AVERAGE CONCENTRATIONS, AVERAGE BAF, AND AVERAGE EXPOSURE PARAMETERS
SWMU 8 - BUILDING 106 POND
NSWC CRANE, INDIANA

	Meadow Vole		Short-Tailed Shrew		American Woodcock		Bobwhite Quail	
Parameter	**NOAEL EEQ**	**LOAEL EEQ**	**NOAEL EEQ**	**LOAEL EEQ**	**NOAEL EEQ**	**LOAEL EEQ**	**NOAEL EEQ**	**LOAEL EEQ**
Inorganics								
CADMIUM	7.9E-04	7.9E-05	9.4E-03	9.4E-04	1.6E-01	1.2E-02	1.2E-03	8.9E-05
LEAD	5.0E-04	5.0E-05	2.5E-03	2.5E-04	6.0E-01	6.0E-02	1.7E-02	1.7E-03
MERCURY	4.5E-04	9.1E-05	1.1E-03	2.1E-04	4.4E-01	4.4E-02	1.7E-02	1.7E-03
ZINC	5.3E-04	2.7E-04	4.2E-03	2.1E-03	1.3E+00	1.5E-01	1.6E-02	1.8E-03

Notes:
Cells are shaded black if the EEQ is greater than 1.0
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

TABLE 8-17

TERRESTRIAL WILDLIFE MODEL
MAXIMUM CONCENTRATIONS AND MAXIMUM INPUTS
DOWNGRADIENT TRIBUTARY SEDIMENT
SWMU 8 - BUILDING 106 POND
NSWC CRANE, INDIANA

	Mink		Belted Kingfisher	
Parameter	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**
Semivolatile Organics				
ACENAPHTHYLENE	3.9E-04	3.9E-05	3.2E-04	3.2E-05
PYRENE	7.0E-02	4.2E-02	6.2E-03	6.2E-04
Inorganics				
ARSENIC	6.4E+01	6.4E+00	1.1E-01	3.6E-02
CADMIUM	4.0E-01	4.0E-02	8.5E-03	6.2E-04
CHROMIUM	4.8E-01	1.2E-01	8.7E-01	1.7E-01
COPPER	1.3E-01	9.8E-02	4.9E-03	3.7E-03
LEAD	1.4E-01	1.4E-02	4.4E-01	4.4E-02
MERCURY	4.7E-02	9.4E-03	6.5E-02	6.5E-03
NICKEL	5.1E-02	2.6E-02	3.2E-03	2.3E-03
SELENIUM	2.0E-01	1.2E-01	2.7E-02	1.4E-02

Notes:
Cells are shaded black if the EEQ is greater than 1.0
NA - Not applicable
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor

TABLE 8-18

TERRESTRIAL WILDLIFE MODEL
AVERAGE CONCENTRATIONS AND AVERAGE INPUTS
DOWNGRADIENT TRIBUTARY SEDIMENT
SWMU 8 - BUILDING 106 POND
NSWC CRANE, INDIANA

	Mink		Belted Kingfisher	
Parameter	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**
Inorganics				
ARSENIC	2.0E+00	2.0E-01	5.7E-02	1.9E-02

Notes:
Cells are shaded black if the EEQ is greater than 1.0
NA - Not applicable
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor

TABLE 8-19

TERRESTRIAL WILDLIFE MODEL
MAXIMUM CONCENTRATIONS AND MAXIMUM INPUTS
DOWNGRADIENT MAIN STREAM SEDIMENT
SWMU 8 - BUILDNG 106 POND
NSWC CRANE, INDIANA

	Mink		Belted Kingfisher	
Parameter	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**
Inorganics				
ARSENIC	6.8E+01	6.8E+00	8.1E-02	2.7E-02
CHROMIUM	4.8E-01	1.2E-01	4.3E-01	8.5E-02
SELENIUM	1.6E-01	9.4E-02	2.1E-02	1.1E-02

Notes:
Cells are shaded black if the EEQ is greater than 1.0
NA - Not applicable
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor

TABLE 8-20

TERRESTRIAL WILDLIFE MODEL
AVERAGE CONCENTRATIONS AND AVERAGE INPUTS
DOWNGRADIENT MAIN STREAM SEDIMENT
SWMU 8 - BUILDING 106 POND
NSWC CRANE, INDIANA

	Mink		Belted Kingfisher	
Parameter	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**	**NOAEL EEQ 10% SUF**	**LOAEL EEQ 10% SUF**
Inorganics				
ARSENIC	3.3E+00	3.3E-01	1.6E-02	5.3E-03

Notes:
Cells are shaded black if the EEQ is greater than 1.0
NA - Not applicable
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor

TABLE 8-21

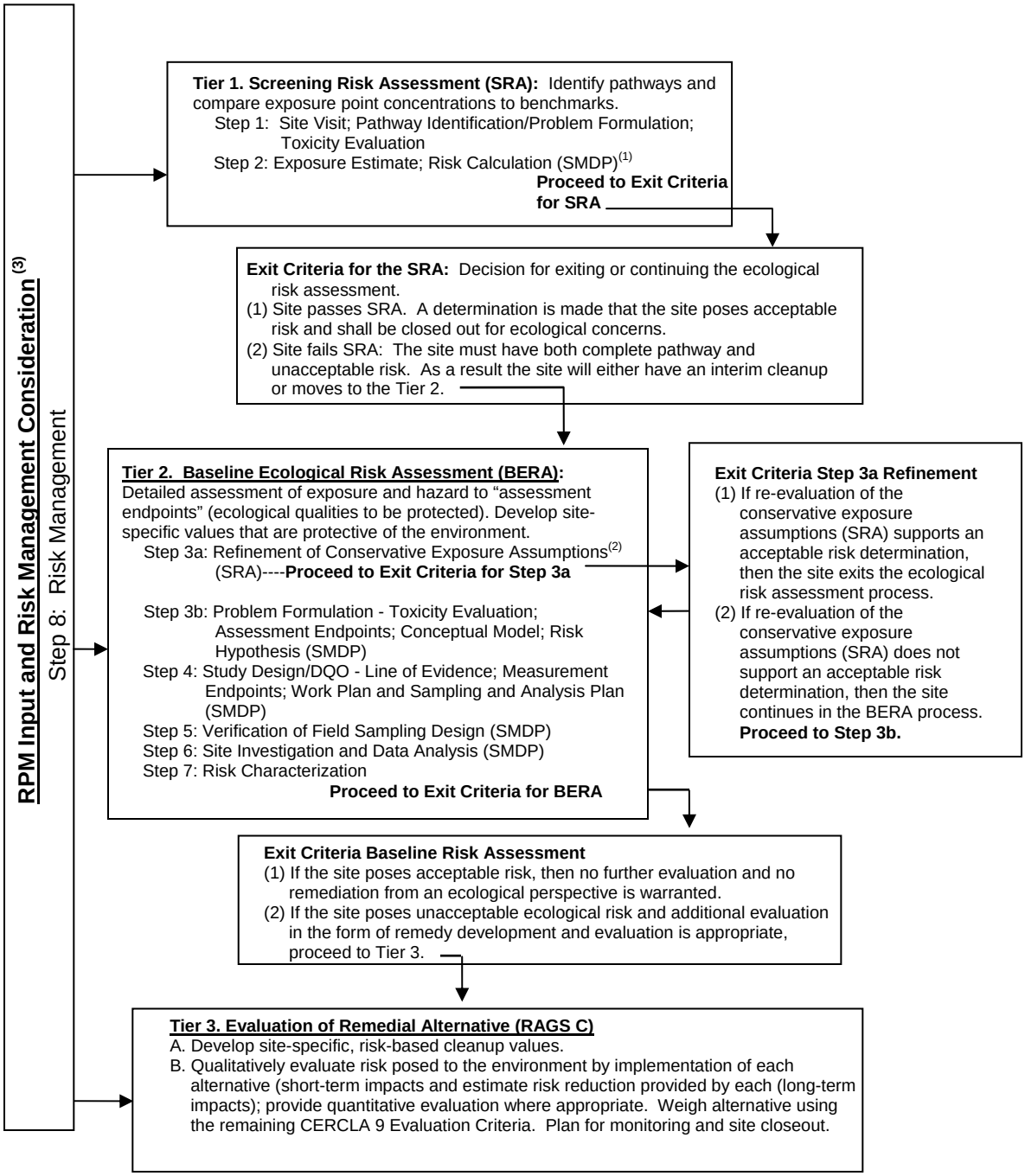
STEP 3A EVALUATION FOR RISKS TO TERRESTRIAL WILDLIFE
SURFACE SOIL AND SEDIMENT COPCS
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Chemical of Potential Concern (COPC)	Frequency of Detection[1]	Maximum Detected Concentration (mg/kg)[1]	EEQs Using Average Concentrations and Average Exposure Parameters				Basis of Wildlife Toxicity Reference Value	Other Step 3a Factors Considered in Evaluation[2]	Risk Determination (Acceptable/ Unacceptable)	Retained as a COPC?
			NOAEL		LOAEL					
			EEQ > 1.0	Species	EEQ > 1.0	Species				
Insectivorous/Herbivorous Wildlife										
Zinc	8/8	128	1.3	Woodcock	None	NA	No effects were observed among hens consuming 48 and 228 mg/kg zinc, but egg hatchability was reduced by 20% among hens consuming 2,028 mg/kg zinc.	- The NOAEL EEQ is greater than 1.0 (but similar to the EEQs from the site data) using the maximum background concentration for zinc in the food-chain model calculation. Therefore, site risks to insectivorous birds are only slightly greater than background risks. Also, the greatest zinc concentration (128 mg/kg) was found in the sample from location 15SB001. This sample location is in a grass area adjacent to Building 107 and a gravel lot, so insectivorous birds are unlikely to obtain a significant amount of food from this area. All other detections of zinc in surface soil are less than the maximum zinc concentration in the background samples (60.2 mg/kg).	Acceptable	No
Piscivorous Wildlife (Tributary)										
Arsenic	2/2	18.7	2.0	Mink	None	NA	Declining litter sizes over multiple mice generations when fed 5 mg/L arsenic in their drinking water and 0.06 mg/kg in their food (LOAEL).	- A NOAEL for the mink has not been developed for arsenic. Because the mouse was used as the test species, it is likely that the TRV calculated for the mink with body weight scaling is conservative. The NOAEL EEQ is slightly greater than 1.0 (2.0), so actual risks to mink from arsenic are not likely. A SUF of 10% was used to better evaluate risk to piscivorous receptors, which is likely conservative.	Acceptable	No
Piscivorous Wildlife (Main Stream)										
Arsenic	1/1	19.7	3.3	Mink	None	NA	Declining litter sizes over multiple mice generations when fed 5 mg/L arsenic in their drinking water and 0.06 mg/kg in their food (LOAEL).	- A NOAEL for the mink has not been developed for arsenic. Because the mouse was used as the test species, it is likely that the TRV calculated for the mink with body weight scaling is conservative. The NOAEL EEQ is slightly greater than 1.0 (3.3), so actual risks to mink from arsenic are not likely. A SUF of 10% was used to better evaluate risk to piscivorous receptors, which is likely conservative.	Acceptable	No

Footnotes:
1 - These columns present the frequency of detection and maximum concentrations in soil for insectivorous/herbivorous receptors and in sediment for piscivorous receptors.
2 - See Section 8.4.2.2 for a more detailed Step 3a Evaluation.

EEQ - Ecological Effects Quotient
NA - Not available or not applicable
NOAEL = No Observed Adverse Effect Level
LOAEL = Lowest Observed Adverse Effect Level
SUF = Site Use Factor

FIGURE 8-1
NAVY ECOLOGICAL RISK ASSESSMENT TIERED APPROACH
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA



Notes: 1 See U.S. EPA's Steps ERA Process for requirements for each Scientific Management Decision Point (SMDP).
2 Refinement includes but is not limited to background, bioavailability, detection frequency, etc.
3 Risk management is incorporated throughout the tiered approach.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
DQO - Data quality objective
ERA - Ecological risk assessment
RAGS - Risk assessment guidance for Superfund
RPM - Remedial project manager

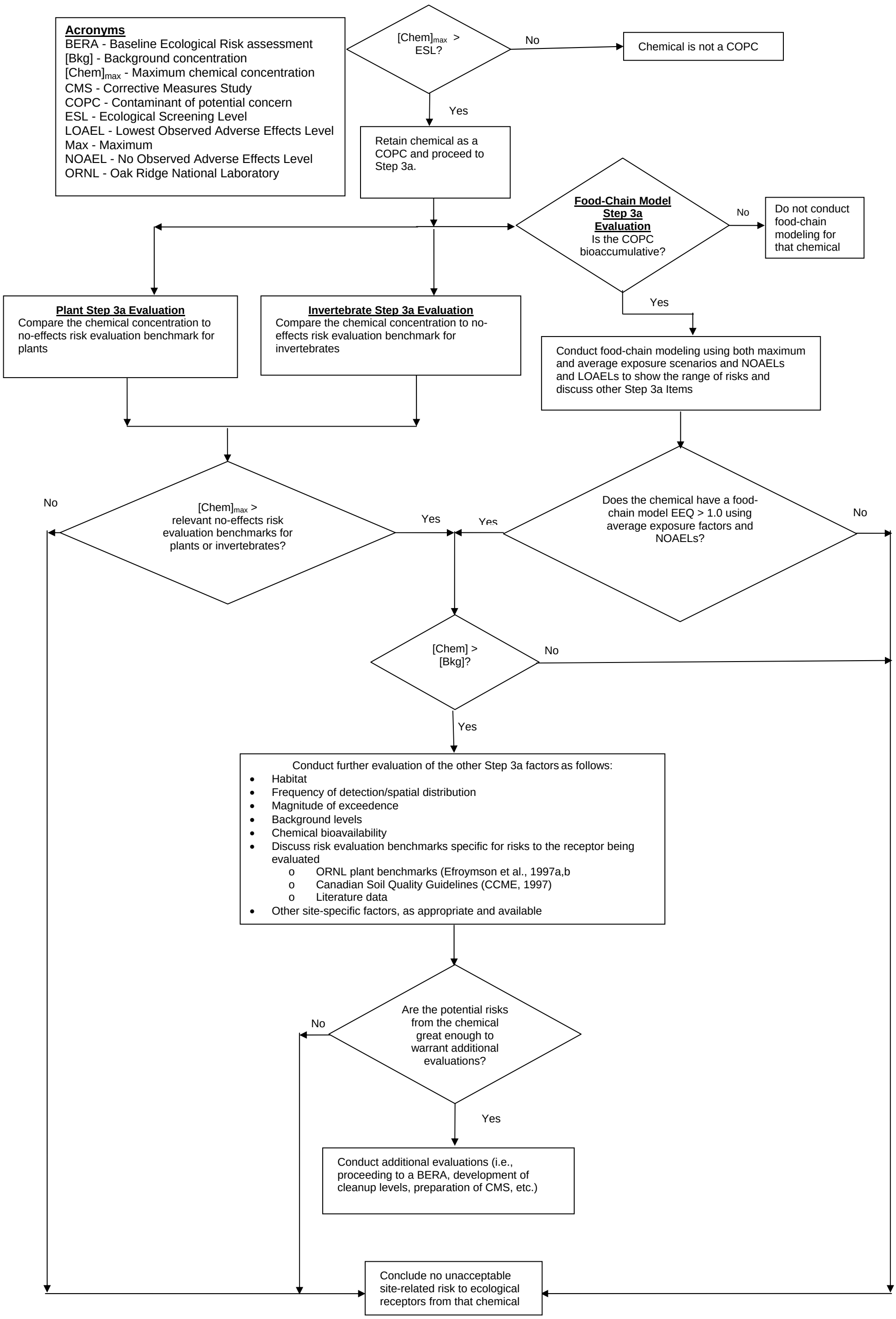


FIGURE 8-2

GENERAL ERA PROCESS FOR EVALUATION OF RISKS TO CHEMICALS IN SURFACE SOIL AT NSWC CRANE, INDIANA
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

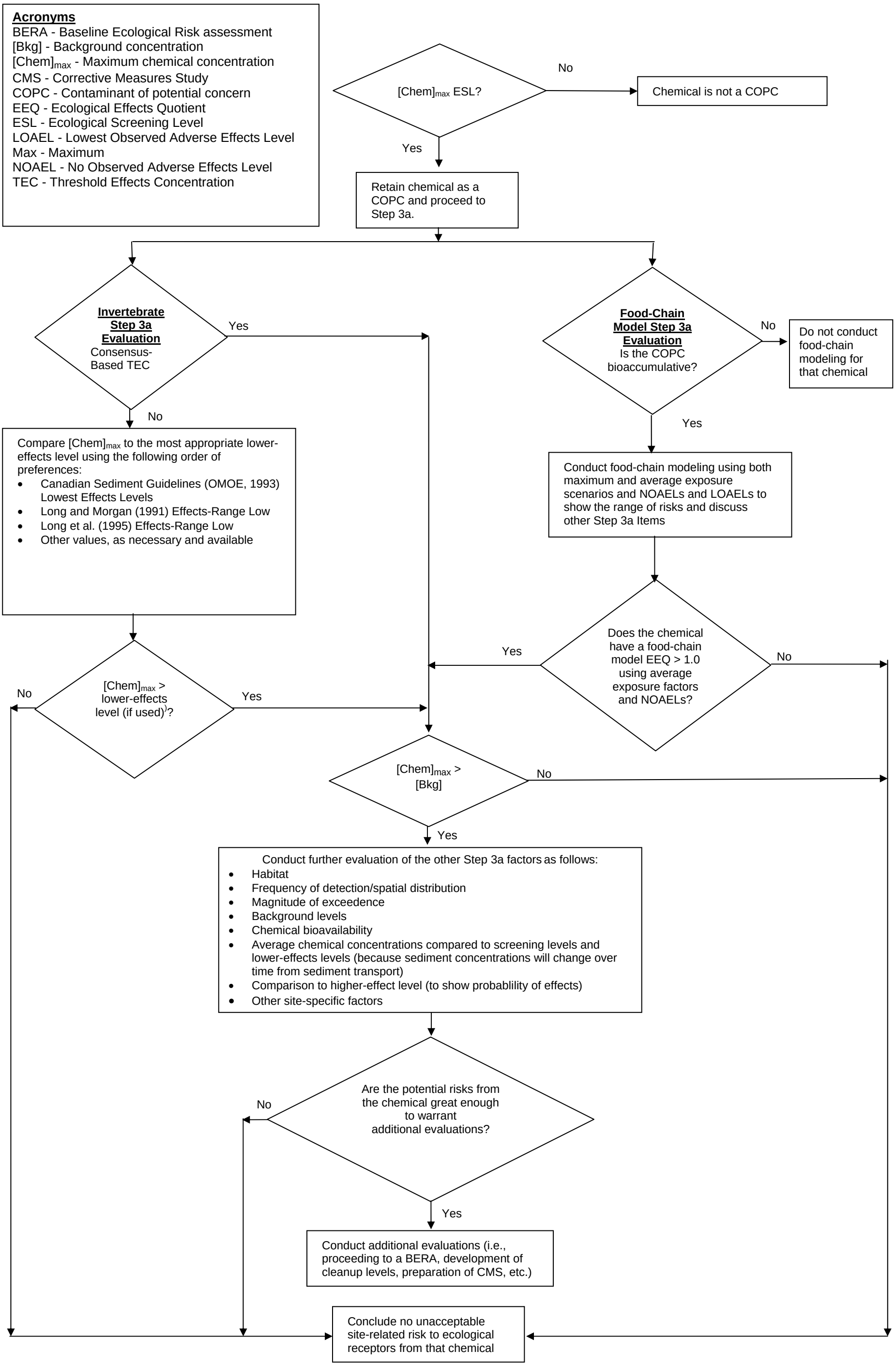


FIGURE 8-3

GENERAL ERA PROCESS FOR EVALUATION OF RISKS TO CHEMICALS IN SEDIMENT AT NSWC CRANE, INDIANA
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

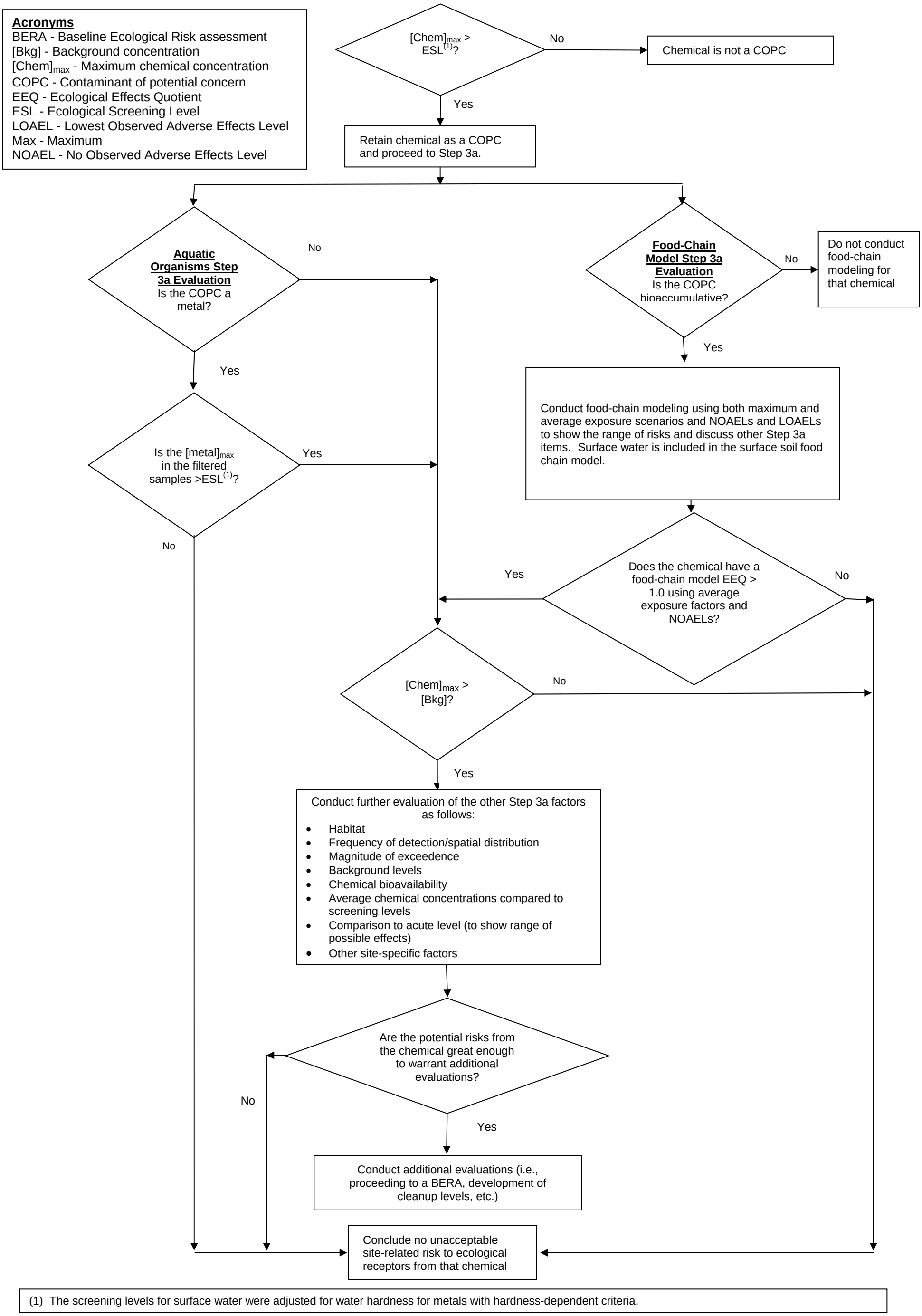
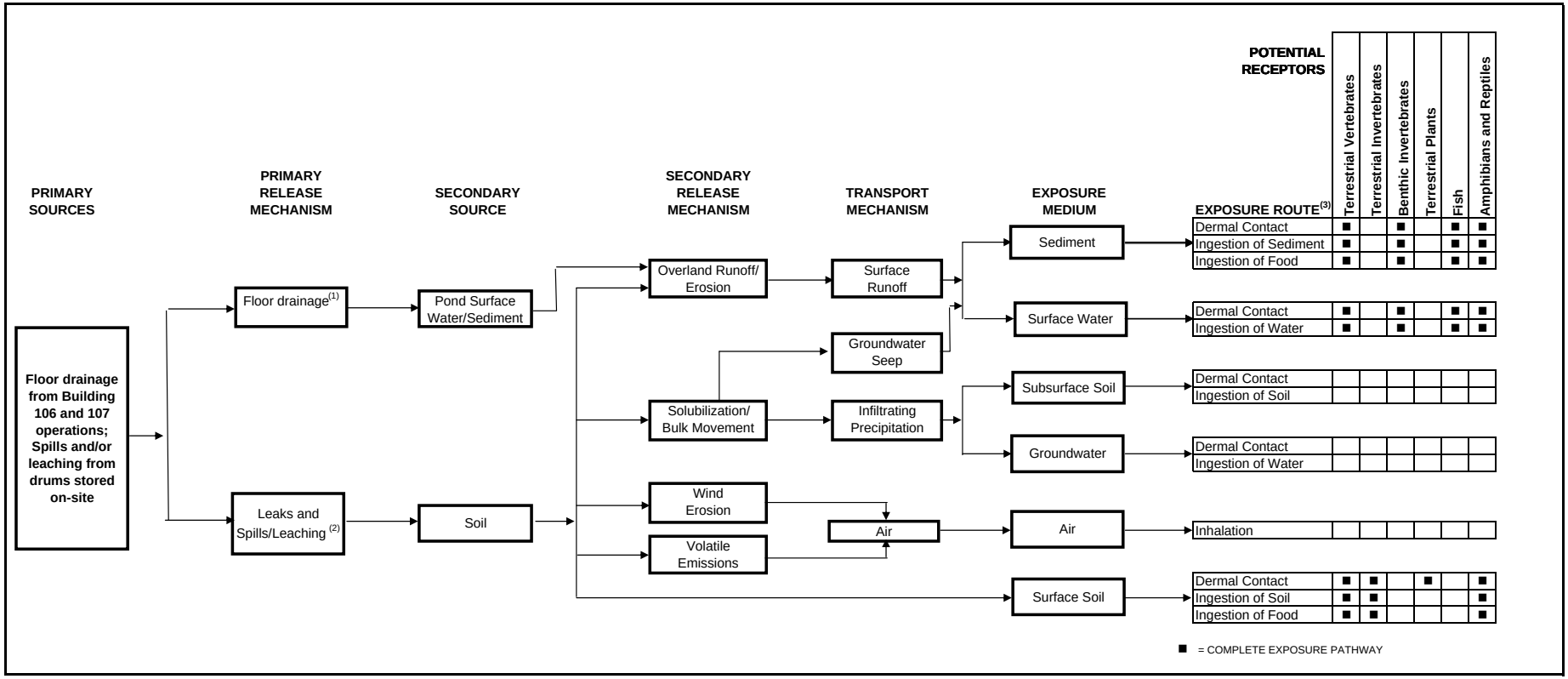


FIGURE 8-4

GENERAL ERA PROCESS FOR EVALUATION OF RISKS TO CHEMICALS IN SURFACE WATER AT NSWC CRANE, INDIANA
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, CRANE, INDIANA

FIGURE 8-5

ECOLOGICAL CONCEPTUAL SITE MODEL
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE, INDIANA



1. Floor drains from Buildings 106 and 107 lead to the Building 106 Pond.
2. Leaks and spills from storage drums.
3. Blank space indicates incomplete exposure pathway or relatively insignificant or not applicable potential exposure.

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APPENDIX A
PHOTOGRAPHS AND PHOTOGRAPH DIRECTION FIGURE

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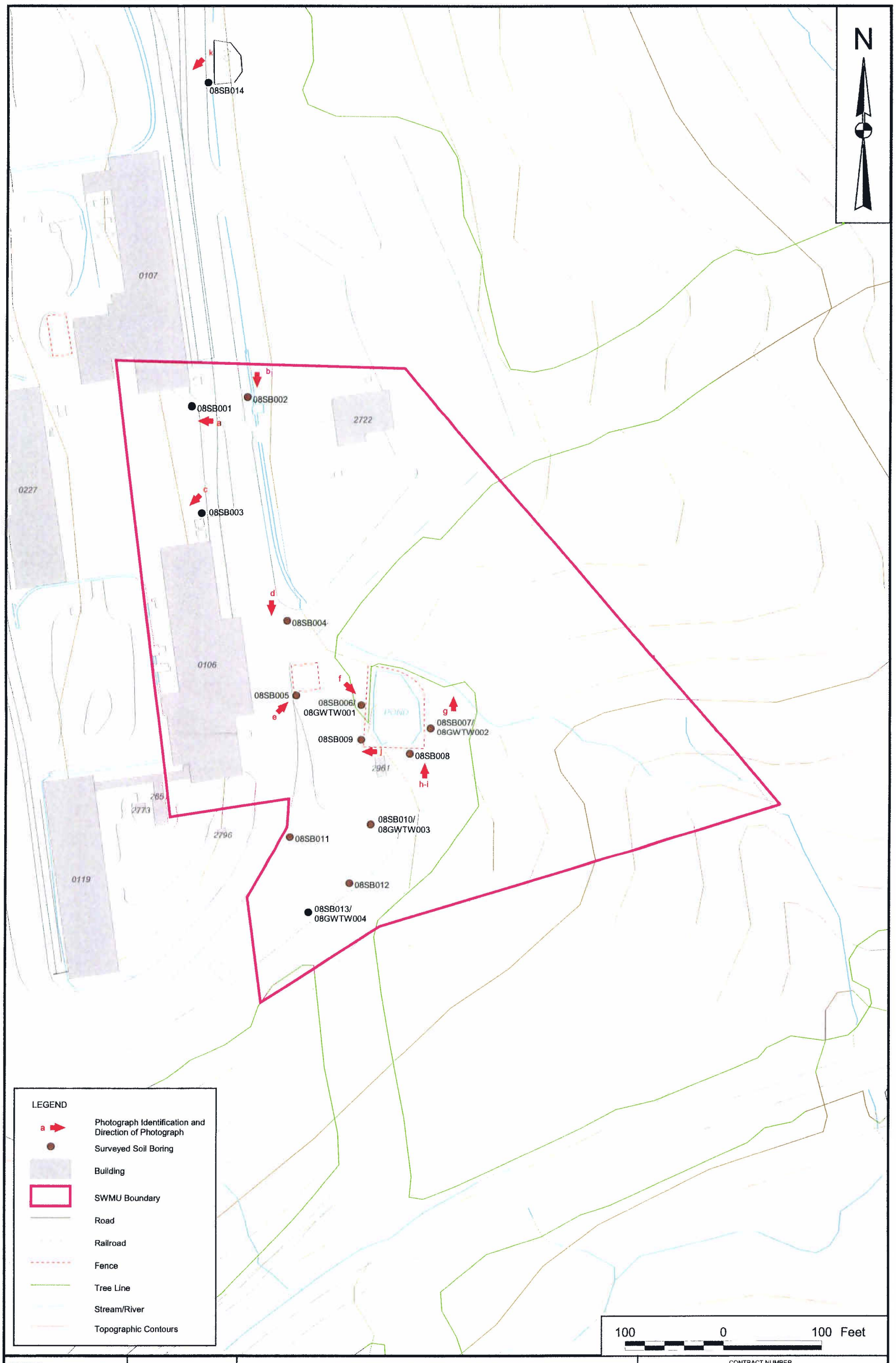


DRAWN BY K. PEILA	DATE 3/23/05	PHOTOGRAPH DIRECTION MARKERS SURVEYED SOIL BORING / TEMPORARY GROUNDWATER WELL LOCATIONS SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY J. GOERDT	DATE 3/23/05		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE A - 1 / REV 0

SWMU 08, Figure A-1 Photographs

Figure A-1a 08SB001 (249 W) Grassy slope/culvert adjacent to building. (12/11/04)

Figure A-1b 08SB002 (175 S) Small grassy slope alongside road and concrete culvert. (12/11/04)

Figure A-1c 08SB003 (244 SW) Grassy slope next to concrete culvert along side Building 106. (12/11/04)

Figure A-1d 08SB004 (172 S) Asphalt adjacent to power substation across from Building 106. (12/11/04)

SWMU 08, Figure A-1 Photographs

Figure A-1e 08SB005 (33 NE) Open grassy area next to power substation across the road from Building 106. (12/11/04)

Figure A-1f 08SB006 (130 SE) Open area on west side of Building 106 pond. (12/12/04)

Figure A-1g 08SB007 (344 N) Just inside the woods along SE corner of Building 106 pond. Location quickly slopes into deep ravine. Medium tree canopy (12/12/04)

Figure A-1h 08SB008 (344 N) Open grassy area on south corner of Building 106 pond. (12/12/04)

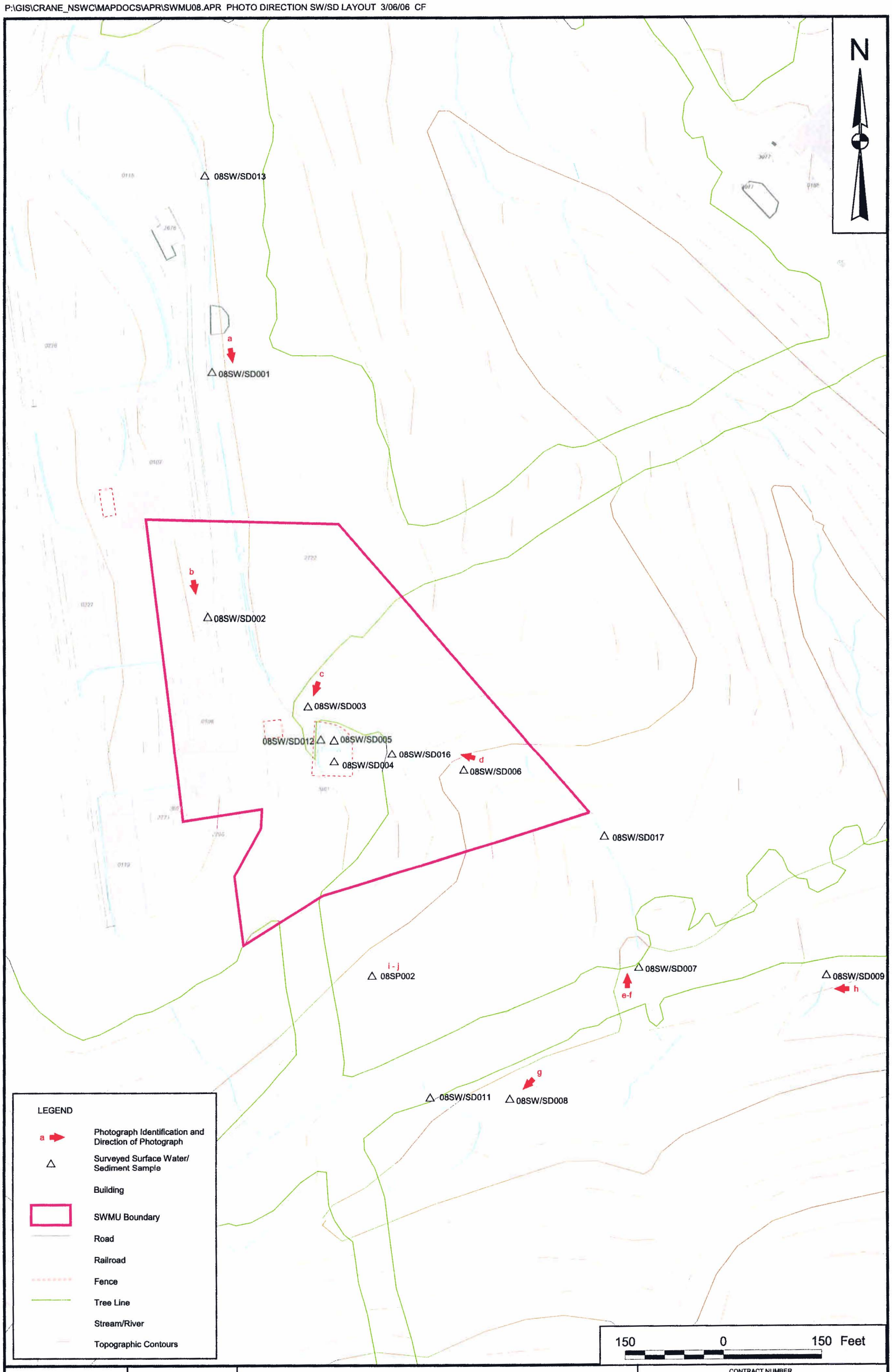
SWMU 08, Figure A-1 Photographs

Figure A-1i 08SB008 (344 N) Open grassy area on south corner of Building 106 pond. (12/12/04)

Figure A-1j 08SB009 (106 E) Open area on SW corner of Building 106 pond. (12/12/04)

Figure A-1k 08SB014 (152 SE) Open grassy area alongside road and next to culvert. (12/12/04)

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU08.APR PHOTO DIRECTION SW/SD LAYOUT 3/06/06 CF



DRAWN BY K. PEILA	DATE 3/23/05	PHOTOGRAPH DIRECTION MARKERS SURVEYED SURFACE WATER/SEDIMENT LOCATIONS SWMU 8 - BUILDING 106 POND NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0331
CHECKED BY S. STROZ	DATE 3/07/06		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE A - 2 / REV 0

SWMU 8, Figure A2 Photographs

Figure A-2a: Downstream 08SWSD001

Figure A-2b: Downstream 08SWSD002

Figure A-2c: Overhead 08SWSD003

Figure A-2d: Upstream 08SWSD006

SWMU 8, Figure A2 Photographs

Figure A-2e: Upstream 08SWSD007

Figure A-2f: Upstream close-up 08SWSD007

Figure A-2g: Upstream 08SWSD008

Figure A-2h: Upstream 08SWSD009

SWMU 8, Figure A2 Photographs

Figure A-2i: Overhead 08SP002

Figure A-2j: Overhead close-up 08SP002

APPENDIX B
BORING LOGS, TEMPORARY WELL CONSTRUCTION DIAGRAMS, AND RELATED MATERIALS

B.1 BORING LOGS AND TEMPORARY WELL CONSTRUCTION DIAGRAMS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB001
DATE: 12-11-04
GEOLOGIST: CONTI
DRILLER: McFALL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1	0		2/2		SOFT	BRN TO	3" TOPSOIL SILTY CLAY - TR ROOTS		MOIST [08SS001000 2]	0			
1305	2					YELLOW BRN TO				0			
	2.5			2.5		ORANG BRN	WEATH SANDSTONE @ 2.5			0			
				BOTM REF &									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: HIT REF @ 3'± - ? CONCRETE MAYBE - MOVED ≈ 2'W BUT HIT REF AGAIN @ 2.5 - LOOKS LIKE BEDROCK - CAN SEE BR ACROSS STREET OUTCROPING

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB002
DATE: 12-11-04
GEOLOGIST: CONTI
DRILLER: MCFAU

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 C	0		1.5/2		SOFT	BRN	6" TOPSOIL TO SANDY CLAY - TR ROOTS			0			
1330	2			2'					[08SB0020002]	0			
	3		.8/1	3	M SOFT	WHITE TAN	SANDSTONE	VBR					
				REF @ 3'									
									TOOK ONLY 1 SAMPLE HERE REF @ 3'				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB003
DATE: 12-11-04
GEOLOGIST: CONTI
DRILLER: McFALL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 @	0		2/2		SOFT	BRN	SANDY CLAY / CLAYEY		MOIST FILL?	0			
1350	2						SAND - TR ROCK FRAGS		[08SS0030002]	0			
	3		.8/1	2.5 3'	M SOFT	ORANG	SANDSTONE FRAGS			0			
				REF & BOTM		BRN							
									ONLY 1 SAMPLE REF @ 3'.				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB004
DATE: 12-11-04
GEOLOGIST: CONTI
DRILLER: McFAU

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole **	Driller BZ**
S-1 e	0	/	7/2		M	GRAY	3" ASPHALT GRAVEL TO SILTY CLAY -TR	CL	MOIST [08SB004002]	0			
1430	2	/			STIFF	BRN	ROCK FRAGS			0			
		/					TO SANDY CLAY -TR	SC	MOIST	0			
S-2 c		/					GRAVEL AND ROCK FRAGS.			0			
1435		/	3/4	5'±	SOFT		? (FILL)		MOIST → WET [08SB004006]	0			
	6	/		6'	M DENSE	TAN BRN	CLAY AND SANDSTONE FRAGS	CL		0			
		/		REF & BOTM									
		/											
		/											
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* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: ~~15~~ 08 SB005
DATE: 12-11-04
GEOLOGIST: CONTI
DRILLER: McFALL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 C	0		2/2		M STIFF		SANDY GRAVEL SILTY CLAY-TR SAND	CL	MOIST FILL	0			
1405	2						ROOTS AND ROAD GRAVEL		08 [15S0050002]	0			
S-2 C			2/2							0			
1410	4			4'	M SOFT/	TAN BRN	SILTY SAND AND	SM	MOIST	0			
				REF & BOTM	M DENSE		SANDSTONE FRAGS		[15SB0050206] 08				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB006
DATE: 12/12/04
GEOLOGIST: CONTI
DRILLER: MCFALL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
S-1	0		2/2		M STIFF	BRN	CLAYEY SAND - TR ROOTS	SC	LOOKS NAT MOIST	0			
0905	2						TO		[08SS0060002]	0			
				3			SANDY CLAY	SC	MOIST	0			
S-2 @			3/4	4				CL		0			
0910					LOOSE	YELLOW BRN	SILTY SAND - SOME	SM	MOIST [08SB0060206]	0			
	6					TO ORANG	WEATH ROCK FRAGS		WET ≈ 5 TO 6	0			
S-3			3/4		TO	GRAY BRN			MOIST	0			
@ 0915	8			8'	DENSE				[08SB0060610]	0			
				REF @ BOTM									
									SET TW				
									3-8' SCREEN				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ___ Well I.D. #: ~~08TW006~~ 08TW001

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB007
DATE: 12-12-04
GEOLOGIST: CONTI
DRILLER: McFAU

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Borehole**	Driller BZ**
S-1 e	0		2/2		STIFF	BRN	SANDY CLAY / CLAYEY	SC	MOIST [08SS007 0002]	0			
1045	2						SAND - TR ROOTS AND ROCK FRAGS		FILL ?	0			
									POOR REC	0			
S-2 e			2/4						HIT ROCK FR IN SHOE	0			
1050									[08SB007 0206]	0			
	6				M STIFF	BRN	CLAYEY SAND /	CL	MOIST	0			
							SANDY CLAY - TR ROOTS, GRAVEL	/SC		0			
S-3 e			4/4	7			ROCK FRAGS		TR STAINS (DARK) @ 8'± SAMPLE	0			
1055									TAKEN HERE [08SB007 0610]	0			
	10						(FILL) ?		COULD BE FILL TO 10'±	0			
					SOFT /	GRAY	SILTY / SANDY CLAY	SC	10→14 WET GRAY W/ ODOR	0			
S-4 e			4/4	sample zone	LOOSE		TR ROCK FRAGS W/ ODOR	"	SEWAGE TYPE ODOR	0			
1100							TR ROOTS			0			
				14						0			
	15			15'±	STIFF	RED BRN	SANDY CLAY - TR ROCK FRAGS	SC	[08SB007 1013]	0			
S-5 e			2/2		LOOSE / STIFF	BRN	WEATHERED SHALY			0			
1105	17					GRAY	SANDSTONE			0			
				17' REF & BOTM					SET TW 007 SCREEN 7-17				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: ~~08TW007~~ 08TW002

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB008
DATE: 12-12-04
GEOLOGIST: CONTI
DRILLER: MCFALL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 e	0		2/2		M STIFF	BRN	SANDY CLAY-TR	SC	MOIST	0			
1020	2						ROOTS-TR ROCK		[08SS0080002]	0			
							SANDY CLAY-SILTY	CL	MOIST	0			
S-2 e			4/4				CLAY	SC		0			
1025							5' PCS ORGANICS(WOOD) FILL.		[08SB0080206]	0			
	6				SOFT	BRN	SANDY CLAY TR	3"	WET ZONE ~5.5 NAT ≈ 6'.	0			
					TO M	BRN	ROOTS			0			
S-3 e			4/4		STIFF	GRAY	SANDY CLAY-TR	SC	MOIST	0			
1030					TO STIFF		ROOTS			0			
	10			10'			TR GRAY SS FRAG IN SHOE		[08SB0080610]	0			
				REF & BOTM									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB009
DATE: 12-12-04
GEOLOGIST: CONTI
DRILLER: McFAUL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 @ 0925	0		2/2		M STIFF	BRN	SANDY CLAY-TR ASH	SC	MOIST (FILL)	0			
	2						ROCK FRAGS TR ROOTS		[08SS009 0002]	0			
								SC		0			
S-2 @ 0930			4/4	±4					MOIST	0			
					M DENSE	ORANGE	SILTY SAND-TR	SM	[08SB009 0206]	0			
	6					BRN	ROCK FRAGS			0			
S-3 @ 0935			2/2.5						MOIST	0			
						TR	TO		[08SB009 0610]	0			
	8.5			8.5 REF @ BOTM		GRAY	SANDSTONE FRAGS			0			
									TOOK MS/MSD 0610				
									ALSO DUP01 0610				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB010
DATE: 12/12/04
GEOLOGIST: CONTI
DRILLER: McFALL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 e	0		2/2	1.0	LOOSE	GRAY	ROAD GRAVEL AND SAND			0			
1135	2				STIFF	GRAY BRN	SILTY/SANDY CLAY	CL/SC	MOIST [08SS0100002]	0			
					TO	GRAY TO	SILTY CLAY - TR ROOTS	CL		0			
S-2 e			4/4		STIFF				MOIST	0			
1140						BRN			[08SB0100206]	0			
	6				M STIFF		SILTY CLAY - TR SAND - TR ROOTS	CL	MOIST	0			
					TO	TO				0			
S-3 e			3.5/4	7	SOFT	GRAY				0			
1145									[08SB0100610]	0			
	10						FILL TO	10'	± ?	0			
					TO			CL	MOIST	0			
S-4 e			4/4	Sample	M STIFF					0			
1200						BRN			[08SB0101013]	0			
				14'					MOIST	0			
	15			15	STIFF	GRAY BRN	CLAYEY SAND TR ROCK FRAGS	SC	WET ZONE & 15 → 16	0			
					V DENSE	GRAY ORANG	SILTY SAND - TR			0			
S-5 e			2.5/2.5	17		BRN	WEATH SANDSTONE			0			
1205	17.5			17.5						0			
				REF & BOTM					SET WELL TW SCREEN 7-17±				
									3/4" Φ PVC				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: ~~08TW010~~ 08TW003

(95)

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB011
DATE: 12/12/04
GEOLOGIST: CONTI
DRILLER: McFAU

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 e	0		2/2	1'	DENSE	GRAY	ROAD SAND AND GRAVEL		[08SS011000Z]	0			
1355	2			2'	STIFF	YELLOW BRN	SILTY SANDY CLAY	CL/SC	MOIST (FILL)	0			
							TR ROCK FRAGS (LOOKS NAT ?)		TO 2'	0			
S-2 e			4/4			GRAY BRN	COULD BE FILL	CL/SC	MOIST	0			
1400									[08SB012020Z]	0			
	6			6			BRN SANDSTONE IN DRIVE SHOE			0			
				REF @ BOTM									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB012
DATE: 12/12/04
GEOLOGIST: CONTI
DRILLER: McFAUL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1	0		2/2	0-5	DENSE	GRAY	SAND / ROAD GRAVEL						
					STIFF	YELLOW	SANDY CLAY	SC	MOIST	0			
e	2			2		BRN	TR ROCK FRAG (FILL)		[08SS0120002]	0			
					M STIFF		SILTY CLAY - TR ROOTS AND ROCK FRAGS	CL	MOIST	0			
S-2 e			4/4		SOFT	TO BRN				0			
14/5						GRAY	(FILL)?		TOOK DUP 02 [08SB0120206]	0			
	6				M STIFF		SILTY CLAY - TR ROOTS	CL	ALSO MS/MSD @ 2-6	0			
									MOIST LOOKS NAT?	0			
S-3 e			4/4		TO	TO				0			
4/20					SOFT	GRAY				0			
	10								[08SB0120610]	6			
										0			
S-4 e			4/4							0			
4/25					M STIFF		13' FEW PCS SANDSTONE		COULD BE FILL ?	0			
					SOFT				MOIST → WET	0			
	15									0			
				Sample 16 Int		GRAY	SILTY CLAY - TR ROOTS	CL	MOIST	0			
S-5										0			
e 1430			3.5/4	18'					[08SB0121018]	0			
	19'			19'	M STIFF	ORANG BRN	CLAYEY SAND TR ROCK - SANDSTONE FRAGS			0			
				REF & BOTM		GRAY							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB013
DATE: 12/12/04
GEOLOGIST: CONTI
DRILLER: McFALL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
				0-5	DENSE	GRAY	SAND AND ROAD GRAVEL						
S-1 @ 1450	0		2/2		STIFF	BRN	SILTY SANDY CLAY/	CL	MOIST	0			
	2						CLAYEY SAND TR ROCK FRAGS (FILL)	SC	[08SS0130002]	0			
					M STIFF	YELLOW BRN	SILTY CLAY	CL	MOIST	0			
S-2 @ 1455			4/4			TO	TR ROCK FRAG AND ROOTS			0			
					SOFT	BRN GRAY			[08SB0130206]	0			
	6					TO	SILTY CLAY - TR ROOTS	CL	MOIST	0			
S-3 @ 1500			4/4			GRAY			NAT ?	0			
										0			
										0			
	10			9 9'					[08SB0130610]	0			
					SOFT	GRAY	SILTY CLAY - TR ROOTS	CL	MOIST	0			
S-4 @ 1505			4/4						NAT ?	0			
										0			
				14		GRAY				0			
	15				M STIFF	ORANGE BRN	SILTY SAND - TR		[08SB0131013]	0			
S-5 @ 1510			4/4		DENSE		CLAY - TR SANDSTONE FRAG	SM	MOIST	0			
										0			
							TO SANDY CLAY	SC		0			
				19	SOFT	BLK	LAST 3" (COAL) CARBONACEOUS ?		MOIST	0			
				REF F BOTH									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: SCREEN 9-19

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: ~~08TW013~~ 08TW004

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS, INC.
DRILLING RIG: DPT RIG

BORING No.: 08SB014
DATE: 12-12-04
GEOLOGIST: CONTI
DRILLER: McFAL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-1 @	0		2.2		MS TIFF	BRN	2" TOPSOIL CLAYEY SAND -TR ROOTS/ROCK FRAGS		MOIST	0			
1 S2 5	2			2' REF & BOTM					[08SS0140002]	0			
									ACTUAL REF @ 2.4 ONLY 1 SAMPLE TAKEN				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

ROUND 1

ROUND 2

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT001
DATE: 5/11-15/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample #2	Borehole	Drill Rig
S1	1	3/4	6"/	6"			black topsoil and limestone gravel			0	0	0	0
	2	4/3	24"				orange-brown to olive-gray						
S2	3	3/4	10"/				mottled silty clay						
	4	3/5	24"	4'			(moist)						
S3	5	3/2	12"/				orange and gray mottled						
	6	2/3	24"	6'			silty clay, plastic						
S4	7	3/4	22"/				(moist)						
	8	4/6	24"	8½'			olive to brown silty clay (very moist)						
S5	9	3/9	22"/				olive-orange silty clay with						
	10	15/20	24"	10'			minor amounts of fine sand						
S6	11	8/17	24"/				tan to brown silty sand with						
	12	10/12	24"				trace of clay. Small chunks						
S7	13	8/9	16"/				of weathered sandstone.						
	14	10/17	24"				Sandstone and siltstone fragments						
S8	15	30/	17"/				increase with depth						
	16	100/	24"	16									
							No recovery; augered to						
							20' with auger (no split						
							spoons)						
	20			20			Set 6" steel casing from 0 to 20						
							feet bgs						
		RQD											
C1		=10%	2'/				soft, weathered, orange to light						
			5'				gray fine sandstone with thin						
	25						shale partings; orange coloration						
							mainly along fractures						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT001

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME-550X-ATV

BORING No.: 08MWT001
DATE: 5/11-15/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample Bz	Borehole**	Driller BZ**
	26					orange, lt. gray, and tan				0	0	0	0
C2		25%	5'/5'	29'		weathered fine sandstone with thin shale partings; highly weathered dark orange and broken from 29-30 feet bgs							
	30												
C3		60%	4'/5'	33'		same as above; broken, highly oxidized, ferruginous							
	35												
C4		95%	5'/5'		med hard	lt gray to tan, fine to med grained sandstone; very few thin shale partings; some thin zones of orange iron coloration							
	40												
C5		60%	5'/5'		med hard	same as above but more highly oxidized and weathered, especially between 44 and 48 ft bgs							
	45												
C6		70%	5'/5'										
	50												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT001

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 5/11-15/05
DATE: 08MWT001
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Background	Driller #2**
	51									0	0	0	0
27		60%	4'/5'			same as above, less weathered and less fractured orange, tan, and pink sandstone							
	55												
					55 feet = total depth of boring								

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT001

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 08MWT002
DATE: 5-11-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Breathing**	Driller #2
	0									0	0	0	0
	2												
	3												
	4						see boring log						
	5						08MWT001						
	6						for log of						
	7						0 – 14.5 feet						
	8						bgs						
	9												
	10												
	11												
	12												
	13												
	14												
					14.5		total depth of		boring				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: This bore hole placed directly adjacent to 08MWT001

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT002

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC Crane SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 08MWT003
DATE: 5/12-16/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6 in. RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density Consistency or Rock Hardness	Color	Material Classification	USCS.	Remarks	PID/FID Reading (ppm) Sample	Sample #2	Backhoe	Driller #2
	1									0	0	0	0
							see log for						
	5						08MWT004 for						
							0-12 feet						
							interval						
							(overburden)						
	10												
	12												
							augered from 12 feet down to						
			0				20 feet bgs through soft						
							weathered rock. Included						
							black shale ~~and~~ between 14 and						
							18 feet bgs. Came up auger as						
							black, very sticky mud						
	20			20'			Set 20' of 6" diameter black steel						
							casing in hole on 5/12/05. Started coring						
							from 20 to 60' bgs on 5/16/05.						
C1		70%	4.0/5.0				fine sandstone interbedded with						
							thin layers of sandy siltstone						
	25			25'			and sandy shale						
							tan to light gray, laminated						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT003

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT003
DATE: 5/12-16/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler #2	Borehole	Drilling Area
	26						same as above but rock			0	0	0	0
		~~5~~	3'				more broken, weathered,						
C2		~~8~~	5'				orange to dark orange						
		10%											
	30			30'									
							lt. gray to tan fine to med						
C3					med		grained sandstone; very						
		90%	5'		hard		few thin shale partings;						
			5'				thin zones of orange						
	35						iron coloration that are						
							not along fractures						
C4													
							same as above but progressively						
							more orange iron staining						
	40			40'									
							orange to pink medium						
							sandstone, bedding laminations						
C5							dipping at 20-30° angle						
	45												
C6													
	50												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT003

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 850X-ATV
BORING No.: 08MWT003
DATE: 5/12-16/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler #2	Borehole**	Driller #2**
	51									0	0	0	0
C7		80%	5'/5'				Same as above						
	55												
C8		75%	5'/5'										
	60												
					total depth of boring = 60 feet								

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT003

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 08MWT004
DATE: 5/12/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Borehole**	Outer Air**
S1	1	2/4	6"/	6"			topsoil with limestone gravel (moist - dry)			0	0	0	0
	2	4/4	24"										
S2	3	3/4	22"				orange-brown to olive-gray mottled silty clay (moist)						
	4	4/5	24"	4'									
S3	5	2/2	22"				orange-gray mottled silty clay, plastic, moist						
	6	3/3	24"	6'									
S4	7	2/2	8"/				olive brown silty clay (very moist)						
	8	3/4	24"	8½'									
S5	9	3/7	22"				olive-orange silty clay with some fine sand (moist)						
	10	10/13	24"	10'									
S6	11	9/20	24"/				weathered fine sandstone						
	12	20/26	24"										
							total depth of boring = 12.0 feet bgs						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT004

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 08MWT005
DATE: 5/12-16/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6 in. RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Background	Drilling Eqt.
	1									0	0	0	0
			0		No recovery; augered down to 19.5' and set 20' of 8" diam. steel casing in hole on 5/12/05								
	20			20'	see 08MWT006 log for this interval								
					coring of bedrock on 5/16/05								
C1		50%	4.5'/5.0'			dark to light gray	interlaminated fine sandstone and gray shale (dry) very dusty while drilling						
	25												
C2		70%	4'/5'										
	30												
C3		75%	5'/5'										
	35												
C4		75%	5'/5'										
	40												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT005

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08 MWT 005
DATE: 5/12-16/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample #2	Background	Driller #2
	41									0	0	0	0
							Same as above; interlayered fine sandstone, siltstone and shale						
C5			10/10										
		15%											
	50												
				52'									
							tan to orange, poorly bedded, fine to medium sandstone; weathered, oxidized few shale partings						
C6		60%	9/10										
				58.5'			coal, shaly, broken						
	60			59.5'									
				60'			lt gray siltstone with lenses of coal; poorly bedded						
					60' =		total depth of boring						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT005

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT006
DATE: 5/12/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Borehole #2	Borehole #3	Other #4
SS1	1	5/9	6"/	1'			brown soil, roots, and limestone gravel			0	0	0	0
	2	5/5	24"/										
SS2	3	3/4	20"/				orange-brown clayey silt (slightly moist)						
	4	5/6	24"	4'									
SS3	5	3/3	14"/				orange-gray silty clay and sandy clay; mottled (moist)						
	6	3/3	24"										
SS4	7	1/2	12"/										
	8	5/5	24"										
SS5	9	1/1	20"/										
	10	1/2	24"	10'									
SS6	11	1/1	18"/										
	12	2/2	24"				orange-gray mottled clayey silt						
SS7	13	1/1	20"/										
	14	2/3	24"	14'									
SS8	15	4/8	20"/				tan to lt gray clayey sand with pieces of weathered fine sandstone						
	16	7/8	24"										
SS9	17	7/8	22"/										
	18	10/12	24"	18'									
							total depth of boring = 18 feet to ∏ of bedrock						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT006

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT007
DATE: 5-13-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample BZ	Borehole	Driller BZ**
SS1	1	10/22	12"	6"			brown sandy topsoil			0	0	0	0
	2	9/4	24"	2'			brown sand with trace of gravel						
SS2	3	2/3	18"				brown to gray clayey silt						
	4	4/6	24"				(dry to slightly moist)						
SS3	5	4/4	22"										
	6	6/6	24"	6'									
SS4	7	4/5	22"				brown sand and pieces of weathered sandstone						
	8	32/50	24"	8'			top of bedrock						
			0				Augered to 10' bgs and set temporary casing						
	10												
C1		10%	5'/5'				fine to medium sandstone tan to light gray with orange bands of oxidation (iron staining) rock broken, especially in 10-15' interval						
	15												
C2		10%	3'/5'										
	20			20'									
C3		70%	5'/5'				medium sandstone, orange because of iron staining angled bedding laminations						
	25												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT007

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT007
DATE: 5-13-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Borehole	Borehole	Driller BZ
	26						Same as above			0	0	0	0
C4		90%	2'/5'										
	30			30'									
C5			2'/5'				gray to black, siltstone, coal, and shale, very broken up.						
	35			35'									
					35' = total depth of boring								
							reamed hole to 33' bgs and packed ground up shale into last 2' of corehole with roller bit						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT007

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT008
DATE: 5-15-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Sample	Breathing Zone	Borehole	Other
				1'			brown topsoil and limestone gravel			0	0	0	0
SS1	1	6/3	16"				gray to dark orange clayey silt						
	2	6/2	24"										
	3	4/5	16"										
SS2	4	6/7	24"										
	5	5/5	24"	5'									
SS3	6	8/7	24"				orange to tan clayey silt and sand; chunks of weathered sandstone near bottom						
SS4	7	4/7	20"										
	8	8/10	24"										
SS5	9	7/22	16"	9'									
	10	50/80	24	10'			top of bedrock						
							fine sandstone, tan to lt. gray, with minor shale partings						
C1		10%	4'/5'										
				14'									
	15												
							fine to medium sandstone with fewer shale partings than above; orange to lt. gray; iron staining on fractures						
C2		20%	5'/5'										
				19'									
	20												
							fine to medium sandstone; lt to med. gray, less iron staining, greater amount of shale partings than above; highly broken in 19–22' ft interval						
C3		15%	4'/5'										
	25												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT008

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1248
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 08MWT008
DATE: 5-15-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil (Density/Consistency) or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Background	Outer BZ
	26						same as above			0	0	0	0
			5'				braking along shale partings						
		40%	5'				in 26'-28' interval						
	30												
					30'	=	total depth of		boring				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT008

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT009
DATE: 5-16-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample BZ	Borehole**	Driller BZ**
	1						silty sand, topsoil			0	0	0	0
	2						chunks of weathered sandstone						
	3			2.5			~~top of bedrock~~						
	4						shaley sandstone						
	5						highly weathered						
	6						soft						
	7												
	8						augered to 10' bgs and						
	9						set temporary 6" casing						
	10												
							same as above						
		0%	2'/5'				orange to gray						
C1													
	15												
							highly broken and iron-stained						
		30%	4'/5'				at 15-16' bgs						
	20												
							same as above, thin streaks						
		20%	4.5'/5'				of coal in rock between						
							22 and 24' bgs;						
				24'			angled laminations						
	25				med hard		fine sandstone lt. - med						

gray; harder less weathered than rock above

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT009

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT009
DATE: 5-16-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler B2	Borehole**	Driller B2**
	26				Same as above fine				sandstone	0	0	0	0
		70%	4.5'		with shale partings,				H. - med				
			5.0'		gray								
	30			30'									
					30' = total depth of				boring				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT009

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC Crane SWMU 8
PROJECT NUMBER: N 1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT010
DATE: 5-24-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
S1	1	1 / 1	22"							0	0	0	0
	2	2 / 2	24"										
S2	3	3 / 5	24"										
	4	7 / 9	24"										
S3	5	7 / 18	18"										
	6	21 / 15	24"										
S4	7	8 / 9	24"										
	8	11 / 15	24"										
S5	9	8 / 11	16"										
	10	21 / 8	24"	10'			top of bedrock						
C1		10%	3.5' / 5'				lt. gray - med gray interbedded fine sandstone and silty shale highly broken; weathered orange near top						
	15			16									
C2		10%	3' / 5'				same as above except fewer shale partings and more competent rock; 20-21' interval highly broken						
	20												
C3		25%	4' / 5'										
	25			24'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT010

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 08MWT010
DATE: 5-24-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample BZ	Background	Driller BZ
	26				lt gray to med gray laminated								
C4		75%	4'/5'		fine sandstone and siltstone								
	30			30'									
					30' = total depth of boring								

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT010

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT011
DATE: 5-23-05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
S51	1	1/2	22"	1'			brown topsoil, sandy			0	0	0	0
	2	3/4	24"										
S52	3	5/6	22"				brown to tan sandy silt with small chunks of weathered rock near bottom						
	4	6/8	24"										
S53	5	3/5	22"										
	6	7/7	24"	6.5			top of weathered bedrock						
S54	7	16/31	18"										
	8	30/30	24"										
	9		0				augered down to 10' ft bgs and set temporary casing						
	10			10'									
C1		0%	2'/5'		soft		highly weathered, tan to dark orange, iron-stained interbedded siltstone and silty shale						
	15			15									
C2		0%	1'/5'				same as above but not iron-stained; lt. gray to med. gray; large proportion of silty shale						
	20												
C3		5%	2.5'/5'										
	25												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT011

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
BORING No.: 08MWT011
PROJECT NUMBER: N1245
DATE: 5-23-05
DRILLING COMPANY: Bowser Morner
GEOLOGIST: Jeff Schubert
DRILLING RIG: CME 550X-ATV
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Bumper B2*	Borehole**	Drillor B2**
	26				same as above, but rock much								
		80%	4.5' / 5.0'		more competant, less fractures								
	30			30'									
					30' = total depth of boring								

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

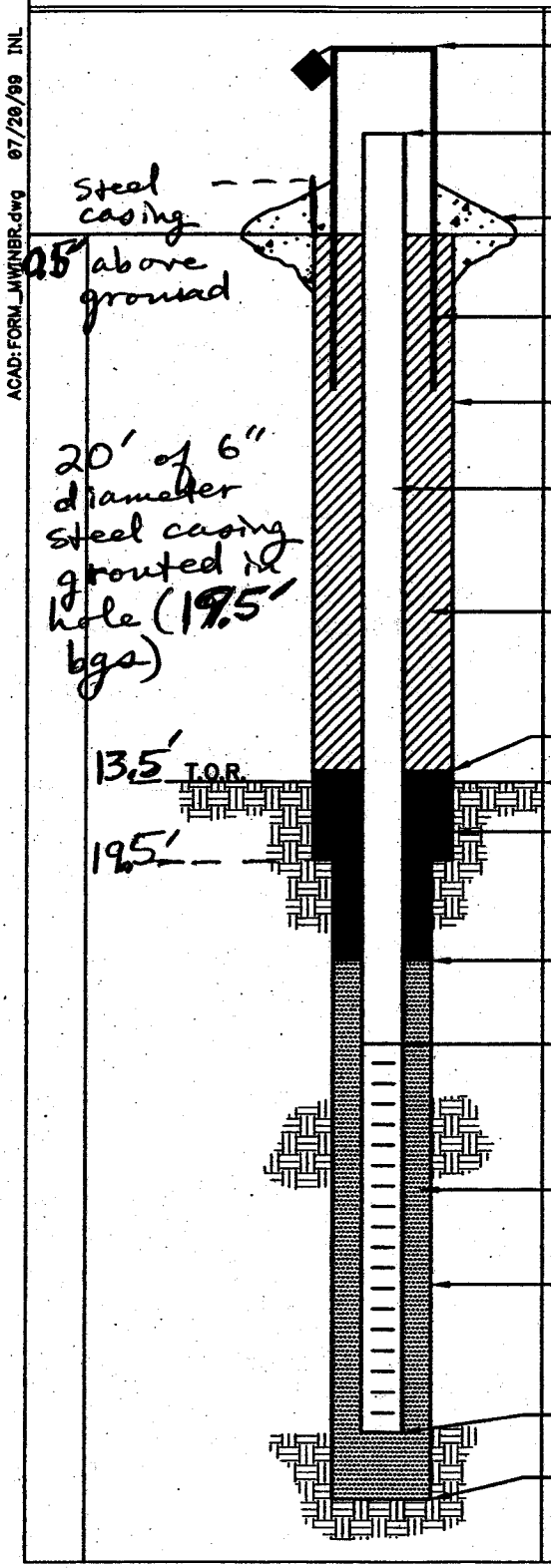
Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT011

WELL NO.: 08MWT001

Tetra Tech NUS, Inc.

BEDROCK MONITORING WELL SHEET WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER Bowser-Morner	
PROJECT NO. N1245	BORING 08MWT001	DRILLING METHOD HSA/AR	
DATE BEGUN 5-11-05	DATE COMPLETED 5-15-05		
FIELD GEOLOGIST Jeff Schubert		DEVELOPMENT METHOD	
GROUND ELEVATION 682.84	DATUM NAVD 88		



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 684.68 / 1.84

ELEVATION/HEIGHT TOP OF RISER: 684.62 / 1.78

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel with hinged top

DIAMETER OF HOLE: 8 inch diameter from 0 to 20 feet bgs

RISER PIPE I.D.: 2 inch

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement-bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 659.84 / 23.0

ELEVATION/DEPTH TOP OF BEDROCK: 669.34 / 13.5

TYPE OF SEAL: ~~cement-bentonite grout~~ bentonite chips medium

ELEVATION/DEPTH TOP OF SAND: 649.84 / 33.0

ELEVATION/DEPTH TOP OF SCREEN: 647.84 / 35.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inch / 20 feet

I.D. SCREEN: 2-inch diameter

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK: 6 inch diameter from 20 to 55 ft bgs

CORE/REAM: 2" core from 20 to 55 ft bgs

ELEVATION/DEPTH BOTTOM SCREEN: 627.84 / 55.0

ELEVATION/DEPTH BOTTOM OF SAND: 627.84 / 55.0

ELEVATION/DEPTH BOTTOM OF HOLE: 627.84 / 55.0

BACKFILL MATERIAL BELOW SAND: None

ACAD:FORM_MWNBR.dwg 07/20/99 INL

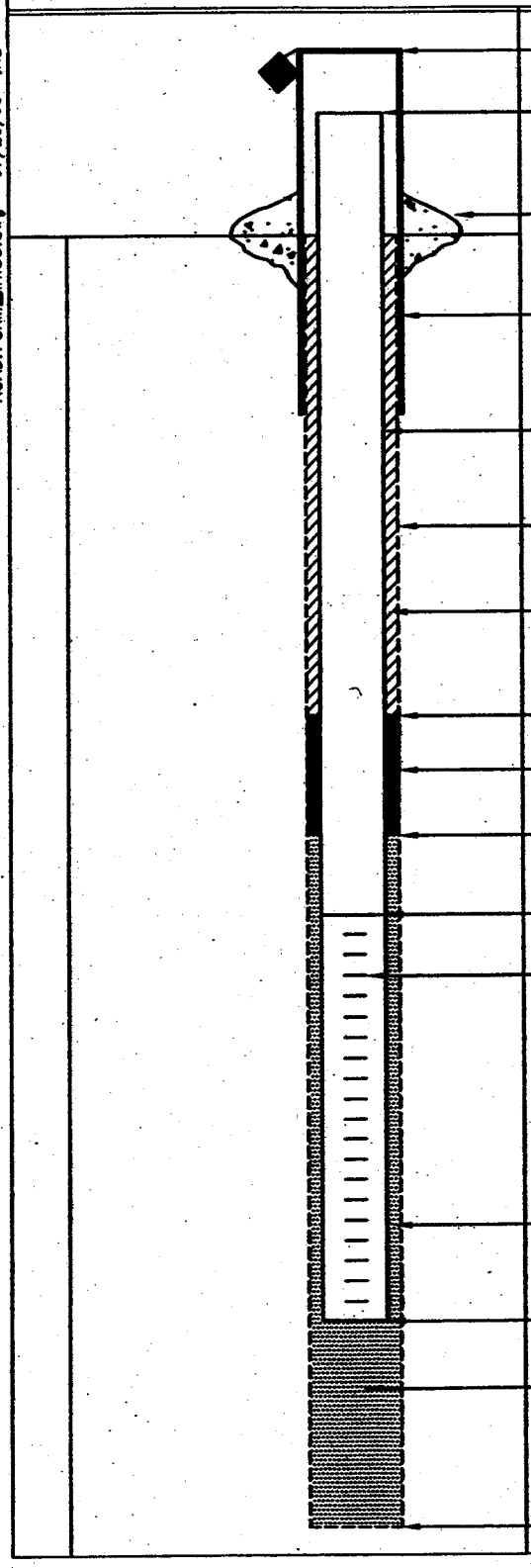
WELL NO.: 08MWT002

OVERBURDEN MONITORING WELL SHEET STICK-UP

Tetra Tech NUS, Inc.

PROJECT NSWC CRANE LOCATION SWMU 8
PROJECT NO. N1245 BORING 08MWT002
DATE BEGUN 5-11-05 DATE COMPLETED 5-11-05
FIELD GEOLOGIST Jeff Schubert
GROUND ELEVATION 683.76 DATUM NAD 88

DRILLER Bowser Morner
DRILLING METHOD HSA
DEVELOPMENT METHOD



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: ~~684.68~~ 685.85/2.09 ft

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 685.88/2.12 ft

TYPE OF SURFACE SEAL: 4'x4'x6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square
TYPE OF SURFACE CASING: steel with hinged top

RISER PIPE I.D.: 2 inches
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 6 inches

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 682.76 / 1.0

TYPE OF SEAL: bentonite chips, medium

DEPTH TOP OF SAND PACK: 681.26/2.5

ELEVATION/DEPTH TOP OF SCREEN: 679.26/4.5

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inch / 10 feet

I.D. OF SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

ELEVATION/DEPTH BOTTOM OF SCREEN: 669.26/14.5

ELEVATION/DEPTH BOTTOM OF SAND PACK: 669.26/14.5

BACKFILL MATERIAL BELOW SAND: None

ELEVATION/DEPTH OF HOLE: 669.26/14.5

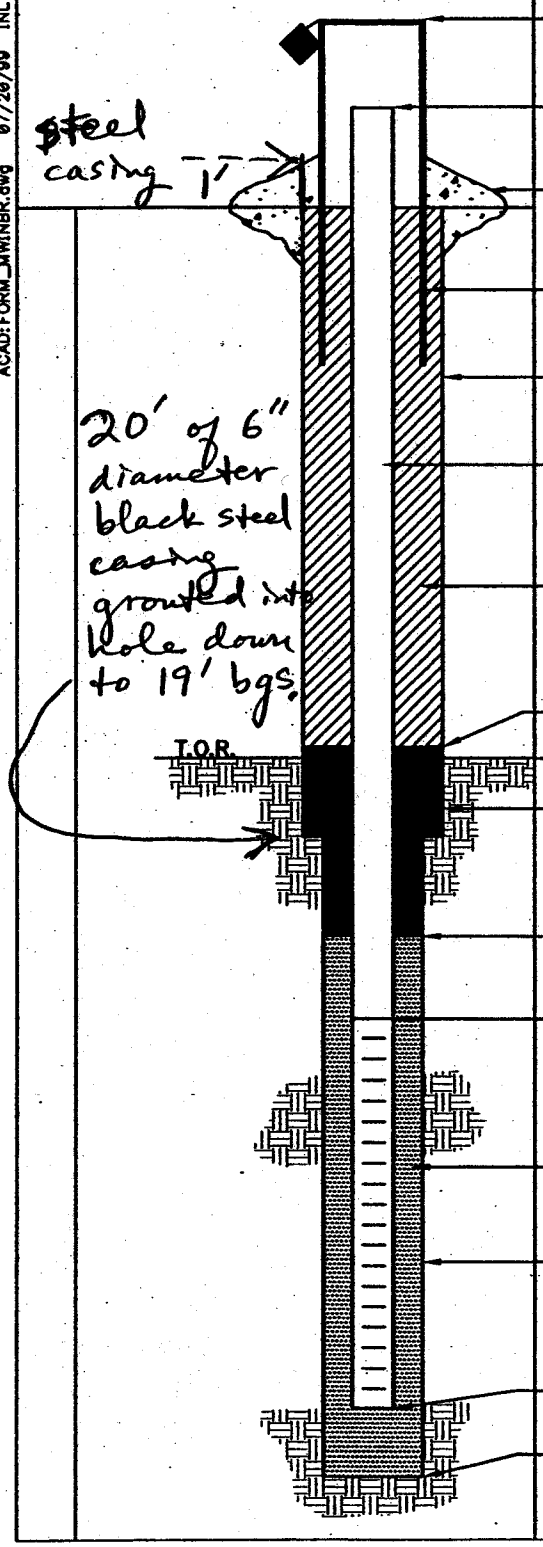
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 08MWT003

Tetra Tech NUS, Inc.

BEDROCK MONITORING WELL SHEET WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER Bowser Morner	
PROJECT NO. N1245	BORING 08MWT003	DRILLING METHOD HSA/AR	
DATE BEGUN 5-12-05	DATE COMPLETED 5-16-05		
FIELD GEOLOGIST Jeff Schubert		DEVELOPMENT METHOD	
GROUND ELEVATION 685.56	DATUM NAVD 88		



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 687.82/2.26

ELEVATION/HEIGHT TOP OF RISER: 687.66/2.10

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel protective casing with hinged top

DIAMETER OF HOLE: 8 inch diameter from 0 to 19 feet bgs

RISER PIPE I.D.: 2 inch

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement-bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 649.56/36.0

ELEVATION/DEPTH TOP OF BEDROCK: 674.16/11.5

TYPE OF SEAL: bentonite chips, medium

ELEVATION/DEPTH TOP OF SAND: 639.56/46.0

ELEVATION/DEPTH TOP OF SCREEN: 635.56/50.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inch/10 feet

I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand, No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK:

CORE/REAM: 2"/6" from 19 to 60 ft bgs

ELEVATION/DEPTH BOTTOM SCREEN: 625.56/60.0

ELEVATION/DEPTH BOTTOM OF SAND: 625.56/60.0

ELEVATION/DEPTH BOTTOM OF HOLE: 625.56/60.0

BACKFILL MATERIAL BELOW SAND: None

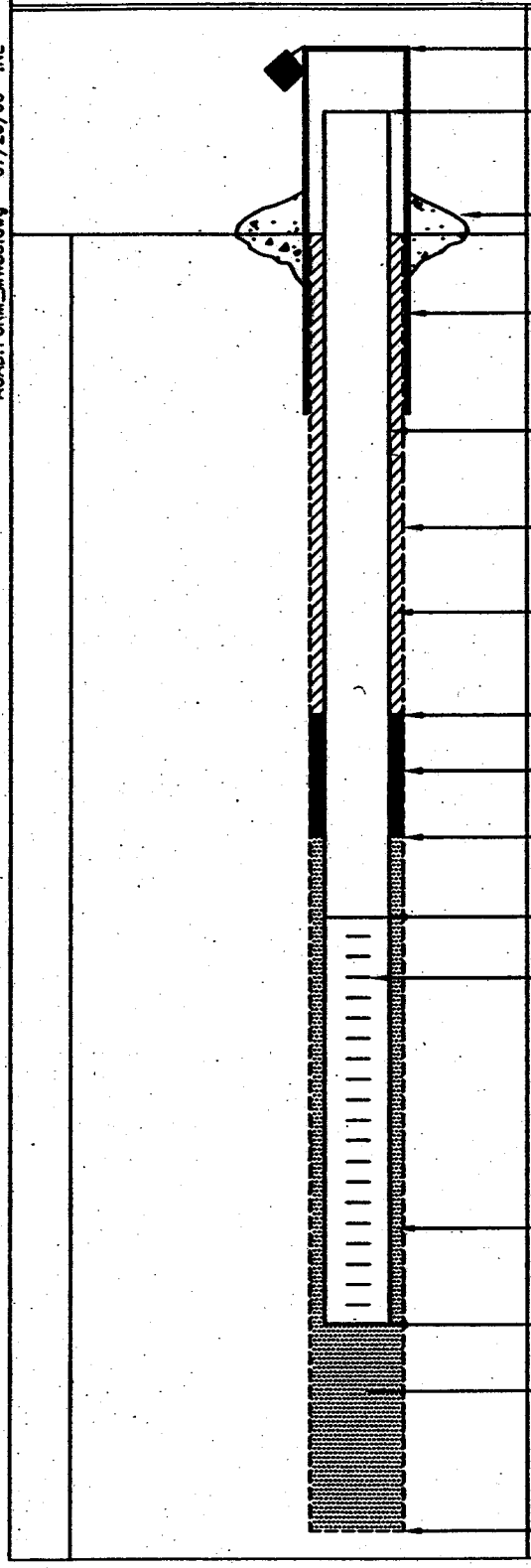
ACAD:FORM_MWNBR.dwg 07/20/99 INL

WELL NO.: 08MWT004

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER Bowser-Morner
PROJECT NO. N1245	BORING 08MWT004	DRILLING METHOD HSA
DATE BEGUN 5-12-05	DATE COMPLETED 5-12-05	DEVELOPMENT METHOD
FIELD GEOLOGIST Jeff Schubert		
GROUND ELEVATION 685.51	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 688.29 / 2.78

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 688.14 / 2.63

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square

TYPE OF SURFACE CASING: Steel with hinged top

RISER PIPE I.D.: 2 inches

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 6 inches

TYPE OF BACKFILL: cement-bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 682.51 / 3.0

TYPE OF SEAL: bentonite chips, medium

DEPTH TOP OF SAND PACK: 680.51 / 5.0 ← ELEVATION/

ELEVATION/DEPTH TOP OF SCREEN: 678.51 / 7.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inches / 5 feet

I.D. OF SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

ELEVATION/DEPTH BOTTOM OF SCREEN: 673.51 / 12

ELEVATION/DEPTH BOTTOM OF SAND PACK: 673.51 / 12

BACKFILL MATERIAL BELOW SAND: None

ELEVATION/DEPTH OF HOLE: 673.51 / [illegible]

ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 08MWT005

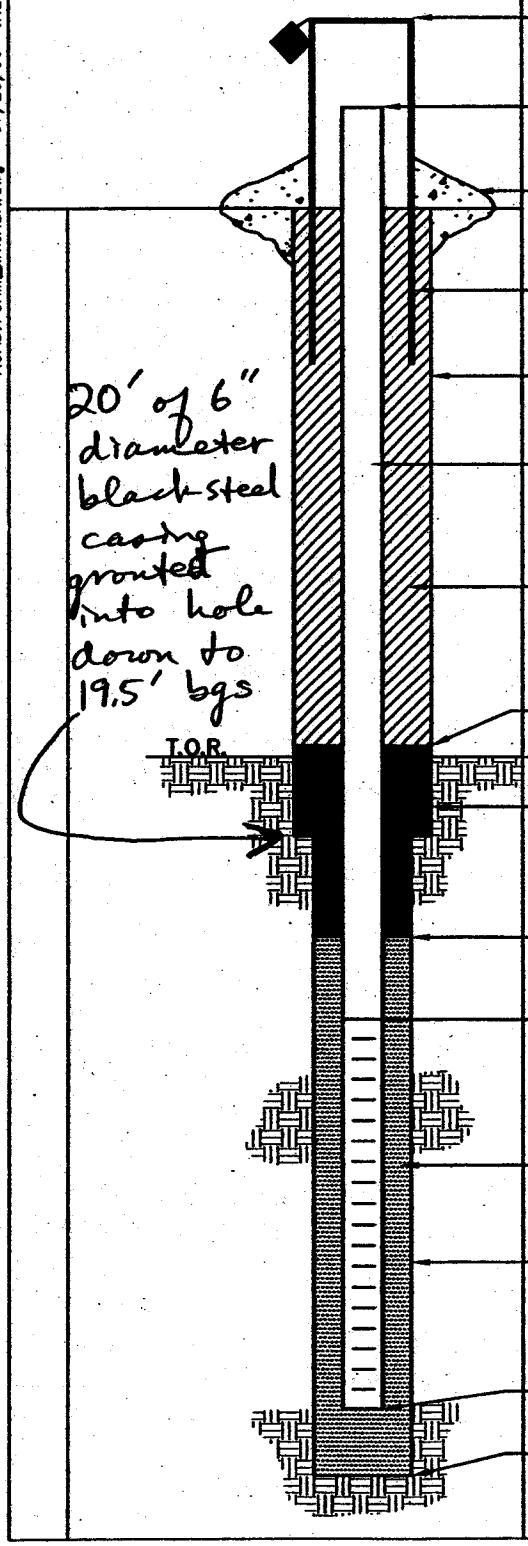
Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE
PROJECT NO. N1245
DATE BEGUN 5-12-05
FIELD GEOLOGIST Jeff Schubert
GROUND ELEVATION 685.85

LOCATION SWMU 8
BORING 08MWT005
DATE COMPLETED 5-16-05
DATUM NAVD 88

DRILLER Bowser Morner
DRILLING METHOD HSA / AR
DEVELOPMENT METHOD



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 687.97 / 2.12

ELEVATION/HEIGHT TOP OF RISER: 687.82 / 1.97

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel protective casing with hinged top

DIAMETER OF HOLE: 8 inch diameter from 0 to 20 feet bgs

RISER PIPE I.D.: 2 inch
TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement - bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 647.85 / 38.0

ELEVATION/DEPTH TOP OF BEDROCK: 669.85 / 16.0

TYPE OF SEAL: bentonite chips medium

ELEVATION/DEPTH TOP OF SAND: 638.85 / 47.00

ELEVATION/DEPTH TOP OF SCREEN: 635.85 / 50.00
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.010 inch / 10 feet
I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK:
CORE/REAM: 2" / 6" from 20 - 60 ft bgs

ELEVATION/DEPTH BOTTOM SCREEN: 625.85 / 60.0
ELEVATION/DEPTH BOTTOM OF SAND: 625.85 / 60.0
ELEVATION/DEPTH BOTTOM OF HOLE: 625.85 / 60.0
BACKFILL MATERIAL BELOW SAND: None

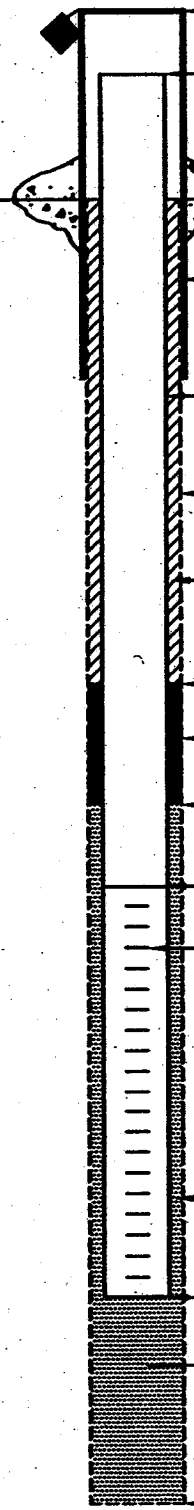
ACAD:FORM_MWNBR.dwg 07/20/99 INL

WELL NO.: 08MW1006

OVERBURDEN MONITORING WELL SHEET STICK-UP

Tetra Tech NUS, Inc.

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER Bowser-Morner	
PROJECT NO. N1245	BORING 08MWT006	DRILLING METHOD HSA	
DATE BEGUN 5-12-05	DATE COMPLETED 5-12-05		
FIELD GEOLOGIST Jeff Schubert		DEVELOPMENT METHOD	
GROUND ELEVATION 686.00	DATUM NAVD88		



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 688.36 / 2.36

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 688.36 / 2.36

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square

TYPE OF SURFACE CASING: Steel with hinged top

RISER PIPE I.D.: 2 inches

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 6 inches

TYPE OF BACKFILL: cement-bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 684.00 / 2[illegible]

TYPE OF SEAL: bentonite chips, medium

DEPTH TOP OF SAND PACK: 680.00/6.0

ELEVATION/DEPTH TOP OF SCREEN: 678.00/ 8.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inches /

I.D. OF SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

ELEVATION/DEPTH BOTTOM OF SCREEN: 668.00 18.0

ELEVATION/DEPTH BOTTOM OF SAND PACK: 668.00/ 18.0

BACKFILL MATERIAL BELOW SAND: None

ELEVATION/DEPTH OF HOLE: 668.00/ 18[illegible]

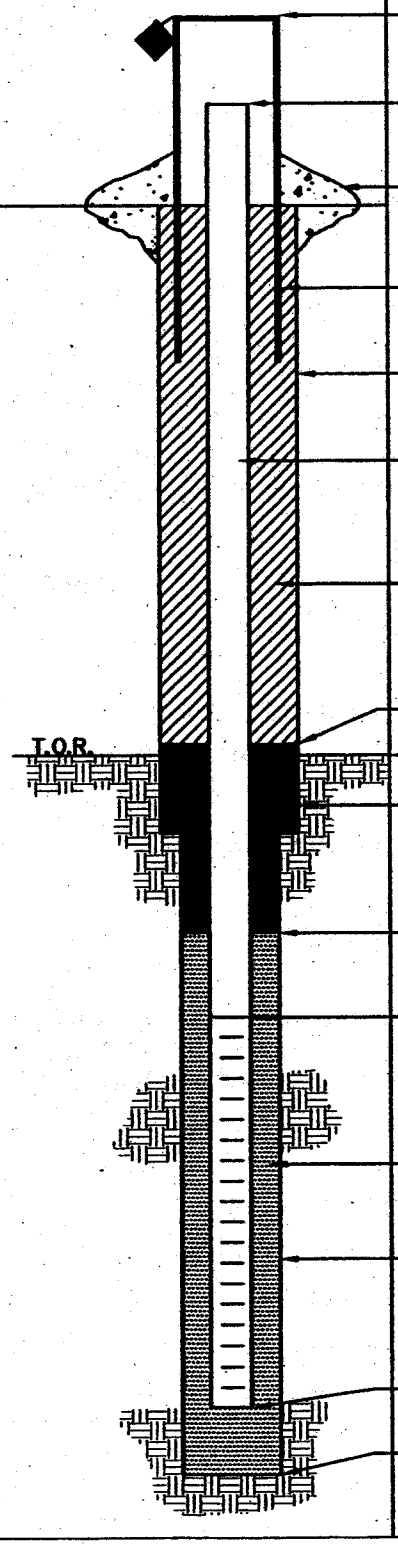
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 08MWT007

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER Bowser Morner	
PROJECT NO. N1245	BORING 08MWT007	DRILLING METHOD HSA/A1	
DATE BEGUN 5-13-05	DATE COMPLETED 5-13-05		
FIELD GEOLOGIST Jeff Schubert		DEVELOPMENT METHOD	
GROUND ELEVATION 699.73	DATUM NAVD 88		



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 701.34 / 1.61

ELEVATION/HEIGHT TOP OF RISER: 701.31 / 1.58

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel protective casing with hinged top

DIAMETER OF HOLE: 8 inches from 0 to 9 ft bgs

RISER PIPE I.D.: 2 inches

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement-bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 695.73, 4.0

ELEVATION/DEPTH TOP OF BEDROCK: 689.73/10.0

TYPE OF SEAL: bentonite chips, medium

ELEVATION/DEPTH TOP OF SAND: 683.73, 16.0

ELEVATION/DEPTH TOP OF SCREEN: 681.73, 18.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inches / 15.0 feet

I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK:

CORE/REAM: 2" / 6" from 10 ft to 33 feet bgs; 2" core only from 33 to 35 ft bgs

ELEVATION/DEPTH BOTTOM SCREEN: 666.73 / 33.0

ELEVATION/DEPTH BOTTOM OF SAND: 666.73 / 33.0

ELEVATION/DEPTH BOTTOM OF HOLE: 664.73 / 35.0

BACKFILL MATERIAL BELOW SAND: ~~Above~~ 2 ft of ground up clay/shale dust released into the 2" core hole with the roller bit

ACAD:FORM_MWINBR.dwg 07/20/99 INL

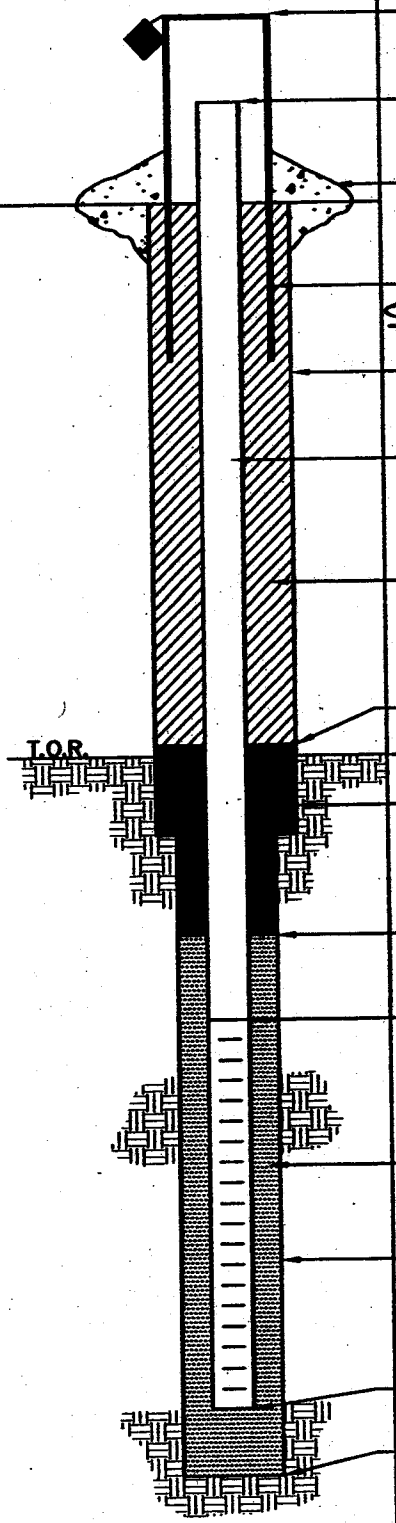
WELL NO.: 08MWT008

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: NSWC CRANE
PROJECT NO.: N1245
DATE BEGUN: 5
FIELD GEOLOGIST: Jeff Schubert
GROUND ELEVATION: 695.60
LOCATION: SWMU 8
BORING: 08MWT008
DATE COMPLETED:
DATUM: NAVD 88

DRILLER: Bowser Mor
DRILLING METHOD: HSA / AR
DEVELOPMENT METHOD:



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 697.61 / 2.01

ELEVATION/HEIGHT TOP OF RISER: 697.59 / 1.99

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel protective casing with hinged top

DIAMETER OF HOLE: 8 inches from 0-10 ft bgs

RISER PIPE I.D.: 2-inches

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement-bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 692.60 / 3.0

ELEVATION/DEPTH TOP OF BEDROCK: 685.60 / 10.0

TYPE OF SEAL: bentonite chips, medium

ELEVATION/DEPTH TOP OF SAND: 682.60 / 13.0

ELEVATION/DEPTH TOP OF SCREEN: 680.60 / 15.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inches / 15.0 feet

I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand, U.S. Standard Sieve Size No 10-20

DIAMETER OF HOLE IN BEDROCK:

CORE/REAM: 2 inches / 6 inches

ELEVATION/DEPTH BOTTOM SCREEN: 665.60 / 30.00

ELEVATION/DEPTH BOTTOM OF SAND: 665.60 / 30.0

ELEVATION/DEPTH BOTTOM OF HOLE: 665.60 / 3

BACKFILL MATERIAL BELOW SAND: None

ACAD:FORM_MWINBR.dwg 07/20/99 INL

WELL NO.: 08 MWT009

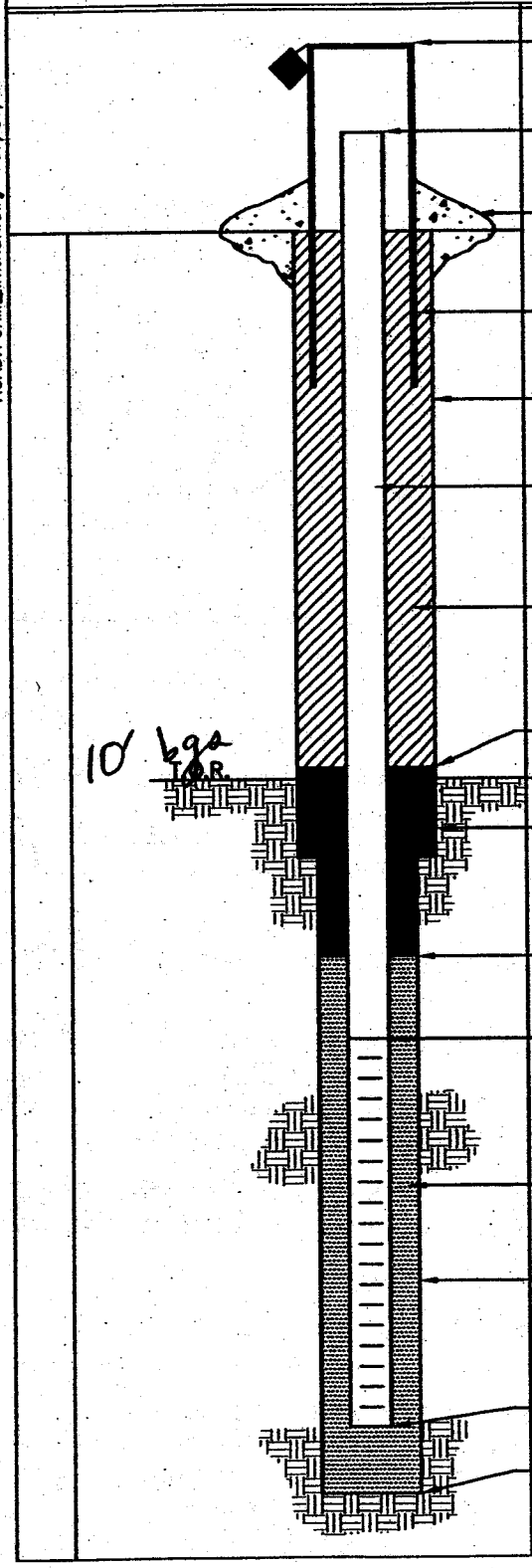
Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE
PROJECT NO. N1245
DATE BEGUN 5-17-05
FIELD GEOLOGIST Jeff Schubert
GROUND ELEVATION 635.49

LOCATION SWMU 8
BORING 08 MWT009
DATE COMPLETED 5-17-05
DATUM NAVD 88

DRILLER Bowser Morner
DRILLING METHOD HSA/AR
DEVELOPMENT METHOD



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 637.72/2.23

ELEVATION/HEIGHT TOP OF RISER: 637.61/2.12

TYPE OF SURFACE SEAL: 4'x4'x6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4"x4" square steel with hinged top

DIAMETER OF HOLE: 8" diameter from 0-10 ft bgs

RISER PIPE I.D.: 2 inches
TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement-bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 629.49/6.0

ELEVATION/DEPTH TOP OF BEDROCK: 625.49/10.0

TYPE OF SEAL: bentonite chips medium

ELEVATION/DEPTH TOP OF SAND: 623.49/12.0

ELEVATION/DEPTH TOP OF SCREEN: 620.49/15.0
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.010 inches/15.0 feet
I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK: 6 inches
CORE/REAM: 2"/6"

ELEVATION/DEPTH BOTTOM SCREEN: 605.49/30.0
ELEVATION/DEPTH BOTTOM OF SAND: 605.49/30.0
ELEVATION/DEPTH BOTTOM OF HOLE: 605.49/30.0
BACKFILL MATERIAL BELOW SAND: None

ACAD:FORM_MWNBR.dwg 07/28/99 INL

WELL NO.: 08MWT010

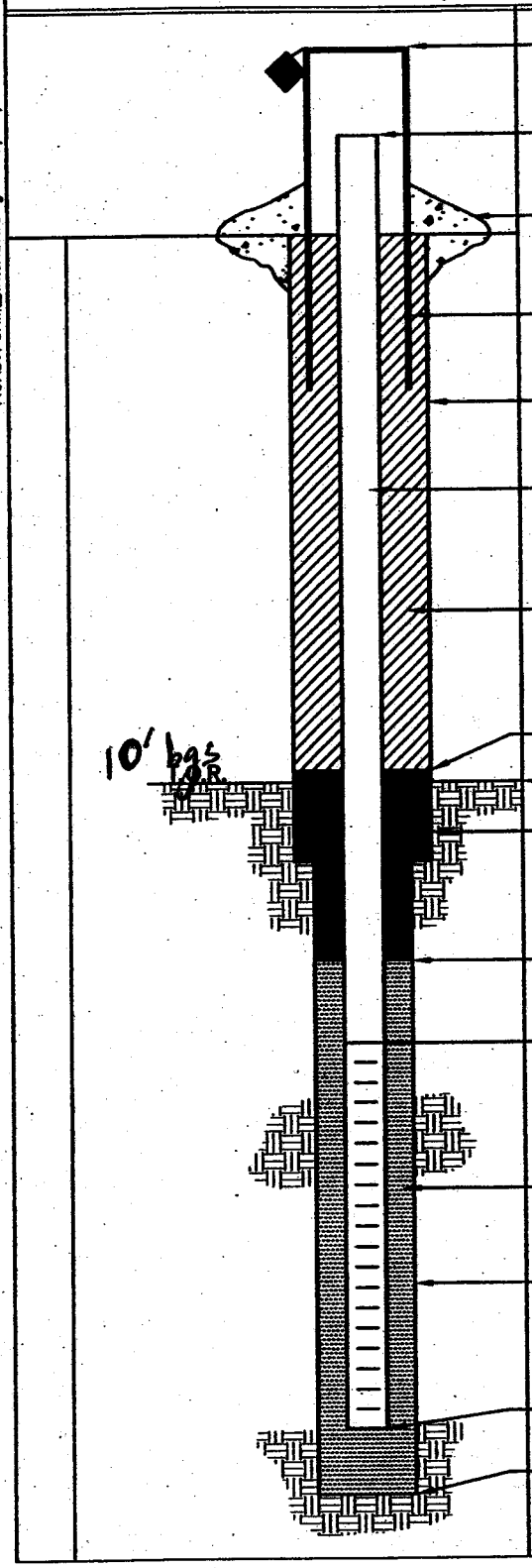
Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE
PROJECT NO. N1245
DATE BEGUN 5-24-05
FIELD GEOLOGIST Jeff Schubert
GROUND ELEVATION 601.97

LOCATION SWMU 8
BORING 08MWT010
DATE COMPLETED 5-24-05
DATUM NAVD88

DRILLER Bowser Morner
DRILLING METHOD HSA/AR
DEVELOPMENT METHOD



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 604.19 / 2.22

ELEVATION/HEIGHT TOP OF RISER: 604.22 / 2.25

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel with hinged top

DIAMETER OF HOLE: 8 inches from 0-10 ft bgs

RISER PIPE I.D.: 2 inches
TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 597.97 / 4.0

ELEVATION/DEPTH TOP OF BEDROCK: 591.97 / 10.0

TYPE OF SEAL: bentonite chips, medium

ELEVATION/DEPTH TOP OF SAND: 589.97 / 12.0

ELEVATION/DEPTH TOP OF SCREEN: 586.97 / 15.0
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.010 inch / 15.0 feet
I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK:
CORE/REAM: 2" / 6"

ELEVATION/DEPTH BOTTOM SCREEN: 571.97 / 30.0
ELEVATION/DEPTH BOTTOM OF SAND: 571.97 / 30.0
ELEVATION/DEPTH BOTTOM OF HOLE: 571.97 / 3[illegible]
BACKFILL MATERIAL BELOW SAND: 0 None

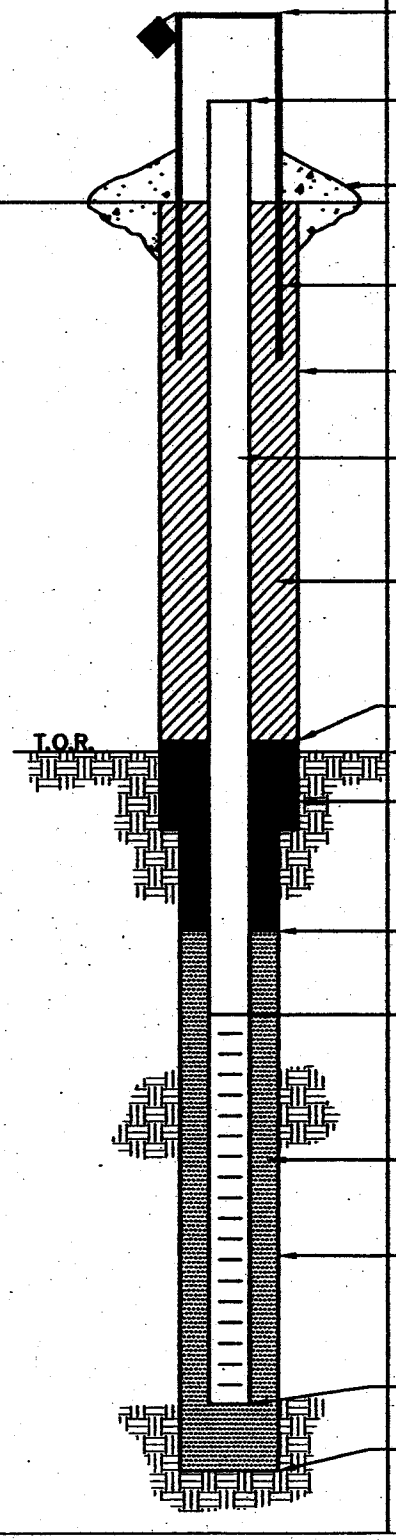
ACAD:FORM_MWNBR.dwg 07/20/99 INL

WELL NO.: 08MWT011

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT NSWC Crane	LOCATION SWMU 8	DRILLER Bowser Morner
PROJECT NO. N1245	BORING 08MWT011	DRILLING METHOD HSA / AR
DATE BEGUN 5-23-05	DATE COMPLETED 5-23-05	DEVELOPMENT METHOD
FIELD GEOLOGIST Jeff Schubert		
GROUND ELEVATION 600.55	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 602.96 / 2.41

ELEVATION/HEIGHT TOP OF RISER: 602.91 / 2.36

TYPE OF SURFACE SEAL: 4' x 4' x 6" cement pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" steel protective casing with hinged top

DIAMETER OF HOLE: 8" from 0 to 10 ft bgs

RISER PIPE I.D.: 2 inches

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 596.55 / 4.0

ELEVATION/DEPTH TOP OF BEDROCK: 590.55 / 10.0

TYPE OF SEAL: bentonite chips medium

ELEVATION/DEPTH TOP OF SAND: 588.55 / 12.0

ELEVATION/DEPTH TOP OF SCREEN: 585.55 / 15.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.010 inches / 15 feet

I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK: 6"

CORE/REAM: 2" / 6" from 10 - 30 feet bgs

ELEVATION/DEPTH BOTTOM SCREEN: 570.55 / 30.0

ELEVATION/DEPTH BOTTOM OF SAND: 570.55 / 30.0

ELEVATION/DEPTH BOTTOM OF HOLE: 570.55 / 30.0

BACKFILL MATERIAL BELOW SAND: None

ACAD: FORM_MWINBR.dwg 07/20/99 INL

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: N/A
DRILLING RIG: hand auger
BORING No.: 08TW005
DATE: 5/24/05
GEOLOGIST: Jeff Schubert
DRILLER: N/A

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil (Density/Consistency) or Rock (Hardness)	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Breathing**	Drilling BZ**
	1			1		dk	brown sandy topsoil (moist)			0	0	0	0
	2												
	3		100%				tan to olive gray clayey						
	4						silt						
	5												
	6												
	7												
	8			8'		8' = top of bedrock/refusal							
							8' = total depth of boring						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08TW005

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC Crane SWMU 8 BORING No.: 08TW006
PROJECT NUMBER: N1245 DATE: 5-24-05
DRILLING COMPANY: N/A GEOLOGIST: Jeff Schubert
DRILLING RIG: hand auger DRILLER: N/A

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Borehole	Drilling Area
	1			1'			brown topsoil			0	0	0	0
	2												
	3		100%				brown to olive gray						
	4						silt + sandy silt						
	5												
	6			6'									
					6' = top of bedrock / refusal								

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08TW006

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC Crane SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: N/A
DRILLING RIG: hand auger
BORING No.: 08TW007
DATE: 5-25-05
GEOLOGIST: Jeff Schubert
DRILLER: N/A

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Background	Drilling Air
	1						silty clay, wet			0	0	0	0
	2			1.5									
							1.5 feet = total depth/ bedrock surface						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

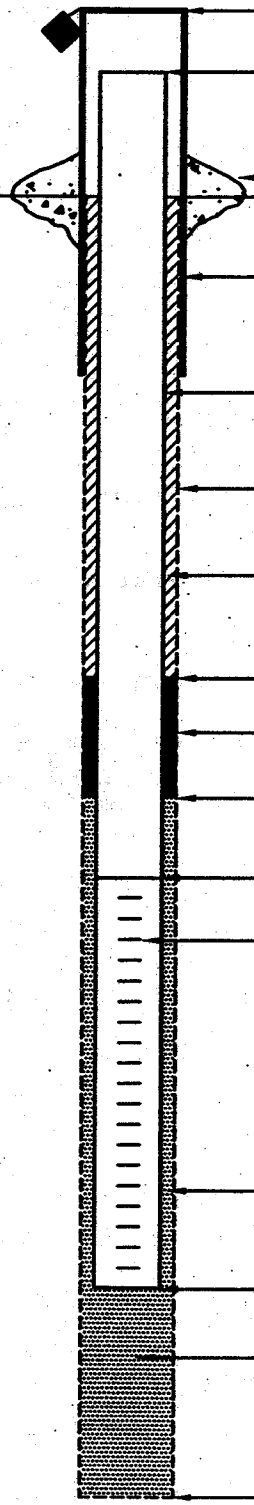
Converted to Well: Yes ✓ No _____ Well I.D. #: 08TW007

WELL NO.: 08TW005

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER Hand Auger
PROJECT NO. N1245	BORING 08TW005	DRILLING METHOD Hand Auger
DATE BEGUN 5-24-05	DATE COMPLETED 5-24-05	DEVELOPMENT METHOD
FIELD GEOLOGIST Jeff Schubert		
GROUND ELEVATION 678.49	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: NA / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 680.54 2.05

TYPE OF SURFACE SEAL: packed clay soil

I.D. OF SURFACE CASING: none

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF BACKFILL: none

ELEVATION/DEPTH TOP OF SEAL: 678.49 0.0

TYPE OF SEAL: bentonite chips medium

DEPTH TOP OF SAND PACK: 675.49 3.0

ELEVATION/DEPTH TOP OF SCREEN: 673.49 / 5.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: NA / 3 ft

I.D. OF SCREEN: 1"

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

ELEVATION/DEPTH BOTTOM OF SCREEN: 670.49 / 8.0

ELEVATION/DEPTH BOTTOM OF SAND PACK: 670.49 / 8.0

BACKFILL MATERIAL BELOW SAND: 0 None

ELEVATION/DEPTH OF HOLE: 670.49 / 8.0

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WELL NO.: 08TW006

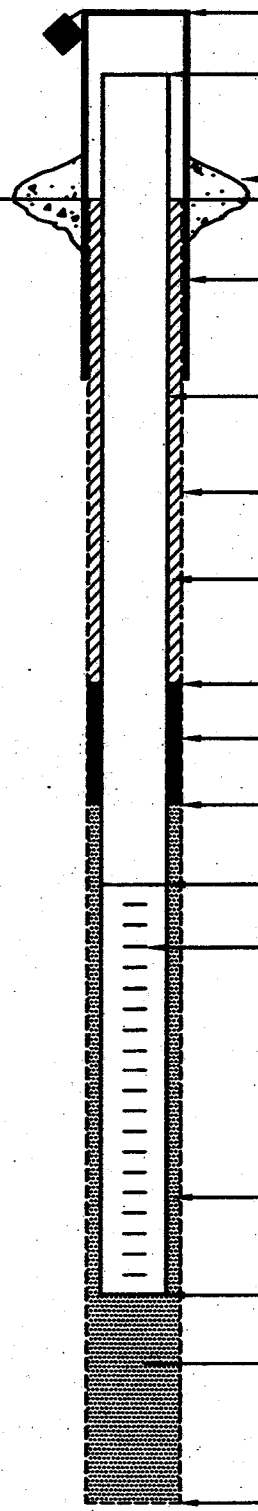
Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT NSWC CRANE
PROJECT NO. N1245
DATE BEGUN 5-24-05
FIELD GEOLOGIST Jeff Schubert
GROUND ELEVATION 670.46

LOCATION SWMU 8
BORING 08TW006
DATE COMPLETED 5-24-05
DATUM NAVD 88

DRILLER NA
DRILLING METHOD Hand Auger
DEVELOPMENT METHOD



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: NA/ NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 672.72/2.26

TYPE OF SURFACE SEAL: packed Clay soil

I.D. OF SURFACE CASING: None
TYPE OF SURFACE CASING:

RISER PIPE I.D.: 1"
TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF BACKFILL: none

ELEVATION/DEPTH TOP OF SEAL: 670.46/0.0

TYPE OF SEAL: bentonite chips medium

DEPTH TOP OF SAND PACK: 669.96 0.5

ELEVATION/DEPTH TOP OF SCREEN: 669.46/1.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: NA / 5.0 feet

I.D. OF SCREEN: 1"

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

ELEVATION/DEPTH BOTTOM OF SCREEN: 664.46/6.0

ELEVATION/DEPTH BOTTOM OF SAND PACK: 664.46/6.0

BACKFILL MATERIAL BELOW SAND: O None

ELEVATION/DEPTH OF HOLE: 664.46/6.0

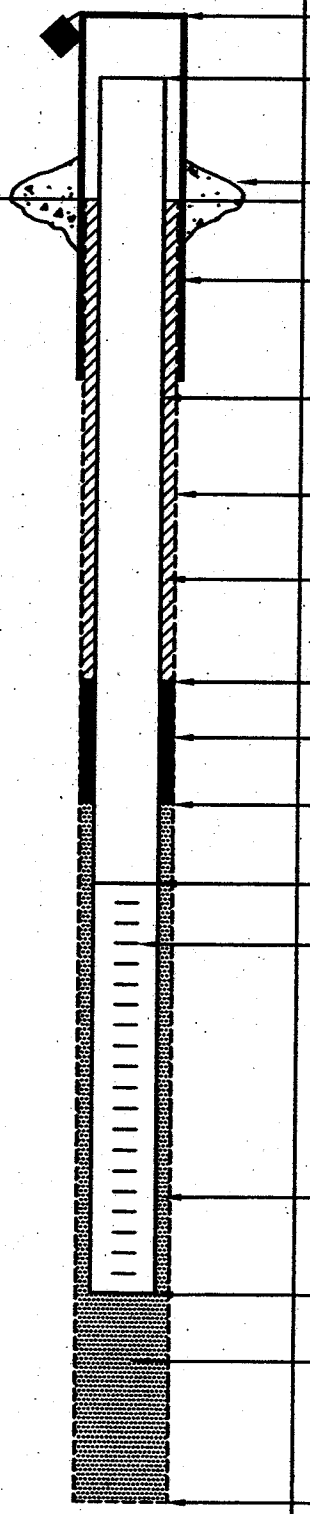
ACAD:FORM_MWSU.dwg 07/28/99 INL

WELL NO.: 08TW007

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER NA
PROJECT NO. N1245	~~BORING~~ 08TW007	DRILLING METHOD hand auger
DATE BEGUN 5-25-05	DATE COMPLETED 5-25-05	
FIELD GEOLOGIST Jeff Schubert		DEVELOPMENT METHOD
GROUND ELEVATION 666.37	DATUM NAVD88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: NA/ NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: 667.92/1.55

TYPE OF SURFACE SEAL: packed clay soil

I.D. OF SURFACE CASING: none

TYPE OF SURFACE CASING:

RISER PIPE I.D.: 1"

TYPE OF RISER PIPE: PVC

BOREHOLE DIAMETER: 3"

TYPE OF BACKFILL: none

ELEVATION/DEPTH TOP OF SEAL: /0.0

TYPE OF SEAL: packed clay soil

DEPTH TOP OF SAND PACK: 666.37/0.0

ELEVATION/DEPTH TOP OF SCREEN: 666.37/0.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: NA/ 1.5 ft

I.D. OF SCREEN: 1"

TYPE OF SAND PACK: Silica Sand No 10-20 U.S. Standard Sieve Size

ELEVATION/DEPTH BOTTOM OF SCREEN: 664.87/1.5

ELEVATION/DEPTH BOTTOM OF SAND PACK: 664.87/1.5

BACKFILL MATERIAL BELOW SAND: 0 None

ELEVATION/DEPTH OF HOLE: 664.87/1.5

ACAD:FORM_MWSU.dwg 07/20/99 INL

ROUND 3

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8 BORING No.: 08MWT012
PROJECT NUMBER: N1245 DATE: 10/8-9/05
DRILLING COMPANY: Bowser Morner GEOLOGIST: Jeff Schubert
DRILLING RIG: CME 550X-ATV DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample #2	Background	Driller #2
SS1	1	3/4	12"	6"			brown silty sandy topsoil			0	0	0	0
	2	4/5	24"										
SS2	3	3/4	18"				brown to orange silty clay, moist, mottled dense						
	4	5/6	24"										
SS3	5	3/4	20"										
	6	6/5	24"	6'									
SS4	7	6/13	20"				orange to tan to olive gray mottled clayey silt to sandy silt						
	8	24/18	24"	8'									
SS5	9	8/9	4"										
	10	8/13	24"				weathered siltstone, orange to tan; mottled, moist, med. dense, dark brown staining on laminations						
SS6	11	8/17	20"										
	12	29/40	24"										
SS7	13	48/83	12"	13'			top of bedrock						
	14		24"										
							weathered, orange, sandy siltstone, very dry, based on chips blown from hole						
	17		0	17									
C1			1½' / 5'				gray shaly siltstone interlayered with tan fine sandstone						
	22			22.5									
C2							black carbonaceous shale very finely bedded						
	25												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT012

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT012
DATE: 10/8-9/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample BZ	Borehole	Drillers BZ
C2	26						same as above			0	0	0	0
				27.5'									
			2'/				silty shale and fine						
C3	30		5'	29.5			sandstone, interbedded finely laminated						
				31'			black carbonaceous						
	32						shale						
C4			5'/				laminated siltstone,						
	35		5'				shale, and fine sandstone						
							dark gray to tan, wavy						
							bedding; broken near						
C5							38' and 43' bgs;						
		80%	2.5'/				rest of section has						
	40		5'				high RQD						
	42												
C6		80%											
	50			50'									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT012

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8 BORING No.: 08MWT012
PROJECT NUMBER: N1245 DATE: 10/8-9/05
DRILLING COMPANY: Bowser Morner GEOLOGIST: Jeff Schubert
DRILLING RIG: CME 550X-ATV DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Borehole**	Drilling Area**
C6	51						laminated fine sandstone			0	0	0	0
	52						and siltstone with small						
							streaks of coal along						
							bedding planes;						
	55			55'			more coaly near bottom						
							siltstone very lt gray						
C7							contains small streaks of						
				58			shale and coal on partings						
							shale with interbedded						
	60						siltstone, finely laminated						
				61									
	62			61.3			thin coal seam						
							shaly siltstone interbedded						
							with fine sandstone;						
							carbonaceous on laminations						
C8													
	70												
	72												
					72		feet = bottom of		boring				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT012

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT 13
DATE: 10/6-11/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler B2	Borehole	Driller B2
							augered down to bedrock at about 12' bgs and set 10" diameter temporary casing			0	0	0	0
				12'									
							roller bit used down to 79' bgs (see logs for 08MWT03 and 08MWT04 for this section); installed 6" steel casing to 79'						
	79'			79'									
C1	80	80%	3.5 / 3.5				fine sandstone and siltstone interbedded; lt. gray to med. gray						
	82			83'									
	85						med. gray shale and interbedded siltstone very broken						
C2		40%	9' / 10'	87'									
	90						siltstone and fine sandstone with shale laminations lt. gray to dark gray						
				92.5									
C3													
	95												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT013

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT013
DATE: 10/6-11/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Borehole**	Drilling Area
	95									0	0	0	0
C3		15%	8'/10'		soft		interbedded shale and sandy siltstone; lt. gray to med. gray; very broken mostly shale						
	100												
	105												
C4		10%	8'/10'										
	110												
	115			115'									
C5		20%	10'/10'				fine sandstone interbedded with some silty shale, lt. - med. gray more competant than rock above						
	120			119' 119-123			interlayered fine ss. and coal		highly broken				

* When rock coring, enter rock brokeness. 123 feet = bottom of boring

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Background (ppm): 0

Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT013

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV
BORING No.: 08MWT014
DATE: 10/5-10/10
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sample #2	Borehole	Driller #2
										0	0	0	
							augered down						
							to bedrock						
							at 13 feet bgs						
				13									
							used 8" diam roller bit down to						
							79 feet bgs and set 80 ft						
							of 6" diam. steel casing						
							(see logs for 08MWT05						
							and 08MWT06 for this						
	78			78'			interval)						
C1	79			79'			concrete grout inside 6" casing						
	80												
							interbedded siltstone and						
				82'			silty shale (rock broken						
							at 80' and 81')						
		~~80~~	9'/				hole producing lots of water						
C2	85		10'										
							Shale with interbedded						
							fine sandstone and siltstone;						
							lt. gray to dark gray;						
							rock heavily broken on						
	90						bedding planes						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ✓ No _____ Well I.D. #: 08MWT014

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE SWMU 8
PROJECT NUMBER: N1245
DRILLING COMPANY: Bowser Morner
DRILLING RIG: CME 550X-ATV

BORING No.: 08MWT014
DATE: 10/5-10/05
GEOLOGIST: Jeff Schubert
DRILLER: Jim Walsh

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sample #2	Borehole**	Driller #2
	90									0	0	0	0
C2													
							same as above but slightly less shale and rock core more competent						
	95												
C3		25%	10'/10'										
							lt. gray – dk. gray not producing much water at depth						
	100												
							cored to 112.5 feet bgs.						
	115						reamed hole to 115 feet bgs						
					115		feet = total depth of boring						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

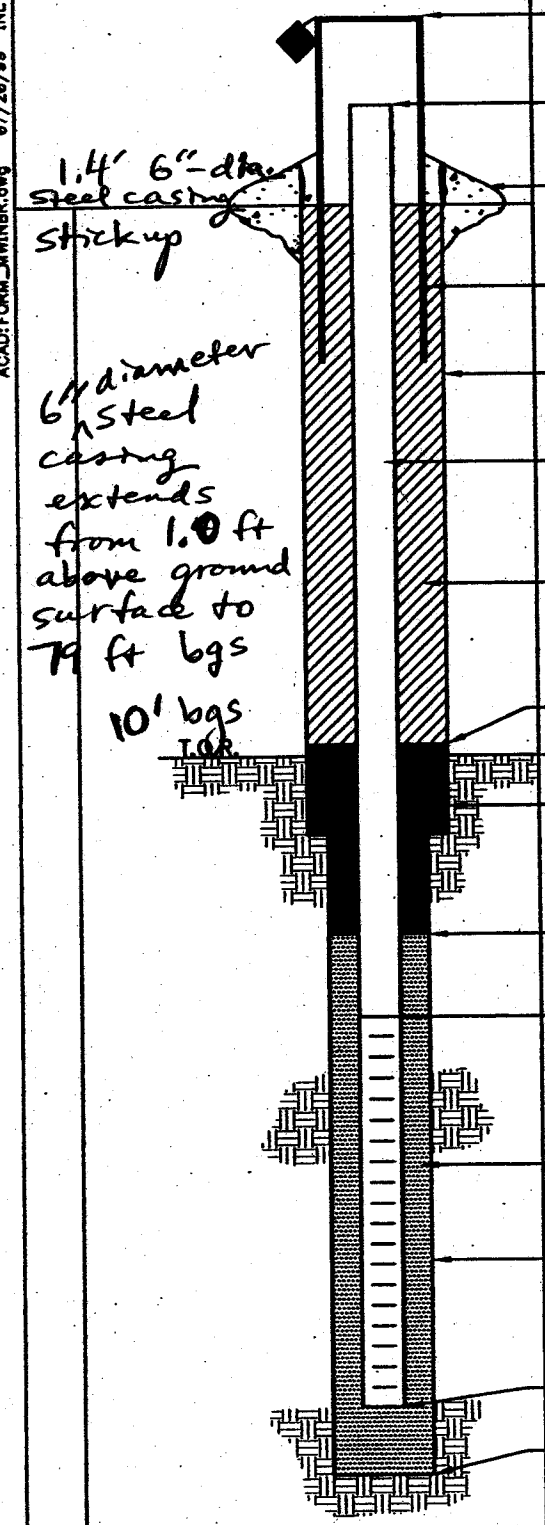
Converted to Well: Yes ✓ No ____ Well I.D. #: 08MWT014

WELL NO.: 08MWT013

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE	LOCATION SWMU 8	DRILLER Bowser Morner
PROJECT NO. N1245	BORING 08MWT013	DRILLING METHOD HSA/AR
DATE BEGUN 10-6-05	DATE COMPLETED 10-11-05	DEVELOPMENT METHOD
FIELD GEOLOGIST Jeff Schubert		
GROUND ELEVATION 685.68	DATUM NAVD 88	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / 688.23 / 2.55

ELEVATION/HEIGHT TOP OF RISER: 688.~~53~~ 25 / 2.~~95~~ 57

TYPE OF SURFACE SEAL: 4' x 4' x 6" cement pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel with hinged top

DIAMETER OF HOLE: 8" from 0 to 79 feet bgs

RISER PIPE I.D.: 2 inches

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 592.68 / 93

ELEVATION/DEPTH TOP OF BEDROCK: 675.68 / 10.0

TYPE OF SEAL: bentonite chips, medium

ELEVATION/DEPTH TOP OF SAND: 584.68 / 101.0

ELEVATION/DEPTH TOP OF SCREEN: 582.68 / 103.0

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.020 inch / 20 feet

I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK:

CORE/REAM: 2" core 6" reaming

ELEVATION/DEPTH BOTTOM SCREEN: 562.68 / 123

ELEVATION/DEPTH BOTTOM OF SAND: 562.68 / 123

ELEVATION/DEPTH BOTTOM OF HOLE: 562.68 / 123

BACKFILL MATERIAL BELOW SAND: 0 None

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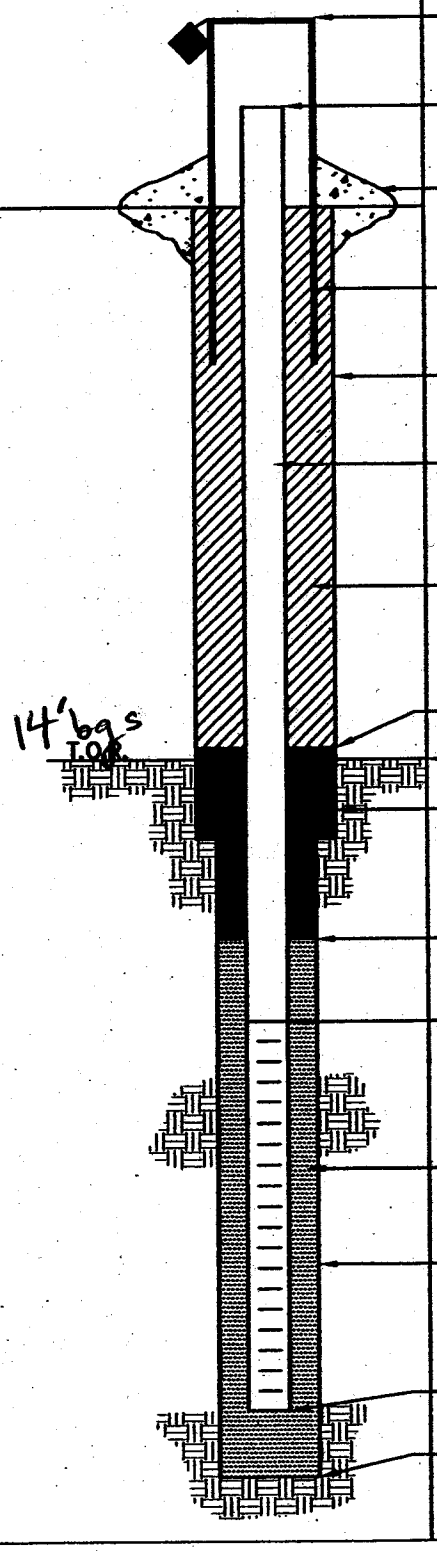
WELL NO.: 08MWT012

Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: NSWC CRANE
LOCATION: SWMU 8
PROJECT NO.: N1245
BORING: 08MWT012
DATE BEGUN: 10-8-05
DATE COMPLETED: 10-9-05
FIELD GEOLOGIST: Jeff Schubert
GROUND ELEVATION: 683.33
DATUM: NAVD88
DRILLER: Bowser Morner
DRILLING METHOD: HSA/AR
DEVELOPMENT METHOD:



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 685.88 / 2.55

ELEVATION/HEIGHT TOP OF RISER: 685.86 / 2.53

TYPE OF SURFACE SEAL: 4' x 4' x 6" concrete pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" steel with hinged top

DIAMETER OF HOLE: 8" from 0 to 14 feet bgs

RISER PIPE I.D.: 2 inches

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 643.33 / 40.0

ELEVATION/DEPTH TOP OF BEDROCK: 669.33 / 14.0

TYPE OF SEAL: bentonite chips, medium

ELEVATION/DEPTH TOP OF SAND: 633.33 / 50.0

ELEVATION/DEPTH TOP OF SCREEN: 631.33 / 52.00

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.020 inches / 20 feet

I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK: 6"

CORE/REAM: 2" / 6"

ELEVATION/DEPTH BOTTOM SCREEN: 611.33 / 72.0

ELEVATION/DEPTH BOTTOM OF SAND: 611.33 / 72.0

ELEVATION/DEPTH BOTTOM OF HOLE: 611.33 / 77

BACKFILL MATERIAL BELOW SAND: 0 None

ACAD: FORM_MWINBR.dwg 07/20/99 INL

WELL NO.: 08MWT014

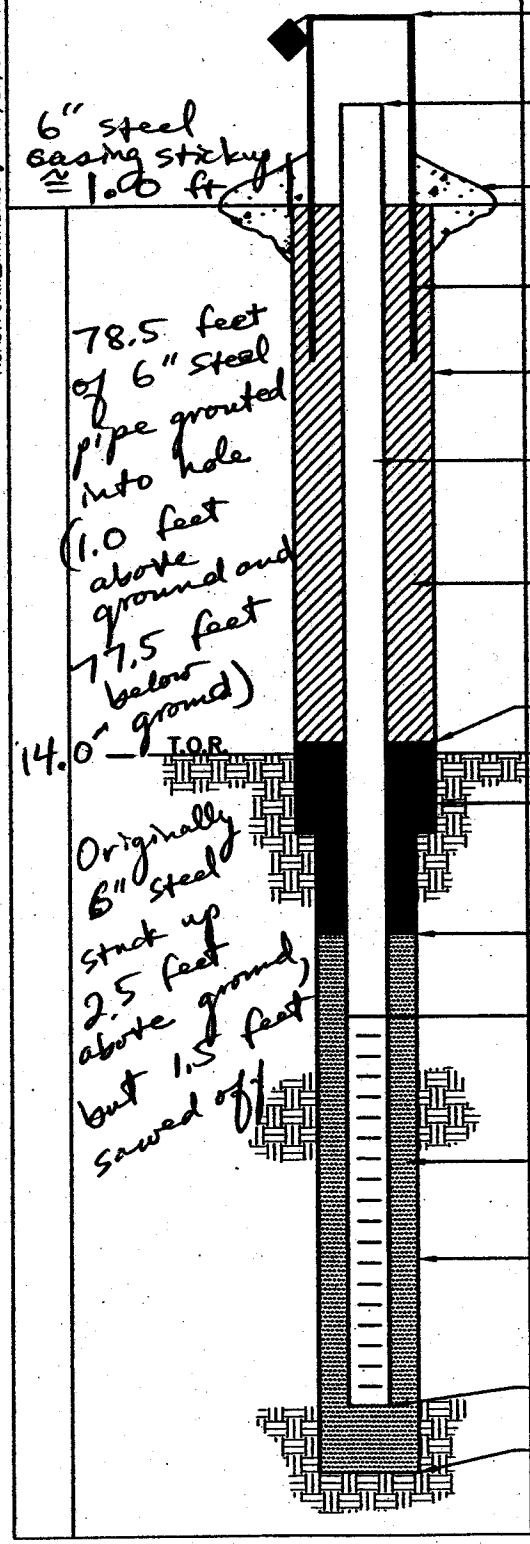
Tetra Tech NUS, Inc.

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT NSWC CRANE
PROJECT NO. N1245
DATE BEGUN 10-5-05
FIELD GEOLOGIST Jeff Schubert
GROUND ELEVATION 685.86

LOCATION SWMU 8
BORING 08MWT014
DATE COMPLETED 10-10-05
DATUM NAVD88

DRILLER Bowser-Morner
DRILLING METHOD HSA / AR
DEVELOPMENT METHOD



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: 688.56 / 2.70

ELEVATION/HEIGHT TOP OF RISER: 688.53 / 2.67

TYPE OF SURFACE SEAL: 4' x 4' x 6" cement pad with 4 barrier posts

I.D. OF SURFACE CASING: 4" x 4" square steel with hinged top

DIAMETER OF HOLE: 8" from 0 to 79 feet bgs

RISER PIPE I.D.: 2 inches

TYPE OF RISER PIPE: PVC

TYPE OF BACKFILL: cement/bentonite grout

ELEVATION/DEPTH TOP OF SEAL: 597.86 / 88

ELEVATION/DEPTH TOP OF BEDROCK: 671.86 / 14.0

TYPE OF SEAL: bentonite chips, medium

ELEVATION/DEPTH TOP OF SAND: 587.86 / 98

ELEVATION/DEPTH TOP OF SCREEN: 585.86 / 100

TYPE OF SCREEN: ~~0.020 in~~ PVC

SLOT SIZE x LENGTH: 0.020 inch / 15 feet

I.D. SCREEN: 2 inches

TYPE OF SAND PACK: Silica Sand No. 10-20 U.S. Standard Sieve Size

DIAMETER OF HOLE IN BEDROCK:

CORE/REAM: 2" core 6" reaming

ELEVATION/DEPTH BOTTOM SCREEN: 570.86 / 115

ELEVATION/DEPTH BOTTOM OF SAND: 570.86 / 115

ELEVATION/DEPTH BOTTOM OF HOLE: 570.86 / 115

BACKFILL MATERIAL BELOW SAND: None

ACAD:FORM_MWNBR.dwg 07/20/99 INL

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB015
DATE: 10/3
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							silty sandy gravel loose, dry	GC					
	1								08SS0150002				
				1.3'									
	2				Brown		silty clay, stiff, damp	ML					
	3												
	4												
							moist layer		08SB0150406				
	5												
	6						Hard, damp						
	7			Refusal			END of Boring AT 6.5' BGS						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: ~~DPT - Geoprobe~~ Hand Auger

BORING NUMBER: 08SB016
DATE: 10/4
GEOLOGIST: DH
DRILLER: DW

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				~1.0'			Top Soil						
	1					Brown	Silty Clay, Stiff, damp	ML					
	2												
	3												
				Auger Refusal			END of BORING AT 3' BGS						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB017
DATE: 10/3
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				0.5'			Top Soil, Silty Sandy gravel, loose, dry						
	1						Clay w/ some silt, soft, moist.	ML	08SS0170002				
	2												
				Refusal			END of Boring AT 2' BGS						
	3												
	4												
	5												
	6												
	7												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB018
DATE: 10/3
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Black		Top Soil and gravel loose, dry						
	1			1.0'									
					Brown		Silty clay, some small gravel, fin, damp	ML					
	2												
							Stiff						
	3												
	4												
	5			Refusal			END of Bori AT 4.5' BGS						
	6												
	7												
	8												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB019
DATE: 10/3
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Asphalt / gravel dry, loose						
	1												
	2				Tan - Brown		Silty Clay, w/some fine to mod sand, trace gravel, moist.	ML	08SS0190002				
	3												
	4			Refusal			END of Boring AT 3.5' BGS						
	5												
	6												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 1.5' of gravel, Refusal ~3.5' BGS

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB020
DATE: 10/3
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Black		Top Soil, gravel, organics, damp						
	1			1.75					08SS020 0002				
					Brown		silty sandy Clay w/ some gravel, moist	ML					
	2												
	3			3.0									
					Tan-Brown		fine Sand w/ some silty Clay, moist	ML	08SB020020C				
	4			Refusal			END of Boring AT 3.5' BGS						
	5												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB021
DATE: 10/3
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Black		Top Soil, some sand and gravel, damp						
	1			1.0					08SS0210002				
					Brown		silty clay, fine, some gravel, damp		ML				
	2												
	3			2.8					08SB0210204				
					Tan gray		Clayey fine Sand, moist	SC					
	4			Refusal			END of Boring AT 3.5' BGS						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB022
DATE: 9/29
GEOLOGIST: DH
DRILLER: J.M.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown		Silty Sand w/ some Clay, soft, moist	SC					
	1								08SS0220002	0			
	2												
	3												
	4												
	5												
	6												
					Brown		Silty Sand w/ some Clay, moist, soft	SC	Bottom 2-3 inches = wet				
	7								08SB0220608				
							Bottom 3" is white Silty Sand, moist	SC					
	8			Refusal			— END of BORING — AT 7.5' BGS						
	9												
	10												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Approximately 0.5' of Concrete at location
Set Temporary well w/ 5' Screen

Converted to Well: Yes ✓ No _____ Well I.D. #: 08TW0008

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: ~~DPT Geoprobe~~ Hand Auger

BORING NUMBER: 08SB023
DATE: 10/4
GEOLOGIST: DH
DRILLER:

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Asphalt/gravel						
	1												
					Brown		Silty Sand & gravel	GC					
	2												
				Hand Auger Refusal			END OF BORING AT 2' BGS						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB024
DATE: 10/3
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Silty Sandy gravel	GC					
	1								08SS0240002				
				1.75									
	2				Dark Brown		Silty clay Layer	ML					
				2.25									
					Brown		Silty Clay, Trace fine Sand, gravel		08SB0240204				
	3						fine, damp	ML					
				Refusal									
	4						END OF BORING AT 3.0' BGS						
	5												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB025
DATE: 9/29/05
GEOLOGIST: D. Nicke
DRILLER: Jay McFall

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					orangish-Brown		Sandy Silt w/ some clay, moist, soft -	SM		3.3			
	1						some water in top half of sample from coring		08SS0250002				
	2												
					orange-Brown		Silty Sand w/ some clay, damp, soft	SM		65			
	3												
									08SB0250206				
	4												
	5												
	6												
					orangish Brown		Clayey Sand/silt, moist, soft	ML		3.2			
	7						- Bottom 3" is a mottled Brown and gray clay w/some silt, moist, soft		08SB0250608				
	8			Refusal			END OF BORING AT 7.5' BGS						
	9												
	10												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Located inside Bldg 106, ~6" of Concrete over location.

Drilling Area Background (ppm): 0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB026
DATE: 9/29
GEOLOGIST: DH
DRILLER: J.M.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Mottled gray-Brown		Silty Clay, Trace fine sand, Stiff, moist						
	1								08SB026000 2	0	→		
	2												
	3												
	4												
	5				Brown		Silty Clay, Very Stiff, slightly moist.			1.0	0	→	
									08SB0260406				
	6												
	7		Refusal				END OF BORING						
	8												
	9												
	10												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx. 0.5 ft of Concrete at this location

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB027
DATE: 8/29
GEOLOGIST: D.H.
DRILLER: J.M.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
			8/24		gray-Brown		Silty Clay w/ some sand, stiff, moist						
	1								08SS0270002				
	2												
	3												
	4												
					Brown		Clay w/ some silt, moist, stiff						
	5								08SB0270406				
							Bottom 4" is a yellow brown silty sand w/some clay, dry						
	6												
			Refusal				END OF BORING						
	7												
	8												
	9												
	10												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 6" of Concrete at location

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB028
DATE: 9/29
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown-Gray		Silty Clay, trace fine sand, stiff, dry			4.5	0	→	
	1								08SS028 0002				
	2												
	3												
	4												
					Brown-Gray		Clay w/some silt, moist, stiff, plastic			3.4	0	→	
	5								08SB028 0406				
	6												
			Refusal				END OF BORING						
	7												
	8												
	9												
	10												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5' of Concrete at this location

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB029
DATE: 9/29
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown-Gray		Silty Clay, Trace fine sand, stiff, dry			3.3			
	1								08SS029 0002				
	2												
	3												
	4												
	5				Gray-Brown		Silty Clay, Trace fine sand, stiff, dry			1.3			
									08SB029 0406				
	6												
				6.5									
	7			Refusal			END OF Boring						
	8												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5' of Concrete at this location

Drilling Area Background (ppm): ____

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB030
DATE: 10/7
GEOLOGIST: DH
DRILLER: DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown		Silty Sandy gravel, loose, dry						
	1								080300002				
	2												
				Refusal			END OF BORING						
	3												
	4												
	5												
	6												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5" of Concrete over this loc.

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB030
DATE: 9/29
GEOLOGIST: DH
DRILLER: JM

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Gray-Brown		Silty Clay, some fine sand, stiff, dry			15.5			
	1								08SS0310002				
	2												
	3												
	4												
					Gray-Brown		Clay w/some silt, v. stiff, dry			86.8			
	5								08SB0310406 (Dupe, MS/MSD)				
							Bottom 3 inches is a white silty sand w/ trace clay, slt. moist.						
	6												
				Refusal			END OF BORING						
	7												
	8												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5' of Concrete at this location.

Drilling Area Background (ppm): ____

Converted to Well: Yes ✓ No ____ Well I.D. #: 08TW009

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB032
DATE: 10/4
GEOLOGIST: DH
DRILLER: DW

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole*	Driller BZ**
				0.5			Top Soil						
	1				orange-Brown		Silty Clay, Trace fine Sand, moist		ML				
	2												
	3												
	4												
	5												
	6												
	7												
				Hand Auger Refusal			END OF BORING AT 7' BGS						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB033
DATE: 10/4
GEOLOGIST: DH
DRILLER: DW

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
				0.5			Top Soil						
	1				Gray-Brown		Silty Clay, fin, damp	ML					
	2												
	3												
	4												
	5						Strong hydrocarbon odor		PID=375				
	6												
				Hand Auger Refusal			END of Boring AT 6' BGS						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB034
DATE: 10/2
GEOLOGIST: DH
DRILLER: DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown		Silty Clay, some gravel, stiff, moist						
	1								08SS0340002				
	2												
	3												
	4												
	5						Moisture increases in from 5-6' BGS		08SB0340204				
	6												
				Refusal			END of BORING						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5' of Concrete over this location.

Drilling Area Background (ppm): ____

Converted to Well: Yes ✓ No ____ Well I.D. #: 08TW011

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB035
DATE: 10/2
GEOLOGIST: DH
DRILLER: DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown		Silty fine-med sand, loose, moist						
	1								08SS0350002				
					Brown		Silty Clay, soft, moist						
	2												
	3												
							moisture increase						
	4												
	5				Gray-Brown		silty fine sand, firm, damp						
			Refusal				END of Boring						
	6												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ✓ No ___ Well I.D. #: 08TW012

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB0806
DATE: 9/27/05
GEOLOGIST: D. Hickey
DRILLER: JAY McFall

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						Lt. Tan	Sandy Silt w/abundant gravel		Fill				
1													
2													
3													
				Refusal			End of Boring						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collected Sample 08SS0360002

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB037
DATE: 9/27/05
GEOLOGIST: D. Hickey
DRILLER: Jay McFall

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						med BRN	Fine grained Sandy Silt w/ abundant gravel, dry		Fill				
	1												
	2												
				2.5'									
	3			Refusal			END of Boring						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collect Sample 08SS037002

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB038
DATE: 9/27/05
GEOLOGIST: D. Hickey
DRILLER: Jay McFall

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	4					GRN GRAY	Silty Clay, moist, abundant gravel		Fill				
	1												
	2												
				2.5									
	3		Refusal				END of Boring						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collect Sample 08SS038000-2

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB039
DATE: 9/27/05
GEOLOGIST: D. Hickey
DRILLER: J. McFall

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						DRK BRN	Clay w/ some fine Sand and silt, damp		Fill				
	1												
	2			2.0 Refusal			END of Boring						
	3												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Collect Sample 08SS039 0002

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: ~~DPT - Geoprobe~~ Hand Auger

BORING NUMBER: 08SB040
DATE: 10/4
GEOLOGIST: DH
DRILLER: DW

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole -	Driller BZ**
				0.5			Top Soil						
	1				Brown		Clayey Silt w/ ~~Trace Sand~~, fine, dry.	ML					
	2												
	3												
	4												
				Hand Auger Refusal			END of Boring AT 4' BGS						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB041
DATE: 10/2
GEOLOGIST: DH
DRILLER: DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Tan		Clayey Silt silty clay, soft, dry						
	1								08SS041000 2	2.5			
	2												
	3			3.0						2.7			
					mottled Tan-gray		Silty Clay, Trace fine sand, firm to soft, moist.		08SB041000 4 DH				
	4												
	5												
							moist		08SB041040 6	2.7			
	6			5.9									
					Tan-orange		Silty fine to med sand, firm damp						
	7			Refusal			END of Boring						
	8												
	9												
	10												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5 ft of Concrete over this location

Drilling Area Background (ppm): ____

Converted to Well: Yes ✓ No ____ Well I.D. #: 08TW010

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB042
DATE: 10/2
GEOLOGIST: DH
DRILLER: DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Tan		Clayey Silt, fir., dry						
	1								08SS042000Z				
	2												
	3												
	4												
	5			4.8	Brown		Silty Clay, firm, damp		08SB042040G				
				5.5	orange to gray		Silty fine sand, T gravel firm, damp						
	6			Refusal			END of Boring						
	7												
	8												
	9												
	10												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5' of Concrete above this bore.

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

Page 1 of ___

PROJECT NAME:	NSWC CRANE	BORING NUMBER:	08SB043 ~~044~~
PROJECT NUMBER:	N1245	DATE:	10/2
DRILLING COMPANY:	EFS	GEOLOGIST:	DH
DRILLING RIG:	DPT - Geoprobe	DRILLER:	DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Tan		Clayey Silt, soft, dry						
	1								08SS04900002				
	2												
	3			3.0	Tan-gray		silty clay, stiff, moist						
	4								08SB04302005				
	5			4.7	orange-gray		silty fine sand, firm, dry						
				Refusal			END OF BORING						
	6												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5 ft of Concrete over this location

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe
BORING NUMBER: 08SB044
DATE: 10/7
GEOLOGIST: DH
DRILLER: DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown		Clayey Silt, fine, ~~mt.~~ damp						
	1								08SS044 0002				
	2												
	3								08SB044 0204 (MS/MSD)				
	4				orange-grey		silty fine sand, fine, dry						
				Refusal			END OF Boring						
	5												
	6												
	7												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx 0.5 ft of Concrete over this location

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NSWC CRANE
PROJECT NUMBER: N1245
DRILLING COMPANY: EFS
DRILLING RIG: DPT - Geoprobe

BORING NUMBER: 08SB045
DATE: 10/2
GEOLOGIST: DH
DRILLER: DL

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth /Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
					Brown		Clayey Silt, fine, dry, trace small gravel.						
	1								08SS0450002 (Dupe)				
	2												
	3								~~08045~~				
									08SB0450204				
	4			3.8 Refusal			END OF Boring						
	5												
	6												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Approx. 6" of Concrete over this location

Drilling Area Background (ppm): ____

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

GW

Round 4

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB46
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	N
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
Drilling Rig	6610DT	**Drilling Method**	Direct-Push Technology

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 8.2' BGS - end of boring.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB47
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 8' BGS - end of boring. Installed temp well 08TW018 with a 10' screen at this location.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB48
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 7' BGS - end of boring. Installed temporary well 08TW008 at this location with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB49
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	N
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 7.4' BGS - end of boring.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB50
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	N
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
Drilling Rig	6610DT	**Drilling Method**	Direct-Push Technology

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 7.6' BGS - end of boring.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB51
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	N
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 4.1' BGS - end of boring. Moderate hydrocarbon odor (PID = 144ppm) from bottom half of interval

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB52
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	N
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 3' BGS - end of boring.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB53
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 7' BGS - end of boring. Installed temporary well 08TW009 at this locationb with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB54
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	N
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 4' BGS - end of boring. Temporary well 08TW010 planned for this locvation was not installed due to the lack of groundwater within the boring.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB55
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 8.8' BGS - end of boring. Installed temporary well 08TW011 at this location with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB56
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 8.9' BGS - end of boring. Installed temporary well 08TW012 at thisocation with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB57
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 7.5' BGS - end of boring. Installed temporary well 08TW013 at this location with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB58
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	N
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 8.5' BGS - end of boring.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB59
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 9.0' BGS - end of boring. Temporary well 08TW014 installed at this location with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB60
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 8.7' BGS - end of boring. Installed temporary well 08TW015 at this location with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB61
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 6.5' BGS - end of boring. Installed temporary well 08TW016 at this location with a 5' screen.

- End of Report -

Tetra Tech NUS, Inc.

BORING LOG LOG

Created By	David Hickey	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/23/06	**Modified Date**	11/14/06	**Printed Date**	2/9/07

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Boring ID #**	08SB62
TtNUS Project #	112GN1245	**Available to Sampling?**	Y
Task/Contract #	CTO 0331	**Converted to Well?**	Y
WBS Code #		**Geologist**	David Hickey
Status	Complete	**Backround PID Screening**	

Drilling Information

Drilling Company	Environmental Field Services Inc.	**Lead Driller**	STEVE GAISER
		Drilling Method	Direct-Push Technology
Drilling Rig	6610DT		

Runs

Field Screening

Lithology

Water Level

geotech

Lab Analysis

General Observations and Notes

Refusal at 6' BGS - end of boring. Installed temporary well 08TW017 at this location with a 5' screen. Initial attempt refused at ~1' BGS

- End of Report -

B.2 DIGGING PERMITS

DIGGING PERMIT
NSWC CRANE 11000/3 (REV. 8/02)

4669

REQUESTED BY: Tetra Tech / Terry Rojah 412-921-8857	DATE: 11/18/04
WORK REQUEST ON E/S NO.	Bldg 106 Area
WORK WILL BE PERFORMED BY: TetraTech NUS, Inc.	DATE (Start - on or about): 12/3/04

WORK DESCRIPTION: Soil borings to obtain surface & subsurface samples. Locations are: North, east, & south of Building 106. Locations are marked with stakes with pink ribbon or white paint, & are solid circles on attached drawing.

EQUIPMENT TYPE: ☐ HAND TOOLS ☐ CORE DRILL ☐ TRENCHER ☐ BACKHOE ☐ HEAVY EQUIPMENT

Faxed CROP2 11/19/04 **UNDERGROUND UTILITIES LOCATED IN WORK SITE**

UTILITY	PRESENT	MARKED	NOT LOCATED	REMARKS
COMPRESSED AIR CROP 2	N/A			RJ 11-23-04
HIGH VOLTAGE ELECTRICAL	NA			S.P. 11-23-04
FIRE ALARM CROP 2	Yes	Yes		MA 11-22-04
GROUNDING CROP 2	N/A			11-22-04 BR
~~Exp 12/19~~ 2 TURAL GAS 0411190560	YES	YES		11-22-04 DEH
SECURITY ALARM CROP 2	NA			11-20 MA
SEWER	yes	yes		12-1-04 M. Wagoner
STEAM	Yes	Hot Pink Lines & Flags		11-19-04
TELEPHONE Faxed 11/18/04	N/A			11-29-04
WATER	Yes	Yes		12-1-04 M. Wagoner
SECOND ELECTRICAL CROP 2	N/A			11-22-04 BR
Faxed 11/19/04 GENERAL DYNAMICS/NMCI	N/A	NO	Not in Area	11-29-04

In addition to the general precautions for excavating where underground utilites are present, comply with the following:

* Exp 12/27 0412071315

PERMIT HOLDER SIGNATURE: Terry Rojah	DATE: 12/07/04
DIGGING PERMIT APPROVED BY: Donna L. Zellman	DATE: 12/7/04

DISTRIBUTION:

ORIGINAL - Code 09Z5 File
YELLOW - Supv. At work site
PINK - Permit requestor

DIGGING PERMIT
NSWC CRANE 11000/3 (REV. 8/02)

4667

REQUESTED BY: Tetra Tech / Terry Rojahn 412-921-8857	DATE: 11/17/04
WORK REQUEST ON/E/S NO.	E side H-45, S of B-3287 & N of [illegible]
WORK WILL BE PERFORMED BY: Tetra Tech NUS, INC.	DATE (Start - on or about): 12/3/04

WORK DESCRIPTION
Soil borings to obtain surface & subsurface soil samples. Locations are marked with wooden staked with pink ribbon. Location are annotated by solid circles on attached drawing.

EQUIPMENT TYPE
☐ HAND TOOLS ☐ CORE DRILL ☐ TRENCHER ☐ BACKHOE ☐ HEAVY EQUIPMENT

Faxed CROP2 11/17/04 **UNDERGROUND UTILITIES LOCATED IN WORK SITE**

UTILITY	PRESENT	MARKED	NOT LOCATED	REMARKS
COMPRESSED AIR CROP2	N/A			DW 11-18-04
HIGH VOLTAGE ELECTRICAL	NA			SP 11-23-04
FIRE ALARM CROP2	NA			MH 11-20
GROUNDING CROP2	N/A			11-18-04 BL
NATURAL GAS	N/A			11/17/04 dg
SECURITY ALARM CROP2	NA			MH 11-20
SEWER	N/A			12-1-04 M. Wagoner
STEAM	N/A			11-19-04 JCD
TELEPHONE Faxed 11/17/04	N/A			LP 12-6-04
WATER	N/A			12-1-04 M. Wagoner
SECOND ELECTRICAL CROP2	N/A			11-18-04 BL
GENERAL DYNAMICS/NMCI Faxed 11/17/04	NA			11-18-04 JL

In addition to the general precautions for excavating where underground utilites are present, comply with the following:

PERMIT HOLDER SIGNATURE: Terry Rojahn	DATE: 12/07/04
DIGGING PERMIT APPROVED BY: Donna L. Zollman	DATE: 12/7/08

DISTRIBUTION:
ORIGINAL - Code 09Z5 File
YELLOW - Supv. At work site
PINK - Permit requestor

DIGGING PERMIT
NSWC CRANE 11000/3 (REV. 8/02)

4668

REQUESTED BY: Tetra Tech / Terry Rojahn 412-921-8857

DATE: 11/17/04

WORK REQUEST ON E/S NO.:

Hwy 555, B-3330, B-2693 Areas

WORK WILL BE PERFORMED BY: Tetra Tech NUS, Inc.

DATE (Start - on or about): 12/3/04

WORK DESCRIPTION: Soil borings to obtain surface & subsurface samples. Location are: south & east off Highway 555; south & west of Building 3330; North, east & west of Building 2693. Marked with stakes with pink ribbon, or white paint. Locations are solid circles on attached drawing.

EQUIPMENT TYPE

☐ HAND TOOLS ☐ CORE DRILL ☐ TRENCHER ☐ BACKHOE ☐ HEAVY EQUIPMENT

Faxed CROP 1&2 11/17/04

UNDERGROUND UTILITIES LOCATED IN WORK SITE

UTILITY	PRESENT	MARKED	NOT LOCATED	REMARKS
COMPRESSED AIR CROP1	N/A	3337		KG 12-2-04
HIGH VOLTAGE ELECTRICAL	yes	yes	see note *	S.D. 11-23-04
FIRE ALARM CROP1	N/A	N/A		SEG 11-18-04
GROUNDING CROP1	N/A			KG 12-2-04
NATURAL GAS See Below	YES	YES		DEH 11-22-04
SECURITY ALARM CROP2	NA			MJ 11-20
SEWER	yes	yes		12-1-04 M.W. Agner
STEAM 3330	N/A			11-18-04 GCD
TELEPHONE Faxed 11/17/04	N/A			11-29-04
WATER	yes	yes		12-1-04 M.W. Agner
SECOND ELECTRICAL CROP1	yes	yes		11-30-04 K.G.
GENERAL DYNAMICS/NMCI Faxed 11/17/04	NA			11-18-04

In addition to the general precautions for excavating where underground utilites are present, comply with the following:

0412071308, 0412071310, 0412071312
~~0411190569~~, ~~0411190572~~, 0411190582 Exp ~~12/9~~ 12/27

*Marked at 412-473-4414

PERMIT HOLDER SIGNATURE: Terry Rojahn

DATE: 12/07/04

DIGGING PERMIT APPROVED BY: Donna L. Zollman

DATE: 12/7/04

DISTRIBUTION:

ORIGINAL - Code 09Z5 File
YELLOW - Supv. At work site
PINK - Permit requestor

APPENDIX C
SAMPLE LOG SHEETS AND OTHER FIELD FORMS

C.1 SOIL SAMPLE LOG SHEETS

ROUND 1

MULTIPLE SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

[X] SURFACE SOIL [ ] SEDIMENT
[X] SUBSURFACE SOIL [ ] LAGOON / POND
[ ] OTHER _____

SIGNATURE(S): S. Conti

SAMPLER (S): SJC/JG

PROJECT NAME: NSWC CRANE
PROTECT NUMBER: N1245

LOCATION: SWMU 8 (08SB01 - 08SB09)

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE 2004	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES: Volitiles 8260B	SVOCs w/PAHs	SVOCs w/PAHs & PCBs	Energetics, Nitroaromatics, Nitramines & Perchlorates	TAL Metals plus Sn		SOIL GROUP #	PID READING	SOIL DESCRIPTION
08SS00600002	DPT	0-2	12-12	0905	L	G	6	3		1	1	1		3	0	CLAYEY SAND
08SB00600206	"	2-6	"	0910	"	"	6	3		1	1	1		8	0	CLAY/SAND
08SB00600610	"	6-8	"	0915	"	"	6	3		1	1	1		9	0	SILTY SAND - ROCK FRAG.
08SS00900002	"	0-2	"	0925	"	"	6	3		1	1	1		Fill	0	SANDY CLAY
08SB00900206	"	2-6	"	0930	"	"	6	3		1	1	1		9	0	SILTY SAND
08SB00900610	"	6-8.5	"	0935	"	"	15	9		2	2	2		9	0	SILTY SAND - TR S.ST FRAGS
+ FD12120401	"	6-8.5	"	0000	"	"	6	3		1	1	1		—	0	DUP OF 08SB00900610
08SS00800002	"	0-2	"	1020	"	"	6	3		1	1	1		Fill	0	SANDY CLAY
08SB00800206	"	2-6	"	1025	"	"	6	3		1	1	1		"	0	" "
08SB00800610	"	6-10	"	1030	"	"	6	3		1	1	1		8	0	" "
08SS00700002	"	0-2	"	1045	"	"	6	3		1	1	1		Fill	0	CLAYEY SAND/CLAY
08SB00700206	"	2-6	"	1050	"	"	6	3		1	1	1		"	0	" " "
08SB00700610	"	6-10	"	1055	"	"	6	3		1	1	1		"	0	" "
08SB00710 13	"	10-A	"	1100	"	"	6	3		1	1	1		8	0	SEWAGE. ODOR? SILTY SANDY CLAY

REMARKS: See Figure 3-1
○ MS/MSD
□ DUP

LABORATORY: Laucks Testing Laboratories

COC No.: 3648 & 3649

MULTIPLE SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

[X] SURFACE SOIL [] SEDIMENT
[X] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER _____

SIGNATURE(S): S. Conti

SAMPLER (S): SJC/JG

PROJECT NAME: NSWC CRANE
PROTECT NUMBER: N1245

LOCATION: SWMU 8 (08SB01 - 08SB09)

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE 2004	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES: Volitiles 8260B	SVOCs w/PAHs	SVOCs w/PAHs & PCBs	Energetics - Nitroaromatics, Nitramines & Perchlorates	TAL Metals plus Sn		SOIL GROUP #	PID READING	SOIL DESCRIPTION
08SS0010002	DPT	0-2	12-11	1305	L	G	6	3	1	—	1	1		3	0	SILTY CLAY
08SS0020002	"	0-2	"	1330	"	"	6	3	1	—	1	1		3	0	CLAY/ SANDSTONE FRAGS
08SS0030002	"	0-2	"	1350	"	"	5	3	—	1	—	1		Fill	0	SANDY CLAY
08SS0050002	"	0-2	"	1405	"	"	6	3	1	—	1	1		"	0	CLAY.
08SB0050206	"	2-4	"	1410	"	"	6	3	1	—	1	1		9	0	SILTY SAND/ SANDSTONE FRAGS
08SS0040002	"	0-2	"	1430	"	"	6	3	1	—	1	1		Fill	0	CLAY
08SB0040206	"	2-6	"	1435	"	"	6	3	1	—	1	1		"	0	CLAY/SANDSTONE.

REMARKS: See Figure 3-1

LABORATORY: Laucks Testing Laboratories

COC No.: 3648

MULTIPLE SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

[X] SURFACE SOIL [ ] SEDIMENT
[X] SUBSURFACE SOIL [ ] LAGOON / POND
[ ] OTHER _____

SIGNATURE(S): S J Conti
SAMPLER (S): SJC / JG

PROJECT NAME: NSWC CRANE
PROTECT NUMBER: N1245

LOCATION: SWMU 8 (08SB10 - 08SB14)

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE 2004	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES: Volitiles 8260B	SVOCs w/PAHs, PCBs, Pesticides & Herbicides	Inorganics, Nitroaromatics, Nitramines & Perchlorates	TAL Metals plus Sn	CEC, pH & TOC		SOIL GROUP #	PID READING	SOIL DESCRIPTION
08SS0100002	DPT	0-2	12-12	1135	L	G	5	3	1	—	1	—		FILL	0	SANDY CLAY
08SB0100206	"	2-6	"	1140	"	"	5	3	1	—	1	—		"	0	SILTY CLAY
08SB0100610	"	6-10	"	1145	"	"	5	3	1	—	1	—		"	0	" "
08SB0101013	"	10-17	"	1200	"	"	5	3	1	—	1	—		9	0	" "
08SS0110002	"	0-2	"	1355	"	"	5	3	1	—	1	—		FILL	0	SILTY SANDY CLAY
08SB0110206	"	2-6	"	1400	"	"	5	3	1	—	1	—		8	0	" " "
08SS0120002	"	0-2	"	1410	"	"	5	3	1	—	1	—		FILL	0	SANDY CLAY
08SB0120206	"	2-6	"	1415	"	"	13	9	2	—	2	—		"	0	SILTY CLAY
FD12120402	"	2-6	"	0800			5	3	1	—	1	—		—	—	DUP OF 08SB0120206
08SB0120610	"	6-10	"	1420	"	"	5	3	1	—	1	—		"	0	CLAY
08SB0121018	"	10-18	"	1430	"	"	5	3	1	—	1	—		8	0	SILTY CLAY
08SS0130002	"	0-2	"	1450	"	"	5	3	1	—	1	—		FILL	0	CLAY
08SB0130206	"	2-6	"	1455	"	"	5	3	1	—	1	—		8	0	"
08SB0130610	"	6-10	"	1500	"	"	5	3	1	—	1	—		8	0	"

REMARKS: See Figure 3-1 ○ MS/MSD □ DUP 02

LABORATORY: Laucks Testing Laboratories

COC No.: 3649 & 3650

MULTIPLE SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

[] SURFACE SOIL [] SEDIMENT
[] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER _____

SIGNATURE(S): SJ Conte

SAMPLER (S): SJC/JG.

PROJECT NAME: NSWC CRANE
PROTECT NUMBER: N1245

LOCATION: SWMU 8 (08SB10 - 08SB14)

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE 2004	TIME	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES: Volitiles 8260B	SVOCs w/PAHs, PCBs, Pesticides & Herbicides	Nitroaromatics, Nitramines & Perchlorate	TAL Metals plus Sn	CEC, pH & TOC		SOIL GROUP #	PID READING	SOIL DESCRIPTION
08SB0131013	DPT	1013	12/12	1505	L	G	5	3	1	—	1	—		8	0	CLAY
08SS0140002	"	0-2	"	1525	"	"	1					1		3	0	CLAYEY SAND

REMARKS: See Figure 3-1

LABORATORY: Laucks Testing Laboratories

COC No.: 3650

ROUND 3

Tetra Tech NUS, INC.

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0150002
Sample Location ID	08SB15
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005
Time [Now]: 15:26
Method: DPT
Monitor Readings: 0.0
Depth Interval: 0-2
Color: -Select-
Description:

[redacted] [redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	16:26	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: Crane Soils - Fall 2005
Choose Analysis Method: Percent Moisture
Description: Percent Moisture
Preservative: None
No. Of Containers: 1
Container Type: Glass
Container Requirements: 4 oz. wide-mouth clear w/Teflon cap
Date [Today]: 10/03/2005
Time [Now]: 15:20
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	16:20	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/03/2005	16:20	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

Tetra Tech NUS, INC.

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0150406
Sample Location ID	08SB15
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 15:36

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

[redacted]

Data Entered by James Goerdt on 11/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	16:29	DPT	0.0	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 15:29

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by James Goerdt on 11/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	16:29	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11. 10
✔	10/03/2005	16:29	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11. 10.

[redacted]

Tetra Tech NUS, INC.

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0160002
Sample Location ID	08SB16
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 10:17

Method: Hand Auger

Monitor Readings: 0.0

Depth Interval: 0-2

Color: brown

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	11:17	Hand Auger	0.0	0-2	brown	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 10:17

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	11:17	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/04/2005	11:17	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

Tetra Tech NUS, INC.

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0160203
Sample Location ID	08SB16
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 10:23

Method: Hand Auger

Monitor Readings: 0.0

Depth Interval: 2-3

Color: brown

Description:

[redacted] [redacted]

Data Entered by James Goerdt on 11/01/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	11:23	Hand Auger	0.0	2-3	brown	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 10:23

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by James Goerdt on 11/01/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	11:23	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/04/2005	11:23	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

Tetra Tech NUS, INC.

submit cancel print layout switchboard

SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0170002
Sample Location ID	08SB17
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 15:49

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	16:49	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 15:49

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	16:49	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/03/2005	16:49	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0180002
Sample Location ID	08SB18
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 16:02

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description

[redacted] [redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	17:02	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 16:02

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	17:02	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/03/2005	17:02	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0180204
Sample Location ID	08SB18
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 16:08

Method: DPT

Monitor Readings: 0.0

Depth Interval: 4-6

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	17:08	DPT	0.0	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 16:08

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	17:08	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/03/2005	17:08	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0190002
Sample Location ID	08SB19
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 14:30

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description

Data Entered by Terry Rojahn on 12/12/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	15:30	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 14:30

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by Terry Rojahn on 12/12/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	15:30	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/03/2005	15:30	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0200002
Sample Location ID	08SB20
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 14:37

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description

[redacted] [redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	15:37	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 14:37

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	15:37	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/03/2005	15:37	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0200204
Sample Location ID	08SB020
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005
Time [Now]: 14:41
Method: DPT
Monitor Readings: 0.0
Depth Interval: 2-4
Color: -Select-
Description:

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	15:41	DPT	0.0	2-4	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/03/2005
Time [Now]: 14:41
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	15:41	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/03/2005	15:41	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0210002
Sample Location ID	08SB21
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 14:50

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description

[redacted] [redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	15:50	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 14:50

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	15:50	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/03/2005	15:50	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0210204
Sample Location ID	08SB21
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 14:54

Method: DPT

Monitor Readings: 0.0

Depth Interval: 2-4

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	15:54	DPT	0.0	2-4	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 14:54

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	15:54	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/03/2005	15:54	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0220002
Sample Location ID	08SB22
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 10:52

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	11:52	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 10:52

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	10:52	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/29/2005	10:52	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0220206
Sample Location ID	08SB22
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 11:09

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

Reset Add Entry

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	11:57	DPT	0.0	2-6	-Select-	Per the QAPP,sampling of this interval ended up not requiring the sample to be collected/shippe This log recorde and analysis wei correctly markec as "not collected

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 10:57

Collected: ◉ No ○ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Chain
X	09/29/2005	10:57	Percent Moisture	Not Collected		
X	09/29/2005	10:57	SW-846 8260B	Not Collected		

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0220608
Sample Location ID	08SB22
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 11:05

Method: DPT

Monitor Readings: 0.0

Depth Interval: 6-8

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	12:05	DPT	0.0	6-8	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 11:05

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	11:05	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/29/2005	11:05	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0230002
Sample Location ID	08SB23
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 12:54

Method: Hand Auger

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	13:54	Hand Auger	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 12:54

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	13:54	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/04/2005	13:54	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0240002
Sample Location ID	08SB024
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005

Time [Now]: 15:03

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/03/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	16:03	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/03/2005

Time [Now]: 15:03

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/03/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	16:03	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/03/2005	16:03	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/03/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0240203
Sample Location ID	08SB24
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/03/2005
Time [Now]: 15:07
Method: DPT
Monitor Readings: 0.0
Depth Interval: 2-3
Color: -Select-
Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/03/2005	16:07	DPT	0.0	2-3	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/03/2005
Time [Now]: 15:07
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/03/2005	16:07	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/03/2005	16:07	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0250002
Sample Location ID	08SB25
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005
Time [Now]: 09:45
Method: DPT
Monitor Readings:
Depth Interval: 0-2
Color: -Select-
Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	10:45	DPT	13.3	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 09/29/2005
Time [Now]: 09:45
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	09:45	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/29/2005	09:45	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0250206
Sample Location ID	08SB25
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 09:55

Method: DPT

Monitor Readings: 65.0

Depth Interval: 2-6

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	10:55	DPT	65.0	2-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 09:55

Collected: ◉ No ○ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	09:55	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/29/2005	09:55	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0250608
Sample Location ID	08SB25
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 10:06

Method: DPT

Monitor Readings: 3.2

Depth Interval: 6-8

Color: -Select-

Description:

Reset Add Collection

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	11:06	DPT	3.2	6-8	-Select-	Per the QAPP,samp of this interv was not requ but did not k until after sa collected. Th sample was collected/shi This log rec and analysis correctly ma as "collected

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 10:06

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	10:06	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/29/2005	10:06	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0260002
Sample Location ID	08SB26
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 12:45

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	13:45	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 12:45

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	12:45	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/29/2005	12:45	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0260406
Sample Location ID	08SB26
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 12:53

Method: DPT

Monitor Readings: 7.0

Depth Interval: 4-6

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	13:53	DPT	7.0	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 12:53

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	12:53	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/29/2005	12:53	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0270002
Sample Location ID	08SB27
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 10:28

Method: DPT

Monitor Readings:

Depth Interval: 0-2

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	11:28	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 10:28

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	10:28	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/29/2005	10:28	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0270406
Sample Location ID	08SB27
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 10:35

Method: DPT

Monitor Readings: 0.0

Depth Interval: 4-6

Color: -Select-

Description

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	11:35	DPT	0.0	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 10:35

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	10:35	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/29/2005	10:35	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0280002
Sample Location ID	08SB28
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 13:04

Method: DPT

Monitor Readings: 4.5

Depth Interval: 0-2

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	14:04	DPT	4.5	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 13:04

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	13:04	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/29/2005	13:04	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0280406
Sample Location ID	08SB28
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 13:10

Method: DPT

Monitor Readings: 3.4

Depth Interval: 4-6

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	14:10	DPT	3.4	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 13:10

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	13:10	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/29/2005	13:10	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0290002
Sample Location ID	08SB29
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005
Time [Now]: 13:20
Method: DPT
Monitor Readings: 3.3
Depth Interval: 0-2
Color: -Select-
Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	14:20	DPT	3.3	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 09/29/2005
Time [Now]: 13:20
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	13:20	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/29/2005	13:20	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0290406
Sample Location ID	08SB29
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 13:28

Method: DPT

Monitor Readings: 1.3

Depth Interval: 4-6

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	14:28	DPT	1.3	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 13:28

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	13:28	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11. 92
✔	09/29/2005	13:28	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11. 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0300002
Sample Location ID	08SB30
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 09:59

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	10:59	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 09:59

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	10:59	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/02/2005	10:59	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0310002
Sample Location ID	08SB31
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005

Time [Now]: 13:49

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	14:45	DPT	75.5	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/29/2005

Time [Now]: 13:45

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	13:45	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/29/2005	13:45	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/29/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	Field Duplicate - 08FD0
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0310406
Sample Location ID	08SB31
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/29/2005
Time [Now]: 13:52
Method: DPT
Monitor Readings: 36.8
Depth Interval: 4-6
Color: -Select-
Description:

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/29/2005	14:52	DPT	36.8	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 09/29/2005
Time [Now]: 13:52
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/29/2005	13:52	Percent Moisture	Containers: 3 Preservative: 4d C Type: Glass	Do MS/MSD	11 92
✔	09/29/2005	13:52	SW-846 8260B	Containers: 9 Preservative: 4d C Type: EnCore	Do MS/MSD	11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0320002
Sample Location ID	08SB32
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 13:17

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	14:16	Hand Auger	0.0	0-2	- Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 13:16

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	14:16	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/04/2005	14:16	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0320206
Sample Location ID	08SB32
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005
Time [Now]: 13:23
Method: Hand Auger
Monitor Readings: 0.0
Depth Interval: 2-6
Color: -Select-
Description:

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	14:23	Hand Auger	0.0	2-6	-Select-	Per the QAPP,sampling of this interval ended up not requiring the sample to be collected/shippe This log recorde and analysis wei correctly markec as "not collected

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/04/2005
Time [Now]: 13:23
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Chain
X	10/04/2005	13:23	Percent Moisture	Not Collected		
X	10/04/2005	13:23	SW-846 8260B	Not Collected		

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0320607
Sample Location ID	08SB32
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 13:42

Method: Hand Auger

Monitor Readings: 0.0

Depth Interval: 6-7

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	14:42	Hand Auger	0.0	6-7	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 13:42

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	14:42	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/04/2005	14:42	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0330002
Sample Location ID	08SB33
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 10:37

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	11:36	Hand Auger	0.0	0-2	- -Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 10:36

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	10:36	Percent Moisture	Containers: 3 Preservative: 4° C Type: Glass	Do MS/MSD	11 10
✔	10/04/2005	10:36	SW-846 8260B	Containers: 9 Preservative: 4° C Type: EnCore	Do MS/MSD	11 10

[redacted]

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	Field Duplicate 08FD10
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0330406
Sample Location ID	08SB33
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 11:15

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	12:13	Hand Auger	375+	4-6	brown	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 11:13

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	11:13	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass	Potential hot sample	11 10
✔	10/04/2005	11:13	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore	Potential hot sample	11 10

[redacted]

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0340002
Sample Location ID	08SB34
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 11:06

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	12:06	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 11:06

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	12:06	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/02/2005	12:06	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0340406
Sample Location ID	08SB34
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 11:15

Method: DPT

Monitor Readings: 0.0

Depth Interval: 4-6

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	12:15	DPT	0.0	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 11:15

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	12:15	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/02/2005	12:15	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0350002
Sample Location ID	08SB35
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 11:26

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	12:26	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 11:26

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	12:26	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/02/2005	12:26	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0350305
Sample Location ID	08SB35
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005
Time [Now]: 11:30
Method: DPT
Monitor Readings: 0.0
Depth Interval: 3-5
Color: -Select-
Description:

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	12:30	DPT	0.0	3-5	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/02/2005
Time [Now]: 11:30
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	12:30	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/02/2005	12:30	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/27/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0360002
Sample Location ID	08SB36
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/27/2005

Time [Now]: 14:03

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/27/2005	15:00	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/27/2005

Time [Now]: 14:00

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/27/2005	14:00	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/27/2005	14:00	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/27/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0370002
Sample Location ID	08SB37
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/27/2005

Time [Now]: 14:13

Method: DPT

Monitor Readings:

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/27/2005	15:13	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/27/2005

Time [Now]: 14:13

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/27/2005	14:13	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/27/2005	14:13	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/27/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0380002
Sample Location ID	08SB38
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/27/2005

Time [Now]: 14:24

Method: DPT

Monitor Readings:

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/27/2005	15:24	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/27/2005

Time [Now]: 14:24

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/27/2005	14:24	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92
✔	09/27/2005	14:24	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 09/27/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0390002
Sample Location ID	08SB39
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 09/27/2005

Time [Now]: 14:34

Method: DPT

Monitor Readings:

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
09/27/2005	15:32	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 09/27/2005

Time [Now]: 14:35

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	09/27/2005	14:35	Percent Moisture	Containers: 1 Preservative: 4d C Type: Glass		11 92
✔	09/27/2005	14:35	SW-846 8260B	Containers: 3 Preservative: 4d C Type: EnCore		11 92

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0400002
Sample Location ID	08SB40
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 11:31

Method: Hand Auger

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	12:31	Hand Auger	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 11:31

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	12:31	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/04/2005	12:31	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/04/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0400204
Sample Location ID	08SB40
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/04/2005

Time [Now]: 11:46

Method: -Select-

Monitor Readings:

Depth Interval:

Color: -Select-

Description:

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/04/2005	12:45	Hand Auger	0.0	2-4	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/04/2005

Time [Now]: 11:45

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/04/2005	12:45	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/04/2005	12:45	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0410002
Sample Location ID	08SB41
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005
Time [Now]: 07:45
Method: DPT
Monitor Readings: 0.0
Depth Interval: 0-2
Color: -Select-
Description:

[redacted] [redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	08:45	DPT	2.5	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/02/2005
Time [Now]: 07:45
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	08:45	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/02/2005	08:45	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0410406
Sample Location ID	08SB41
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005
Time [Now]: 07:57
Method: -Select-
Monitor Readings:
Depth Interval:
Color: -Select-
Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	08:47	DPT	2.7	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-

Date [Today]: 10/02/2005
Time [Now]: 07:47
Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	08:47	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/02/2005	08:47	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0420002
Sample Location ID	08SB42
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 08:09

Method: DPT

Monitor Readings: 1.9

Depth Interval: 0-2

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	09:09	DPT	1.9	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 08:09

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	09:09	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/02/2005	09:09	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0420406
Sample Location ID	08SB42
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005
Time [Now]: 08:14
Method: DPT
Monitor Readings: 2.4
Depth Interval: 4-6
Color: -Select-
Description:

[redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	09:14	DPT	2.4	4-6	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/02/2005
Time [Now]: 08:14
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	09:14	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11. 10.
✔	10/02/2005	09:14	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11. 10.

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0430002
Sample Location ID	08SB43
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 08:28

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	09:28	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 08:28

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	09:28	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/02/2005	09:28	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0430305
Sample Location ID	08SB43
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005
Time [Now]: 08:38
Method: DPT
Monitor Readings: 0.0
Depth Interval: 3-5
Color: -Select-
Description:

[redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	09:38	DPT	0.0	3-5	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/02/2005
Time [Now]: 08:38
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	09:38	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11. 10.
✔	10/02/2005	09:38	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11. 10.

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0440002
Sample Location ID	08SB44
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 08:49

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	09:49	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 08:49

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	09:49	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10
✔	10/02/2005	09:49	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0440204
Sample Location ID	08SB44
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 08:57

Method: DPT

Monitor Readings: 0.0

Depth Interval: 2-4

Color: -Select-

Description:

[redacted]

Data Entered by John Wright on 10/02/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	09:57	DPT	0.0	2-4	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 08:57

Collected: ○ No ◉ Yes

Observation/Notes:

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/02/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	08:57	SW-846 8260B	Containers: 9 Preservative: 4° C Type: EnCore	Do MS/MSD	11. 10.
✔	10/02/2005	08:57	Percent Moisture	Containers: 3 Preservative: 4° C Type: Glass	Do MS/MSD	11. 10.

[redacted]

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Surface Soil-SS
QA Sample Type	Fiel Duplicate 08FD100
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SS0450002
Sample Location ID	08SB45
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005

Time [Now]: 09:19

Method: DPT

Monitor Readings: 0.0

Depth Interval: 0-2

Color: -Select-

Description:

[redacted] [redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	10:19	DPT	0.0	0-2	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-

Choose Analysis Method: NONE

Description: NONE

Preservative: None

No. Of Containers:

Container Type: -Select-

Container Requirements: -Select-

Date [Today]: 10/02/2005

Time [Now]: 09:19

Collected: ○ No ◉ Yes

Observation/Notes

All Sample Analysis

[redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	10:19	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11 10
✔	10/02/2005	10:19	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11 10

[redacted]

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SOIL & SEDIMENT SAMPLE LOG SHEET

Entered by John Wright on 10/02/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112GN1245
Task/Contract No.	CTO 0331
WBS Code	Open
Sample Source	Subsurface Soil-SB
QA Sample Type	
Sample Data Type	Grab
Matrix	SO

Sample ID No	08SB0450204
Sample Location ID	08SB45
Sampled By:	John Wright
Concentration:	Low Concentration
Log Completed:	◉ Y ○ N

* Complete all fields in this section before adding sample or analysis data.

SAMPLE COLLECTION DATA [test]

Add New Sample Collection

Date [Today]: 10/02/2005
Time [Now]: 09:29
Method: DPT
Monitor Readings: 0.0
Depth Interval: 2-4
Color: -Select-
Description:

[redacted]

Data Entered by John Wright on 10/04/2005

All Sample Collections

Date	Time	Method	Monitor	Depth	Color	Description
10/02/2005	10:29	DPT	0.0	2-4	-Select-	

SAMPLE ANALYSIS INFORMATION [test]

Add New Sample Analysis

Choose Fraction Type: -Select-
Choose Analysis Method: NONE
Description: NONE
Preservative: None
No. Of Containers:
Container Type: -Select-
Container Requirements: -Select-
Date [Today]: 10/02/2005
Time [Now]: 09:29
Collected: ○ No ◉ Yes
Observation/Notes

All Sample Analysis

[redacted] [redacted]

Analysis Entered by John Wright on 10/04/2005

Collected	Date	Time	Analysis	Storage	Comments	Ch
✔	10/02/2005	10:29	SW-846 8260B	Containers: 3 Preservative: 4° C Type: EnCore		11. 10.
✔	10/02/2005	10:29	Percent Moisture	Containers: 1 Preservative: 4° C Type: Glass		11. 10.

[redacted]

ROUND 4

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB460608	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB46	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	09:50	DPT	0	6-8'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	09:50	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB470608	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB47	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	09:30	DPT	0	6-8'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	09:30	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB480507	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB48	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	09:15	DPT	0	5-7'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	09:15	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB490507	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB49	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	10:10	DPT	0	5-7'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	10:10	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB500608	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB50	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	10:30	DPT	7.5	6-8'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	10:30	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB510204	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB51	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	10:55	DPT	144	2-4'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	10:55	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram	Hydrocarbon odor	112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB520103	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB52	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	-Select-	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	11:05	DPT	0	1-3'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	11:05	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB530507	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB53	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	14:50	DPT	0	5-7'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
			SW-846					EnCore		112GN1245-

✓	10/23/06	14:50	8260B	VOCs	4°C	3	EnCore	Sampler - 5 gram		10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB540204	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB54	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	15:25	DPT	0	2-4'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	15:25	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB550709	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB55	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	13:40	DPT	0	7-9'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	13:40	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB560709	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB56	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	13:20	DPT	0	7-9'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	13:20	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB570608	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB57	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	14:27	DPT	3	6-8'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	14:27	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB580709	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB58	**Created Date**	10/24/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/24/06	11:30	DPT	0	7-9'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	11:30	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10242006-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB590709	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB59	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	10:35	DPT	0	7-9'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	10:35	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB600709	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB60	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	10:55	DPT	0	7-9'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	10:55	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB610507	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB61	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	15:08	DPT	0	5-7'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	15:08	SW-846 8260B	VOCs	4°C	3	EnCore	EnCore Sampler - 5 gram		112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SOIL SEDIMENT SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SB620406	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location ID**	08SB62	**Created Date**	10/23/06
Task/Contract #		**Sampled By**	Terry Rojahn	**Modified By**	Terry Rojahn
WBS Code #		**Concentration**	Low concentration	**Modified Date**	11/3/06
QA Sample Type				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Sample Collection Records

Date	Time	Method	Monitor (ppm)	Depth (ft)	Color	Description
10/23/06	11:30	DPT	0	4-6'	Other	See Boring Log

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/23/06	11:30	SW-846 8260B	VOCs	4°C	9	EnCore	EnCore Sampler - 5 gram	DO MS/MSD	112GN1245-10232006-1

General Observations and Notes

No Notes

- End of Report -

C.2 SEDIMENT SAMPLE LOG SHEETS

ROUND 1

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 001 0006
Sample Location: 08SW/SD 001
Sampled By: CD/TK
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/9/05			
Time: 1510	0-6"	DARK BRN	Clay rich organic mat. roots Tr. sand
Method: Dig. Trowel			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	4oz ~~(3) Encore sampler~~ Jar	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

SEE SW 1 PHOTO

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Ty Right

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 1091 08SW/SD/001	**Date:** 1-9-05	**Time:** 1455 (SW) 1510 (SD)	**Sampler:** JG/CD/TR			
Photograph Number/Direction: 1091	___ Upstream	X Downstream	___ East	___ West	___ North	X South
Predominant Surrounding Land Use:	Wooded	Open Field	(Other) Maintained Grassy area			
Canopy Cover:	(Open)	Partly Open	Shaded			
Dicharge Pipe Present:	(Yes)	No				
Aquatic Vegetation Present:	Yes	No	Common Grass	**Stream channelized:**	Yes (SWALES)	No
Water flowing:	Yes	(No)	Not present Stagnate			
Organisms Present: Fish (in)	No	Other (insects, frogs, etc.):	possably worms			
Water Width (ft):	1	**Water Depth (ft):**	4"	**Estimated Flow/Velocity:**	Stagnate	
Channel Width (ft):	1	**Channel Depth (ft):**	0.5-1'			
Signs of flooding (circle all that apply)	Yes	(No)	Water marks on trees	Water-borne debris piles	Other:	
Deep Pools Present (>2 feet):	Yes	(No)	If yes (approximate size)			
Sediment Substrate:	Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply)	Sand	Silt	Clay	Muck		
	Debris	Detritus	Concrete	Iron deposits		
Sediment Odors:	(Normal)	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils:	(Absent)	Slight	Moderate	Profuse		
Water Odors:	(Normal)	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils:	(None)	Droplets	Sheen			
Turbidity:	(Clear)	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: Diversion ditch along road grassy on both sides
mounded area to East/road to West

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 0020006
Sample Location: 08SW/SD 002
Sampled By: CD / TR
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/9/05 Time: 1450 Method: Dis. TROWEL Monitor Reading (ppm): —	0-6"	BRN	Silty clay V. Moist - WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	4oz ~~(3) Encore sampler~~ Jar	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

PHOTO 1090 SWEST
Concrete Swale / diversion ditch

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Ty [illegible]

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW1/50 002 **Date:** 1/9/05 **Time:** 1450 **Sampler:** CD/TK

Photograph Number/Direction: #1090 ___ Upstream ✓ Downstream ___ East ___ West ___ North X South West

Predominant Surrounding Land Use: Wooded Open Field (Other) Lt Industrial including steam line

Canopy Cover: (Open) Partly Open Shaded

Dicharge Pipe Present: (Yes) No

Aquatic Vegetation Present: Yes (No) | **Stream channelized:** Yes No

Water flowing: Yes (No) Not present

Organisms Present: Fish (in) NO Other (insects, frogs, etc.): NO

Water Width (ft): — **Water Depth (ft):** — **Estimated Flow/Velocity:** —

Channel Width (ft): 2' **Channel Depth (ft):** 2

Signs of flooding (circle all that apply) Yes (No) Water marks on trees Water-borne debris piles Other:

Deep Pools Present (>2 feet): Yes (No) If yes (approximate size)

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)

(Circle all that apply) (Sand) (Silt) (Clay) Muck

Debris Detritus (Concrete) SWALE Iron deposits

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic

Sediment Oils: Absent Slight Moderate Profuse

Water Odors: Normal Sewage Petroleum Chemical Anaerobic

Water Surface Oils: None Droplets Sheen

Turbidity: Clear Slightly Turbid Turbid Opaque

Other Comments/Observations: Runs along gravel RR. bed on the E & bounded grassy area to the west

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 0030006
Sample Location: 08SW/SD 003
Sampled By: CD/TK
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/9/05 Time: 1420 Method: Dis Trowel Monitor Reading (ppm):	0-6"	Yellowish Brown	Clayey Silt - Fine Sand V. Moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	4oz ~~(9) Encore sampler~~ JAR	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

SEE SW PHOTO

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 085W/SD 003 **Date:** 1/9/05 **Time:** 1420 **Sampler:** JG/CD/TK

PHOTO FROM ABOVE 1089

Photograph Number/Direction: ___ Upstream ___ Downstream ___ East ___ West ___ North ___ South

Predominant Surrounding Land Use: Wooded Open Field Other

Canopy Cover: Open Partly Open Shaded

Dicharge Pipe Present: Yes No

Aquatic Vegetation Present: Yes No **Stream channelized:** Yes No

Water flowing: Yes No Not present

Organisms Present: Fish (in) No Other (Insects, frogs, etc.): Possible

Water Width (ft): 4x5 **Water Depth (ft):** 4" **Estimated Flow/Velocity:** Stagnate

Channel Width (ft): 8-15' **Channel Depth (ft):** 4-8'

Signs of flooding (circle all that apply) Yes No Water marks on trees Water-borne debris piles Other:

Deep Pools Present (>2 feet): Yes No If yes (approximate size)

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)

(Circle all that apply) Sand Silt Clay Muck

Debris Detritus Concrete Iron deposits

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic

Sediment Oils: Absent Slight Moderate Profuse

Water Odors: Normal Sewage Petroleum Chemical Anaerobic

Water Surface Oils: None Droplets Sheen

Turbidity: Clear Slightly Turbid Turbid Opaque

Other Comments/Observations: TRASH CAN Lid, bottles, PAPER, ~~metal scrap~~ etc.

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 004 0012
Sample Location: 08SW/SD 004
Sampled By: CD / TR
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/10/05 Time: 1145 Method: W/LOCO Monitor Reading (ppm):	0-12" ~~0-6"~~ TR	dark reddish-brown to tan	Silt to clay, saturated

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	(3) Encore sampler	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

Waste odor

Bottom of pond

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 004 1224
Sample Location: 08SW/SD 004
Sampled By: CD / TK
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/10/05 Time: 1200 Method: Wildco Monitor Reading (ppm):	12"-24" ~~0.6~~ CO	dark reddish-brown to black	clay, saturated more stiff material resembling organics with distinct odor.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	(3) Encore sampler	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

Strong fuel oil odor

Bottom of pond

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD005 0012
Sample Location: 08SW/SD 005
Sampled By: TR/CD
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/10/05 Time: 1220 Method: Wildco Monitor Reading (ppm):	0-12" ~~0-6"~~ CD	dark reddish-brown to greenish grey	Clay, Saturated

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	(3) Encore sampler	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

faint waste odor

Bottom of pond

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Colin Dodson

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 005 1224
Sample Location: 08SW/SD 005
Sampled By: CD/TK
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/10/05 Time: 1235 Method: Wildco Monitor Reading (ppm):	12"-24" ~~0-6"~~ CO	reddish-brown to greenish-brown	Silty clay to clay, saturated trace gravels and pebbles

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	(3) Encore sampler	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

no distinct odors

Bottom of pond

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 006 0006
Sample Location: 08SW/SD 006
Sampled By: CD / TR
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/9/05 Time: 1350 Method: Dig Trowel Monitor Reading (ppm): —	0-6"	Yellow Brn	Clayey silt WET - SAT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	4oz ~~(3) Encore sampler~~ JAR	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

SEE SWI PHOTO

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

108B
Sample Number: 08SW/SD006 **Date:** 1/9/05 **Time:** 1350 **Sampler:** JG/CD/TR

Photograph Number/Direction: X Upstream ___ Downstream ___ East ___ West X North ___ South

Predominant Surrounding Land Use: Wooded Open Field Other

Canopy Cover: Open Partly Open Shaded Due to wind blown trees

Dicharge Pipe Present: Yes No

Aquatic Vegetation Present: Yes No | **Stream channelized:** Yes No

Water flowing: Yes No Not present

Organisms Present: Fish (in) NO Other (insects, frogs, etc.): Possibly

Water Width (ft): 3" - 10' | **Water Depth (ft):** SHEET FLOW | **Estimated Flow/Velocity:** 2-5 gpm

Channel Width (ft): 2-12' | **Channel Depth (ft):** 2-3'

Signs of flooding (circle all that apply) Yes No Water marks on trees Water-borne debris piles Other:

Deep Pools Present (>2 feet): Yes No If yes (approximate size)

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)
(Circle all that apply) Sand Silt Clay Muck
Debris Detritus Concrete Iron deposits

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic

Sediment Oils: Absent Slight Moderate Profuse

Water Odors: Normal Sewage Petroleum Chemical Anaerobic

Water Surface Oils: None Droplets Sheen

Turbidity: Clear Slightly Turbid Turbid Opaque

Other Comments/Observations: _____

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 007 0006
Sample Location: 08SW/SD 007
Sampled By: CD / TR
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/9/05 Time: 1008 Method: Dis Trowel Monitor Reading (ppm):	0-6"	Orange - Yellow Brn	F. Silt MED - Fine SAND V Moist - Wet

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	4oz ~~(3) Encore sampler~~ 3 Jar	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

PHOTO 1086 NNW

30' North of SW location

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
Yes	08FD010905 02

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW/SD 007 **Date:** 1/9/05 **Time:** 1008 **Sampler:** CD/JD/TK

Photograph Number/Direction: 1086 X Upstream ____ Downstream ____ East ____ West NNW North ____ South

Predominant Surrounding Land Use: Wooded Open Field (Other) 1/2 wooded 1/2 grassy

Canopy Cover: Open (Partly Open) Shaded

Dicharge Pipe Present: Yes (No)

Aquatic Vegetation Present: (Yes) No Traces | **Stream channelized:** (Yes) No

Water flowing: (Yes) No Not present

Organisms Present: Fish (in) Yes Crayfish Other (insects, frogs, etc.):

Water Width (ft): 1-2' | **Water Depth (ft):** 1-4" | **Estimated Flow/Velocity:** Meas. 10-15 gpm @ culvert down stream

Channel Width (ft): 1-8' | **Channel Depth (ft):** 1/2-2'

Signs of flooding (circle all that apply) (Yes) No Water marks on trees (Water-borne debris piles) Other: Grass matted down

Deep Pools Present (>2 feet): Yes (No) If yes (approximate size) Except for access road down stream

Sediment Substrate: Bedrock Boulder (>10 in) (Cobble (2.5-10 in)) (Gravel (0.10-2.5 in))
(Circle all that apply) (Sand) (Silt) (Clay) Muck
Debris Detritus Concrete Iron deposits Iron rich rock

Sediment Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Sediment Oils: (Absent) Slight Moderate Profuse

Water Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Water Surface Oils: (None) Droplets Sheen

Turbidity: (Clear) Slightly Turbid Turbid Opaque

Other Comments/Observations: _____

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 008 0006
Sample Location: 08SW/SD 008
Sampled By: CD / TK
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 1/9/05 Time: 1145 Method: Dis Trowel Monitor Reading (ppm):	0-6"	BRN	Coarse Sand - Gravel w/ mud matrix Trace Sand & silt (Sat.)

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	4oz ~~(3) Encore sampler~~ JAR	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

SEE SW PHOTO

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW/SD 008 **Date:** 1/9/05 **Time:** 1145 **Sampler:** JG/CD/TR

Photograph Number/Direction: 1087 ✓ Upstream ____ Downstream ____ East ✓ West ____ North ____ South

Predominant Surrounding Land Use: (Wooded) Open Field Other

Canopy Cover: Open Partly Open (Shaded)

Dicharge Pipe Present: Yes (No)

Aquatic Vegetation Present: Yes (No) | **Stream channelized:** (Yes) No

Water flowing: (Yes) No Not present

Organisms Present: Fish (in) Likely Other (insects, frogs, etc.): like fy

Water Width (ft): 2.5-15' | **Water Depth (ft):** 0-8" | **Estimated Flow/Velocity:** 2 sec/ft 0.25' x 2.5'

Channel Width (ft): 12-15' | **Channel Depth (ft):** 1.5-3.5'

Signs of flooding (circle all that apply) (Yes) No Water marks on trees (Water-borne debris piles) Other:

Deep Pools Present (>2 feet): Yes (No) If yes (approximate size)

Sediment Substrate: Bedrock (Boulder (>10 in)) (Cobble (2.5-10 in)) (Gravel (0.10-2.5 in))
(Circle all that apply) (Sand) (Silt) (Clay) Muck
Debris Detritus Concrete Iron deposits

Sediment Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Sediment Oils: (Absent) Slight Moderate Profuse

Water Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Water Surface Oils: (None) Droplets Sheen

Turbidity: (Clear) Slightly Turbid Turbid Opaque

Other Comments/Observations: _____

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 009 0006
Sample Location: 08SW/SD 009
Sampled By: CD / T.R.
C.O.C. No.: 3662

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 1/08/05	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0905	0-6"	BRN	FINE - MED SAND Tr CLAY & SILT Not well sorted
Method: Dis TROWEL			VERY MOIST - SAT.
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Volatiles 8260B	~~(3) Encore sampler~~ 4oz Jar	Yes	
SVOCs w/ PAHs	(1) 4oz Jar	Yes/No	
SVOCs w/ PAHs & PCBs	(1) 4oz Jar	Yes/No	
Energetics - Nitroaromatics, Nitramines & Perchlorates	(1) 4oz Jar	Yes	

OBSERVATIONS / NOTES:

PHOTO # 7084 collected
40' below surface water location

MAP:

See Figures 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW/SD 009 **Date:** 1/9/05 **Time:** 905 **Sampler:** Doolan

Photograph Number/Direction: 1084 ✓ Upstream ____ Downstream ____ East ____ West ____ North X South West

Predominant Surrounding Land Use: (Wooded) Open Field Other

Canopy Cover: Open Partly Open (Shaded)

Dicharge Pipe Present: Yes (No)

Aquatic Vegetation Present: (Yes) No trace | **Stream channelized:** (Yes) No

Water flowing: (Yes) No Not present

Organisms Present: Fish (in) most likely Other (insects, frogs, etc.):

Water Width (ft): 3'-6' **Water Depth (ft):** 2"-8" **Estimated Flow/Velocity:** 1'/sec 0.23' x 3'

Channel Width (ft): 15' **Channel Depth (ft):** 1'-3'

Signs of flooding (circle all that apply) (Yes) No Water marks on trees (Water-borne debris piles) Other: plastic wrapper on roots

Deep Pools Present (>2 feet): Yes (No) If yes (approximate size)

Sediment Substrate: Bedrock (Boulder (>10 in)) (Cobble (2.5-10 in)) (Gravel (0.10-2.5 in))

(Circle all that apply) (Sand) (Silt) (Clay) Muck

(Debris) trace Detritus Concrete Iron deposits

Sediment Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Sediment Oils: (Absent) Slight Moderate Profuse

Water Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Water Surface Oils: (None) Droplets Sheen

Turbidity: (Clear) Slightly Turbid Turbid Opaque

Other Comments/Observations: metal debris on side of stream

ROUND 2

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD00102
Sample Location: 08SW/SD001
Sampled By: CD/TR
C.O.C. No.: 3252

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1645 Method: Disposable trowel Monitor Reading (ppm): –	0-6"	medium to dk brn.	clayey silt trace med. sand, trace organics, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD00202
Sample Location: 08SW/SD002
Sampled By: CD
C.O.C. No.: 3252

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1640 Method: disposable trowel Monitor Reading (ppm): —	0-6"	brown	medium to fine sand, trace silt, moist to v. moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD 00302
Sample Location: 08SW/SD 003
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1615 Method: disposable trowel Monitor Reading (ppm): —	0-6"	med. brown	fine to v. fine sand and silt, saturated

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	(Yes)	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/(No)	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/(No)	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD00602
Sample Location: 08SW/SD006
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1450 Method: disposable trowel Monitor Reading (ppm): –	0-6"	orange brown to med. brown	v fine sand to silt, some clay trace organics, moist to wet

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Chris Jordan

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: ~~08SD0702~~ (CD) 08SD00702
Sample Location: ~~08SW/SD07~~ 08SW/SD007
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 6-5-05	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1040	0-6"	brown to dk. brown	medium to fine sand, trace organics, wet
Method: disposable trowel			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Chris Inglar

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: ~~08SD0802~~ CD 08SD0080
Sample Location: ~~08SW/SD08~~ 08SW/SD00
Sampled By: CO
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1110 Method: disposable trowel Monitor Reading (ppm): —	0-6"	light brown	~~silt~~ CD silt with trace clay, trace organics, ✓ wet to saturated

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Clin Jacobs

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: ~~08SD09 CD~~ (CD) 08SD0 0902
Sample Location: 08SW/SD 09 08SW/SD009
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1020 Method: disposable trowel Monitor Reading (ppm): —	0-6"	brown	medium to coarse sand and gravel trace pebbles, trace organics very wet

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

PHOTO 1647

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD01001
Sample Location: 08SW/SD010
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1405 Method: disposable trowel Monitor Reading (ppm): —	0-6"	orange brown to v. dark brown	coarse to medium sand, trace silt, wet to saturated

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

SEE supplemental Sheet

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Colin Jordan

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW/SD010 **Date:** 6/5/05 **Time:** 1405 **Sampler:** TK/CU

Photograph Number/Direction: X Upstream ___ Downstream ___ East X West X North ___ South

Predominant Surrounding Land Use: Wooded Open Field Other

Canopy Cover: Open Partly Open Shaded

Dicharge Pipe Present: Yes No

Aquatic Vegetation Present: Yes No | **Stream channelized:** Yes No

Water flowing: Yes No Not present

Organisms Present: Fish (in) NO Other (insects, frogs, etc.): likely

Water Width (ft): 6-8 **Water Depth (ft):** ~10" **Estimated Flow/Velocity:** NONE

Channel Width (ft): 30 **Channel Depth (ft):** 2-3' SAMPLED POOL ~ 8'x15'x10"

Signs of flooding (circle all that apply) Yes No Water marks on trees Water-borne debris piles Other:

Deep Pools Present (>2 feet): Yes No If yes (approximate size)

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)
(Circle all that apply) Sand Silt Clay Muck
Debris Detritus Concrete Iron deposits

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic

Sediment Oils: Absent Slight Moderate Profuse

Water Odors: Normal Sewage Petroleum Chemical Anaerobic

Water Surface Oils: None Droplets Sheen

Turbidity: Clear Slightly Turbid Turbid Opaque

Other Comments/Observations: ~~PHOTO 1650~~ Discharge
TK ← PHOTO FROM 08SWSD012 was taken over it!

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: ~~08SD 1101~~ CO 08SD 0110
Sample Location: ~~08SW/SD~~ CO 08 SW/SD 011
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 6-5-05	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1135	0-6"	med. brown	fine sand and silt, trace clay, damp to moist, trace organic matter
Method: disposable trowel			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

See supplemental sheet

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW/SD 011 **Date:** 6/05/05 **Time:** 1140 **Sampler:** CD

Photograph Number/Direction: X Upstream ___ Downstream ___ East X West X North ___ South

Predominant Surrounding Land Use: Wooded (Open Field) Other Grassy

Canopy Cover: Open (Partly Open) Shaded

Dicharge Pipe Present: (Yes) No

Aquatic Vegetation Present: Yes (No) | **Stream channelized:** (Yes) No

Water flowing: Yes (No) Not present

Organisms Present: Fish (in) No Other (insects, frogs, etc.): likely

Water Width (ft): 0 | **Water Depth (ft):** 0 | **Estimated Flow/Velocity:** NONE DRY

Channel Width (ft): 6 | **Channel Depth (ft):** 4

Signs of flooding (circle all that apply) (Yes) No Water marks on trees (Water-borne debris piles) Other:

Deep Pools Present (>2 feet): Yes (No) If yes (approximate size)

Sediment Substrate: (Circle all that apply)

Bedrock	(Boulder (>10 in))	(Cobble (2.5-10 in))	(Gravel (0.10-2.5 in))
(Sand)	(Silt)	Clay	Muck
Debris	Detritus	(Concrete)	Iron deposits

Sediment Odors:	(Normal)	Sewage	Petroleum	Chemical	Anaerobic
Sediment Oils:	(Absent)	Slight	Moderate	Profuse	
Water Odors:	(Normal)	Sewage	Petroleum	Chemical	Anaerobic
Water Surface Oils:	(None)	Droplets	Sheen		
Turbidity:	(Clear)	Slightly Turbid	Turbid	Opaque	

Other Comments/Observations: PHOTO 1648 Discharge pipe in BACKGROUND

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD012 01
Sample Location: 08SW/SD 012
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1515 Method: disposable trowel Monitor Reading (ppm): —	0-6"	tannish to black	v fine sand to silt, trace pebbles, abundant organics, saturated, organic odor

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(2) ~~(1)~~ 4oz Jar	Yes	
Volatiles 8260B	~~(3) Encore sampler or~~ 4oz Jar (2)	Yes/No	
Total Metals + Tin (TAL)	(2) ~~(1)~~ 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

B-106 POND
PHOTOS 1650-52
NO. supplemental sheet (POND)
SEE photos

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: 08FD060505-02

Signature(s): Chris Dunlap

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD013 01
Sample Location: 08SW/SD013
Sampled By: CD
C.O.C. No.: 3252

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1655 Method: disposable trowel Monitor Reading (ppm): —	0-6"	light to dark brown	fine sand, some silt, trace coarse sand, trace organics, slightly damp

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method:				
NA				
Monitor Readings				
(Range in ppm):				
NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

Photo #1653 (downstream)
grassy SWALE / Diversion ditch
No supplemental sheet
swale in grassy area.
see photo

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: ~~085D 1401~~ 085D 0140
Sample Location: ~~085W/SD 1450~~ 085W/SD 0
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 0935 Method: disposable trowel Monitor Reading (ppm): —	0-6"	dk. brown	fine to coarse sand, ~~trace~~ some gravel trace pebbles, v. moist to wet

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(1) 4oz Jar	Yes	
Volatiles 8260B	(3) Encore sampler or 4oz Jar	Yes/No	
Total Metals + Tin (TAL)	(1) 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

SEE supplemental sheet

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU8
Project No.: N1245, CTO 0331

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 08SD01501
Sample Location: 08SW/SD015
Sampled By: CD
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 6-5-05 Time: 1205 Method: disposable trowel Monitor Reading (ppm): —	0-6"	brown	medium sand to silt with some clay, trace organics moist to very moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
NA	NA	NA	NA	NA
Method: NA				
Monitor Readings (Range in ppm): NA				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Semivolatiles 8270C	(2) ~~(1)~~ 4oz Jar	Yes	
Volatiles 8260B	~~(3) Encore sampler or~~ 4oz Jar (2)	Yes/No	
Total Metals + Tin (TAL)	(2) ~~(1)~~ 4oz Jar	Yes/No	

OBSERVATIONS / NOTES:

SEE supplemental sheet

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
yes	—

Signature(s): [signature]

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW/SD 014 **Date:** 6-5-05 **Time:** 0930 **Sampler:** TR/CD

Photograph Number/Direction: X Upstream ___ Downstream ___ East X West ___ North ___ South

Predominant Surrounding Land Use: Wooded Open Field Other

Canopy Cover: Open Partly Open Shaded

Dicharge Pipe Present: Yes No

Aquatic Vegetation Present: Yes No **Stream channelized:** Yes No

Water flowing: Yes No Not present Pool 9' x 20'

Organisms Present: Fish (in) NO Other (insects, frogs, etc.):

Water Width (ft): 9 **Water Depth (ft):** 8-10' **Estimated Flow/Velocity:** NONE

Channel Width (ft): 12 **Channel Depth (ft):** 2-3

Signs of flooding (circle all that apply) Yes No Water marks on trees Water-borne debris piles Other:

Deep Pools Present (>2 feet): Yes No If yes (approximate size)

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)

(Circle all that apply) Sand Silt Clay Muck

Debris Detritus Concrete Iron deposits

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic

Sediment Oils: Absent Slight Moderate Profuse

Water Odors: Normal Sewage Petroleum Chemical Anaerobic

Water Surface Oils: None Droplets Sheen

Turbidity: Clear Slightly Turbid Turbid Opaque

Other Comments/Observations: PHOTO 1645 & 1646

TR

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 08SW/SD 018 **Date:** 6/5/05 **Time:** 1205 **Sampler:** TR/CD

Photograph Number/Direction: X Upstream ___ Downstream ___ East ___ West X North ___ South

Predominant Surrounding Land Use: Wooded Open Field Other

Canopy Cover: Open Partly Open Shaded

Dicharge Pipe Present: Yes No

Aquatic Vegetation Present: Yes No | **Stream channelized:** Yes No

Water flowing: Yes No Not present

Organisms Present: Fish (in) ? Other (insects, frogs, etc.): Lickely

Water Width (ft): 16 | **Water Depth (ft):** | **Estimated Flow/Velocity:** NO Pool 16x25'

Channel Width (ft): | **Channel Depth (ft):**

Signs of flooding (circle all that apply) Yes No Water marks on trees Water-borne debris piles Other:

Deep Pools Present (>2 feet): Yes No If yes (approximate size) 10 x 20

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)

(Circle all that apply) Sand Silt Clay Muck

Debris Detritus Concrete Iron deposits

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic

Sediment Oils: Absent Slight Moderate Profuse

Water Odors: Normal Sewage Petroleum Chemical Anaerobic

Water Surface Oils: None Droplets Sheen

Turbidity: Clear Slightly Turbid Turbid Opaque

Other Comments/Observations: PHOTO 1649 discharge pipe in background

C.3 SURFACE WATER SAMPLE LOG SHEETS

ROUND 1

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[] Other: Diversion Ditch
[] QA Sample Type:

Sample ID No.: 08SW 00101
Sample Location: 08SW/SD 001
Sampled By: JG / TK
C.O.C. No.: 3657

Type of Sample:
[X] Low Concentration
[] High Concentration

* Malfunction

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 1/9/05	CLEAR	7.82	0.530	9.81	34	*	+28.7	—
Time: 1450								
Depth: Surface								
Method: Direct								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 (2) L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	1 (2) L Glass Amber	Yes
PCBs	4°C	(2) L Glass Amber	Yes/No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00101 -F

PHOTO # 1091

FLOW = Stagnate

MAP

See Figure 3-1

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: SWALE / DIVERSION DITCH
[] QA Sample Type:

Sample ID No.: 08SW —
Sample Location: 08SW/SD 002
Sampled By: T. ROJAHN
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: NA								
Time:								
Depth:	NA							
Method:								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ No
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	~~Yes~~
Total Metals	4°C/HNO_3	(1) L HDPE	~~Yes~~
Dissolved Metals	4°C/HNO_3	(1) L HDPE	~~Yes~~
SVOCs	4°C	(2) L Glass Amber	~~Yes~~
PAHs	4°C	(2) L Glass Amber	~~Yes~~
PCBs	4°C	(2) L Glass Amber	~~Yes~~ No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 08SW —-F

MAP

See Figure 3-1

DRY
NO SAMPLE

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

Sample ID No.: 08SW 00301
Sample Location: 08SW/SD 003
Sampled By: JG / TK
C.O.C. No.: 3657

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

* Malfunction

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 1/9/05								
Time: 1415								
Depth: SURFACE	CLEAR	7.7	0.609	7.97	12	*12.2	17.3	—
Method: DIRECT								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 ~~(2)~~ L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	1 ~~(2)~~ L Glass Amber	Yes
PCBs	4°C	(2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00301 -F

Stagnate Pond
4" deep

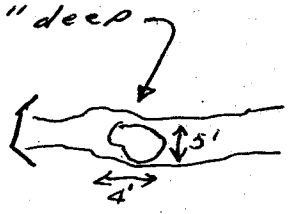

PHOTO # 1089
FROM ABOVE

4-8' BANK

MAP

See Figure 3-1

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Ty Agal

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[X] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00401
Sample Location: 08SW/SD 004
Sampled By: T. Rojaha
C.O.C. No.: 3658

Type of Sample:
[X] Low Concentration
[] High Concentration

FIELD MONITORING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 1-10-05 Time: 1115 Depth: surface Method: peristaltic	clear	7.19	0.310	5.92	11	~~3.74~~ CD 6.34	-76	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	(1) (2) L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	(2) L Glass Amber	Yes
PCBs	4°C	(2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00401 -F

Sheen on water surface at various locations.

Bldg 106 Pond.

MAP

See Figure 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
✓	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[X] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00402
Sample Location: 08SW/SD 004
Sampled By: T. Rojahn
C.O.C. No.: 3658

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 1-10-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1045								
Depth: 5'								
Method: peristaltic	clear	7.10	0.420	6.34	18	2.64	-103	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	(1) (2) L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	(2) L Glass Amber	Yes
PCBs	4°C	(2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00402 -F

Sheen on water surface at various locations.

Bldg 106 Pond

REMARKS

See Figure 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): T. Rojahn

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[X] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00501
Sample Location: 08SW/SD 005
Sampled By: T. Rojahn
C.O.C. No.: 3658

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 1-10-05 Time: 1020 Depth: Surface Method: Peristaltic	Clear	7.22	.300	5.85	13	6.61	-91	—

SAMPLE CONTAINER INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	(1) ~~(2)~~ L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	(2) L Glass Amber	Yes
PCBs	4°C	(2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW00501-F

Bldg 106 Pond

Sheen on water surface at various locations

MAP

See Figure 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Ty Rojahn

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[X] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00502
Sample Location: 08SW/SD 005
Sampled By: T. Rojahn
C.O.C. No.: 3658

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 1-10-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1000								
Depth: 5'								
Method: peristaltic	Clear	7.12	.348	6.15	21	8.27	120.9	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	(1) (2) L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	(2) L Glass Amber	Yes
PCBs	4°C	(2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00502-F

Bldg. 106 Pond
Sheen on water surface at various locations.

See Figure 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Ty Rojahn

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00601
Sample Location: 08SW/SD 006
Sampled By: JG / TR
C.O.C. No.: 3657

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 11/9/05								
Time: 1340								
Depth: SURFACE								
Method: Direct	CLEAR	7.46	0.541	7.62	11	11.36	22.5	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 (2) L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	1 (2) L Glass Amber	Yes
PCBs	4°C	1 (2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00601-F

PHOTO # 1088 N

Flow 2-5gpm

MAP

See Figure 3-1

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW00701
Sample Location: 08SW/SD 007
Sampled By: TR / JG
C.O.C. No.: 3656

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 1/09/05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 0955								
Depth: SURFACE	CLEAR	7.31	0.223	6.02	8.3	12.41	42.8	—
Method: DIRECT								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 (2) L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	1 (2) L Glass Amber	Yes
PCBs	4°C	1 (2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00701 -F

Flow meas. @ discharge
10-15 gpm

PHOTO 1085 NNW

MAP

See Figure 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
YES	08FD01090501

Signature(s): Ty [illegible]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00801
Sample Location: 08SW/SD 008
Sampled By: JG / TK
C.O.C. No.: 3657

Type of Sample:
[X] Low Concentration
[] High Concentration

FIELD ANALYSIS DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 1/9/05 Time: 1138 Depth: SURFACE Method: Direct	CLEAR	7.45	0.330	5.10	12	12.99	32.3	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 (2) L Glass Amber	Yes
Total Metals.	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	1 (2) L Glass Amber	Yes
PCBs	4°C	1 (2) L Glass Amber	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00801 -F

PHOTO # 1087

FLOW:

0.25' x 2.5' 2 sec / ft

0.25' x 2.5' x 0.5 x 449 = 140 gpm

SKETCH

See Figure 3-1

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

Sample ID No.: 08SW009 01
Sample Location: 08SW/SD 009
Sampled By: J.G / TK.
C.O.C. No.: 3656

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 1/09/05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 0855								
Depth: SURFACE	CLEAR	7.20	0.301	4.68	9.7	13.54	40.5	—
Method: DIRECT								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 ~~(2)~~ L Glass Amber	Yes
Total Metals	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals	4°C/HNO_3	(1) L HDPE	Yes
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	1 ~~(2)~~ L Glass Amber	Yes
PCBs	4°C	1 ~~(2)~~ L Glass Amber	Yes/No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00901 -F

Flow 1'/sec
0.23' x 3' x 1 x 449 = 310 gpm
PHOTO # 1083 FACE up stream

MAP

See Figure 3-1

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Ty [illegible]

ROUND 2

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: DRAINAGE Ditch
[] QA Sample Type:

Sample ID No.: 08SW —
Sample Location: 08SW/SD 001
Sampled By: —
C.O.C. No.: —

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6/05/05	NA							
Time: —								
Depth: —								
Method: —								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ No
Semivolatiles 8270C	4°C	(2) L Glass Amber	~~Yes~~
Total Metals plus Tin	4°C/HNO3	(1) L HDPE	~~Yes~~
Dissolved Metals plus Tin	4°C/HNO3	(1) L HDPE	~~Yes~~/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[ ] No[X] 08SW_____-F

DRY

MAP

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[] Other: Drainage Ditch
[] QA Sample Type:

Sample ID No.: 08SW —
Sample Location: 08SW/SD 002
Sampled By: —
C.O.C. No.: —

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6/05/05								
Time: —								
Depth: —	NA							→
Method: —								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ No
Semivolatiles 8270C	4°C	(2) L Glass Amber	~~Yes~~
Total Metals plus Tin	4°C/HNO3	(1) L HDPE	~~Yes~~
Dissolved Metals plus TIn	4°C/HNO3	(1) L HDPE	~~Yes~~/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[ ] No[X] 08SW_____-F

Dry

MAP

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00302
Sample Location: 08SW/SD 003
Sampled By: T. ROJAHN
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6-5-05 Time: 1610 Depth: SURFACE Method: Direct	clear	7.42	0.813	24.02	38.6	Mal-Function	-42	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00302 -F

Pool 5'x2'x3"
No Flow

MAP

Circle if Applicable:

MS/MSD	Duplicate ID No.:
✓	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

Sample ID No.: 08SW —
Sample Location: 08SW/SD006
Sampled By: —
C.O.C. No.: —

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6/05/05								
Time: —								
Depth: —								
Method: —	NA							

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ No
Semivolatiles 8270C	4°C	(2) L Glass Amber	~~Yes~~
Total Metals plus Tin	4°C/HNO3	(1) L HDPE	~~Yes~~
Dissolved Metals plus TIn	4°C/HNO3	(1) L HDPE	~~Yes~~/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[ ] No[X] 08SW_____-F

DRY

MAP

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Taylor

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

Sample ID No.: 08SW00702
Sample Location: 08SW/SD007
Sampled By: T. ROJAHN
C.O.C. No.: 3250

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 6/5/05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1035								
Depth: SURFACE	clear	7.23	0.330	18.74	1.16	MALFUNCTION	198	—
Method: Direct								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW00702-F

Flow - None
Pool 1x4'

MAP

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW 00802
Sample Location: 08SW/SD 008
Sampled By: T. Kosnar
C.O.C. No.: 3250

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 6/05/05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1105								
Depth: SURFACE								
Method: Direct	Clear	7.42	0.381	17.6	2.81	0.83	+245	—

SAMPLE REQUIREMENT INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00802 -F

Pool 10' x 16' + 10"

No PHOTO

MAP

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Troy Kosnar

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

Sample ID No.: 08SW00902
Sample Location: 08SW/SD 009
Sampled By: T. Ganaway
C.O.C. No.: 3250

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6/5/05 Time: 1015 Depth: Surface Method: Direct	Clear	7.41	0.365	19.28	1.40	malfunction	+184	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 00902 -F

Pool 9'x12 No Flow

PHOTOS 1647 upstream & West

MAP

Circle if Applicable:

~~MS/MSD~~ Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

Sample ID No.: 08SW 01001
Sample Location: 08SW/SD 010
Sampled By: T. Kojan
C.O.C. No.: 3250

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 6/05/05 Time: 1400 Depth: SURFACE Method: Direct	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
	Clear	7.16	0.293	20.70	8.55	Mal-function	+229	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 01001 -F

No Flow
Pool

MAP

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW —
Sample Location: 08SW/SD 011
Sampled By: —
C.O.C. No.: —

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6/05/05								
Time: —								
Depth: —	NA							
Method: —								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ No
Semivolatiles 8270C	4°C	(2) L Glass Amber	~~Yes~~
Total Metals plus Tin	4°C/HNO3	(1) L HDPE	~~Yes~~
Dissolved Metals plus Tin	4°C/HNO3	(1) L HDPE	~~Yes~~/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08SW —-F

DRY

PHOTO 1648

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Ty Rgal

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW01201
Sample Location: 08SW/SD 012
Sampled By: T. ROJAHN
C.O.C. No.: 3251

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6/05/05 Time: 1510 Depth: SURFACE Method: DIRECT	Cloudy	7.82	0.453	24.77	96.3	~~0.93~~ malf.	6.0	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW01201 -F

- noticeable scum on surface of the water
- decaying organic odor

B-106 POND

MAP

Circle if Applicable:

MS/MSD	Duplicate ID No.: 08FD060505 01

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: DRAINAGE DITCH
[] QA Sample Type:

Sample ID No.: 08SW —
Sample Location: 08SW/SD 013
Sampled By: —
C.O.C. No.: —

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6/05/05								
Time: —								
Depth: —	NA							
Method: —								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ NO
Semivolatiles 8270C	4°C	(2) L Glass Amber	~~Yes~~
Total Metals plus Tin	4°C/HNO3	(1) L HDPE	~~Yes~~
Dissolved Metals plus TIn	4°C/HNO3	(1) L HDPE	~~Yes~~/No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 08SW_____-F

DRY

MAP

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 08SW01401
Sample Location: 08SW/SD 14
Sampled By: T. ROJAHN
C.O.C. No.: 3250

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6-05-05 Time: 0930 Depth: SURFACE Method: Direct	Clear	7.02	0.313	18.29	10.26	Malfunction	199	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW01401-F

MAP

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

Sample ID No.: 08SW01501
Sample Location: 08SW/SD 015
Sampled By: T. KOJAHN
C.O.C. No.: 3250

[X] Stream / Pool
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 6-5-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1200								
Depth: Surface	Clear	7.52	0.359	17.51	27.2	4.23	+255	—
Method: Direct								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	MS/MSD	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	9	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	6	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	3	(1) L HDPE	Yes/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 01501 -F

Pool
No Flow

MAP

Circle if Applicable:
MS/MSD
Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[] Other: Sump
[] QA Sample Type:

Sample ID No.: 08SW~~W~~4001 01
Sample Location: ~~08SW/SD~~ 08W4001
Sampled By: T. Rosahn
C.O.C. No.: 3257 E
Coli = 3256

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6-7-05								
Time: 0710								
Depth: 7' intake	Black -	* NA						
Method: Peristaltic	Sl cloudy							

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO3	(1) L HDPE	~~Yes~~/No
Coliform Bacteria	4°C + Sodium Thiosulfate		Yes

} LAUCKS

— EC LABS

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[X] No[ ] 08SW 0001 01 -F

W.L. = 4.72
TD = 8.45
Surveyors will get grade for all 4 corners.

* ? Black w/ odor on top - could impact probes
Sl. cloudy below
No Sediment

Circle if Applicable:

MS/MSD —

Duplicate ID No.: 08FD06070501 Coliform (only)

Signature(s): T. [illegible]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Seep
[] QA Sample Type:

Sample ID No.: 08SP —
Sample Location: 08SP01
Sampled By: —
C.O.C. No.: —

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6-04-05								
Time: —								
Depth: —	NA	—						
Method: —								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ NO
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	~~Yes~~
Total Metals plus Tin	4°C/HNO_3	(1) L HDPE	~~Yes~~
Dissolved Metals plus Tin	4°C/HNO_3	(1) L HDPE	~~Yes~~/No

OBSERVATIONS/NOTES

Filtered Sample Collected Yes[ ] No[X] 08SP_____-F

DRY

MAP

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU08
Project No.: N1245 CTO 0331

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Seep / Drainage
[] QA Sample Type:

Sample ID No.: 08SP0201
Sample Location: 08SP02
Sampled By: TR / CD
C.O.C. No.: 3250 E
Coli. - 3256

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 6-4-05								
Time: 1455								
Depth: surface								
Method: direct	tannish v. cloudy	6.41	0.423	17.20	>1000	4.60	145	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(1) ~~(2)~~ L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No
Coliform Bacteria	4°C/sodium	Tiosulfate @ 0650 6/7/05	Yes

LAUCKS

EC LABS

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[✓] No[ ] 08SP 0201 -F

PHOTOS 1625 - 1627

MAP

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

ROUND 3

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW00102	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD001	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Intermittant Drainage	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	12.48
Time	16:15	**pH (S.U.)**	8.33	**ORP (mV)**	125
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.150	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	11.37		
MS/MSD Collected	N	**Turbidity (NTUs)**	2.5		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	16:15	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW00201	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD002	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Intermittant Drainage	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	10.84
Time	16:05	**pH (S.U.)**	8.73	**ORP (mV)**	85
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.109	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	15.81		
MS/MSD Collected	N	**Turbidity (NTUs)**	1.4		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	16:05	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW00303	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD003	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	11.01
Time	15:55	**pH (S.U.)**	7.97	**ORP (mV)**	109
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.365	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	11.09		
MS/MSD Collected	N	**Turbidity (NTUs)**	3.3		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	15:55	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW00403	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD004	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Pond	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	clear	**Temp (C)**	11.40
Time	14:40	**pH (S.U.)**	7.42	**ORP (mV)**	145
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.294	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	3.88		
MS/MSD Collected	N	**Turbidity (NTUs)**	6.9		
Duplicate Collected	Y				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	14:40	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW005-DRY	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD005	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	Terry Rojahn	**Modified Date**	
		Concentration	High	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**		**Temp (C)**	
Time	10:54	**pH (S.U.)**		**ORP (mV)**	
Depth (ft.)		**S.C. (mS/cm)**		**Salinity (%)**	
Method	Other	**DO (mg/L)**			
MS/MSD Collected		**Turbidity (NTUs)**			
Duplicate Collected					

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#

General Observations and Notes

Location dry - no sample collected.

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW006-DRY	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD006	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	Terry Rojahn	**Modified Date**	
		Concentration	High	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**		**Temp (C)**	
Time	14:25	**pH (S.U.)**		**ORP (mV)**	
Depth (ft.)		**S.C. (mS/cm)**		**Salinity (%)**	
Method	Other	**DO (mg/L)**			
MS/MSD Collected		**Turbidity (NTUs)**			
Duplicate Collected					

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#

General Observations and Notes

Location dry - no sample collected.

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW00803	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD008	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	10.39
Time	11:30	**pH (S.U.)**	7.35	**ORP (mV)**	184
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.347	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	9.30		
MS/MSD Collected	N	**Turbidity (NTUs)**	2.0		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	11:30	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW00903	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD009	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	9.53
Time	10:40	**pH (S.U.)**	7.35	**ORP (mV)**	175
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.323	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	8.88		
MS/MSD Collected	N	**Turbidity (NTUs)**	13		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	10:40	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Flow ~1gpm

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW01002	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD010	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	10.76
Time	13:55	**pH (S.U.)**	7.12	**ORP (mV)**	155
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.230	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	3.48		
MS/MSD Collected	N	**Turbidity (NTUs)**	2.7		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	13:55	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW01101	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD011	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	11.80
Time	13:00	**pH (S.U.)**	7.67	**ORP (mV)**	176
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.292	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	7.93		
MS/MSD Collected	N	**Turbidity (NTUs)**	16		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	13:00	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW01301	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD013	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	13.78
Time	16:25	**pH (S.U.)**	9.02	**ORP (mV)**	95
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.095	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	14.41		
MS/MSD Collected	N	**Turbidity (NTUs)**	9.4		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	16:25	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW01402	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD014	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	9.70
Time	10:25	**pH (S.U.)**	7.02	**ORP (mV)**	186
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.267	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	5.48		
MS/MSD Collected	N	**Turbidity (NTUs)**	1.7		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	10:25	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW01502	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD015	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	11.89
Time	13:40	**pH (S.U.)**	7.47	**ORP (mV)**	181
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.380	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	10.16		
MS/MSD Collected	N	**Turbidity (NTUs)**	1.5		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	13:40	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW016-DRY	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD016	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	Terry Rojahn	**Modified Date**	
		Concentration	High	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**		**Temp (C)**	
Time	14:30	**pH (S.U.)**		**ORP (mV)**	
Depth (ft.)		**S.C. (mS/cm)**		**Salinity (%)**	
Method	Other	**DO (mg/L)**			
MS/MSD Collected		**Turbidity (NTUs)**			
Duplicate Collected					

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#

General Observations and Notes

Location dry - no sample collected.

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW01701	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD017	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	clear	**Temp (C)**	11.01
Time	11:05	**pH (S.U.)**	7.41	**ORP (mV)**	191
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.136	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	6.56		
MS/MSD Collected	N	**Turbidity (NTUs)**	1.6		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	11:05	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW01801	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD018	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Culvert Outflow	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	12.32
Time	15:15	**pH (S.U.)**	7.42	**ORP (mV)**	-2
Depth (ft.)	From discharge	**S.C. (mS/cm)**	0.484	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	10.06		
MS/MSD Collected	N	**Turbidity (NTUs)**	8.8		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	15:15	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW02001	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD020	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	Terry Rojahn	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	8.65
Time	09:55	**pH (S.U.)**	7.19	**ORP (mV)**	177
Depth (ft.)	surface	**S.C. (mS/cm)**	0.237	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	7.00		
MS/MSD Collected	N	**Turbidity (NTUs)**	2.4		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	09:55	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

SURFACE WATER SAMPLING LOG

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SW02101	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SW/SD021	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	Stream	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	clear	**Temp (C)**	9.16
Time	09:25	**pH (S.U.)**	6.88	**ORP (mV)**	187
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.329	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	5.16		
MS/MSD Collected	Y	**Turbidity (NTUs)**	0.75		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	09:25	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	9	Glass	40ml vials	Do MS/MSD	112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SP001-DRY	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SP001	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	Terry Rojahn	**Modified Date**	—
		Concentration	High	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**		**Temp (C)**	
Time	14:33	**pH (S.U.)**		**ORP (mV)**	
Depth (ft.)		**S.C. (mS/cm)**		**Salinity (%)**	
Method	Other	**DO (mg/L)**			
MS/MSD Collected		**Turbidity (NTUs)**			
Duplicate Collected					

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#

General Observations and Notes

Location dry - no sample collected.

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SP00202	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SP002	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	T. Rojahn/C. Doolan	**Modified Date**	
		Concentration	Low	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**	Clear	**Temp (C)**	13.41
Time	13:20	**pH (S.U.)**	6.85	**ORP (mV)**	203
Depth (ft.)	Surface	**S.C. (mS/cm)**	0.362	**Salinity (%)**	NA
Method	Direct Bottle	**DO (mg/L)**	5.88		
MS/MSD Collected	N	**Turbidity (NTUs)**	3.9		
Duplicate Collected	N				

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
Yes	10/25/05	13:20	Volatile Organic Compounds	SW-846 8260B	4°C/HCL	3	Glass	40ml vials		112GN1245-10262005-11

General Observations and Notes

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

SURFACE WATER SAMPLING LOG

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SP003-DRY	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SP003	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	Terry Rojahn	**Modified Date**	
		Concentration	High	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**		**Temp (C)**	
Time	13:29	**pH (S.U.)**		**ORP (mV)**	
Depth (ft.)		**S.C. (mS/cm)**		**Salinity (%)**	
Method	Other	**DO (mg/L)**			
MS/MSD Collected		**Turbidity (NTUs)**			
Duplicate Collected					

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#

General Observations and Notes

Location dry - no sample collected.

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08SP004-DRY	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Sample Location**	08SP004	**Created Date**	10/25/05
Task/Contract #	CTO 0331	**Source Type**	-Select-	**Modified By**	
WBS Code #	Open	**Sampled By**	Terry Rojahn	**Modified Date**	
		Concentration	High	**Printed By**	James Goerdt
				Printed Date	3/30/06

Sample Data

Date	10/25/05	**Color**		**Temp (C)**	
Time	13:15	**pH (S.U.)**		**ORP (mV)**	
Depth (ft.)		**S.C. (mS/cm)**		**Salinity (%)**	
Method	Other	**DO (mg/L)**			
MS/MSD Collected		**Turbidity (NTUs)**			
Duplicate Collected					

Laboratory Analysis Data

Collected	Date	Time	Description	Analysis	Preservative	Count	Type	Requirements	Comments	Chain#

General Observations and Notes

Location dry - no sample collected.

C.4 GROUNDWATER SAMPLE LOG SHEETS

ROUND 1

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: 08GWTW (001)
Sample Location: 08TW (001) / 58006
Sampled By: Goerdt / TC
C.O.C. No.: 3655
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 1-6-05								
* Time: See below 1440								
Method: Peristaltic	Brn	-	7.27	.120	7.94	>1000	7.79	22.7

PURGE DATA:

	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Date: 1-6-05								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 1" pvc		SEE LOW FLOW DATA SHEET						
Total Well Depth (TD): 9.92								
Static Water Level (WL): 5.18								
One Casing Volume(gal/L) 2.9								
Start Purge (hrs): 1325								
End Purge (hrs): 1351								
Total Purge Time (min): 16								
Total Vol. Purged (gal/L) 2.25								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	* Container Requirements	Collected
Volatiles 8260B	4°C/HCl	1625 (3) 40ml Vials	Yes
Energetics - Perchlorates & pH	4°C	1505 (1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1440 (1) (2) L Glass Amber	Yes
Total Metals plus Tin	4°C/HNO_3	1555 (1) L HDPE	Yes
Dissolved Metals plus Tin	4°C/HNO_3	1620 (1) L HDPE	Yes/No
SVOCs	4°C	1640 (1) (2) L Glass Amber	Yes
PAHs	4°C	1655 (1) (2) L Glass Amber	Yes
Fecal Coliform	4°C	1/07 @0745 (1) HDPE ~~or Whirl Bag~~	Yes
	Sodium thiosulfate		

1/7/05

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[X] No[ ] 08GWTW 001 -F

Converted Boring 08SB 006

Well dried out. Giving time to recharge, then pulling minimal volume. Well continually dries out.

9.92
5.18
4.74 (.163) = 0.77 gal
= 2.86 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	—	[signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08TW001
DATE: 1-6-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color. etc)
1335	5.18	-	-	-	-	-	-	-	-	Start purge
1345	7.58	1.5	150	7.27	.120	-	7.79	7.94	22.7	Brn
1351	-	2.25	150	-	-	-	-	-	-	Dry - stop purge

Water Quality Meter (SN) 99K1014 AG
Control Box type (SN) NA
Turbidity Meter (SN) 4536 3303

Pump Intake 9.85'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: 08GWTW002
Sample Location: 08TW002 / SB007
Sampled By: CD & TR
C.O.C. No.: 3652 & 3653
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 1/6/05								
Time: 1315								
Method: peristaltic	Lt Brn	—	7.00	1.577	9.16	980	2.29	-109.1

PURGE DATA:

	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Date: 1/6/05								
Method: Peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 1" Ø PVC		SEE LOW FLOW DATA SHEET						
Total Well Depth (TD): 19.8								
Static Water Level (WL): 10.14								
One Casing Volume(gal/L): 1.6								
Start Purge (hrs): 1047								
End Purge (hrs): 1204								
Total Purge Time (min): 77								
Total Vol. Purged (gal/L): 5.9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates & pH	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 (2) L Glass Amber	Yes
Total Metals plus Tin	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin	4°C/HNO_3	(1) L HDPE	Yes No
SVOCs	4°C	1 (2) L Glass Amber	Yes
PAHs	4°C	1 (2) L Glass Amber	Yes
Fecal Coliform	4°C & Sodium thiosulfate	1/07@0735 (1) HDPE ~~or Whirl Bag~~	Yes

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[X] No[ ] 08GWTW 002 -F

Converted Boring 08SB 007

19.8
10.14
9.74
.163

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	08FD010705 01 (Fecal Coliform only)	

Tey Royal

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08TW002
DATE: 1/6/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color. etc)
1047	10.14	0	—	—	—	—	—	—	—	Start Purge
1057	14.16	1020	100	7.12	1.150	>1000	2.34	8.52	-111.9	
1107	13.10	1.720	70	7.26	1.233	>1000	2.98	7.06	-121.7	
1117	13.72	2.320	60	7.39	1.438	910	2.44	7.65	-112.4	
1127	14.20	3.020	70	7.64	1.616	435	2.24	7.81	-127.7	Pump stopped pumping for aeration
1154	16.84	4.720	120	7.07	1.670	980	0.80	9.92	-128.4	
1204	dry	5.920	120	7.00	1.577	"	2.29	9.16	-109.1	dry
1315	11.98	—	—	—	—	—	—	—	—	start sampling

Water Quality Meter (SN) 01D0956 AA
Control Box type (SN) 419
Turbidity Meter (SN) 1175-1503

Pump Intake 19.65'

SIGNATURE(S): [illegible]

PAGE 2 OF 2

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: 08GWTW 003
Sample Location: 08TW 003 / SB 010
Sampled By: Goerzel / TK
C.O.C. No.: 3652 & 3653
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1-6-05	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time: 1025								
Method: peristaltic	clear	—	6.54	.365	12.51	7.1	0.29	-41.6

PURGE DATA:

Date: 1-6-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 19.85								
Static Water Level (WL): 11.65								
One Casing Volume(gal/L): 4.95								
Start Purge (hrs): 0902								
End Purge (hrs): 1022								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 8.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates ~~& pH~~ TK	4°C	MS/MSD (1) L HDPE FD	Yes
Energetics - Nitroaromatics and Nitramines	4°C	MS/MSD (2) L Glass Amber FD	Yes
Total Metals plus Tin	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin	4°C/HNO_3	(1) L HDPE	Yes/No
SVOCs	4°C	(2) L Glass Amber	Yes
PAHs	4°C	(2) L Glass Amber	Yes
Fecal Coliform	4°C	1/07@0715 (1) HDPE ~~or Whirl Bag~~	Yes
	Sodium thiosulfate		

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWTW_____-F

Converted Boring 08SB 010

19.85
11.65
8.20 (.163) = 1.34 gal
= 4.95 L

Well located on gravel pad.
No apparent surface water runoff
infiltrated well from recent heavy rains.

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
Yes	08FD01060501	[signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08TW03
DATE: 1-6-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color, etc)
		—	—	—	—	—	—	—	—	Start purge
0902	11.65	1.9	190	6.35	.255	270	0.68	12.28	-3.7	sl. cloudy
0912	11.34	2.8	190	6.46	.297	70	0.49	12.36	-24.6	"
0922	11.35	3.7	190	6.50	.333	19	0.37	12.39	-35.1	Clear
0932	11.35	4.6	190	6.52	.344	-	0.34	12.40	-38.2	"
0942	11.35	5.5	190	6.53	.350	-	0.32	12.61	-38.1	"
0952	11.38	6.4	190	6.51	.353	12.7	0.31	12.61	-38.7	"
1002	11.39	7.3	190	6.53	.365	8.2	0.30	12.63	-39.6	"
1012	11.43	8.2	190	6.54	.365	7.1	0.29	12.51	-41.6	end purge
1022	11.45									

Water Quality Meter (SN) 99K 1014 AG
Control Box type (SN) NA
Turbidity Meter (SN) 4536 3303

Pump Intake 19.5'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: 08GWTW004
Sample Location: 08TW004 / SB013
Sampled By: Doolan / TR
C.O.C. No.: 3655
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 1/6/05								
Time: 1612								
Method: Peristaltic	brown	—	6.65	0.467	9.73	>1000	3.87	-5.8

PURGE DATA:

	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Date: 1/6/05								
Method: Peristaltic								
Monitor Reading (ppm):	SEE LOW FLOW DATA SHEET							
Well Casing Diameter & Material								
Type: 1" PVC								
Total Well Depth (TD): 19.9								
Static Water Level (WL): 14.38								
One Casing Volume(gal/L): ~~0.9~~ 3.3								
Start Purge (hrs): 1516								
End Purge (hrs): 1546								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 3.600								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Energetics - Perchlorates & pH	4°C	(1) L HDPE	Yes
Energetics - Nitroaromatics and Nitramines	4°C	1 ~~(2)~~ L Glass Amber	Yes
Total Metals plus Tin	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin	4°C/HNO_3	(1) L HDPE	Yes/No
SVOCs	4°C	1 ~~(2)~~ L Glass Amber	Yes
PAHs	4°C	1 ~~(2)~~ L Glass Amber	Yes
Fecal Coliform 1/7/05 @ 0705	4°C & Sodium thiosulfate	(1) HDPE or Whorl Bag	Yes

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[X] No[ ] 08GWTW 004 -F

Converted Boring 08SB 013

19.9
- 14.38
5.52 (.163) = 0.9 gal
= 3.3 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Colin Doolan

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08T W 004
DATE: 1/6/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color. etc)
1516	14.38	0	—	—	—	—	—	—	—	Start purge
1526	15.90	1.300	130	6.93	0.299	731	5.90	10.34	-0.3	
1536	15.99	2.600	130	6.36	0.398	433	3.72	10.01	5.6	
1546	17.76	3.600	106	6.65	0.467	>1000	3.87	9.73	-5.8	

Water Quality Meter (SN) 01D0956 AA
Control Box type (SN) 419
Turbidity Meter (SN) 1175-1503

Pump Intake 19.75'

SIGNATURE(S): Eric Dooley

ROUND 2

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT0101
Sample Location: 08MWT01
Sampled By: CD
C.O.C. No.: 3248
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 6-2-05								
Time: 1920								
Method: ~~peristaltic~~ bladder	clear	—	4.24	0.592	14.12	9.9	9.61	297.8

PURGE DATA:

	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Date: 6-2-05								
Method: ~~peristaltic~~ bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material Type: 2" PVC								
Total Well Depth (TD): 57.71'								
Static Water Level (WL): 50.00'								
One Casing Volume(gal): 4.76								
Start Purge (hrs): 17:25								
End Purge (hrs): 19:15								
Total Purge Time (min): 120								
Total Vol. Purged (gal): 14.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[✓] 08GWT_____-F

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MWT01
DATE: 6-2-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1715 ~~1625~~	50.00									Start purge.
1725	50.15	1.20	120	4.34	0.549	550	6.64	15.02	240.9	cloudy
1735	50.22	2.40	120	4.16	0.541	500	7.08	14.46	253.4	cloudy
1745	50.25	3.60	120	4.07	0.541	340	7.45	14.34	260.2	cloudy
1755	50.26	4.80	120	4.06	0.542	190	7.85	14.37	266.7	slightly cloudy
1805	50.27	6.00	120	4.11	0.540	150	8.19	14.28	273.3	slightly cloudy
1815	50.28	7.20	120	4.11	0.554	110	8.52	14.21	278.6	slightly cloudy
1825	50.28	8.40	120	4.10	0.578	60	8.92	14.11	284.8	v. slightly cloudy
1835	50.29	9.60	120	4.11	0.587	45	9.11	14.14	287.5	v. slightly cloudy
1845	50.29	10.80	120	4.17	0.594	30	9.31	14.20	290.1	clear
1855	50.29	12.00	120	4.22	0.594	20	9.45	14.08	293.2	clear
1905	50.30	13.20	120	4.26	0.593	14	9.52	14.10	295.3	clear
1910	50.30	13.80	120	4.27	0.593	13	9.56	14.14	296.8	clear
1915	50.30	14.40	120	4.24	0.592	9.9	9.61	14.12	297.8	clear, end purge
1920										start sample

Water Quality Meter (SN) 04C3884 AP
Control Box type (SN) ~~Geotech 2 #947~~ MP10 - 1600
Turbidity Meter (SN) 1728 - 1600

Pump Intake 56.5' TOC

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT0201
Sample Location: 08MWT02
Sampled By: CD
C.O.C. No.: 3248
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 6-2-05								
Time: 1515								
Method: peristaltic	clear	—	3.55	0.197	14.34	1.2	7.79	248.9

PURGE DATA:

Date 6-2-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 17.31'								
Static Water Level (WL): 9.90'								
One Casing Volume(gal/L): 4.57								
Start Purge (hrs): 1110								
End Purge (hrs): 1510								
Total Purge Time (min): 240								
Total Vol. Purged (gal/L): 20.1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[✓] 08GWT_____-F

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	FD060205-01

Signature(s): [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MWT02
DATE: 6-2-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1110	9.90									clear, Start purge
1120	10.29	1.00	100	8.27	0.273	5.5	4.22	13.54	146.9	clear
1130	10.54	2.00	100	8.30	0.238	3.1	6.44	13.41	165.9	clear
1140	10.82	3.00	100	8.09	0.213	4.1	7.53	13.59	175.9	clear
1150	11.11	4.00	100	7.53	0.205	3.6	7.58	13.55	193.8	clear
1200	11.40	4.90	90	7.28	0.208	3.3	7.54	13.85	195.3	clear
1210	11.66	5.70	80	7.20	0.208	4.2	7.57	13.95	202.0	clear
1220	11.88	6.50	80	7.09	0.207	4.8	7.57	14.01	210.7	clear
1230	12.10	7.30	80	6.95	0.206	3.5	7.60	14.05	220.7	clear
1240	12.25	8.10	80	6.76	0.207	3.2	7.55	14.10	218.4	clear
1250	12.44	8.90	80	6.65	0.206	4.3	7.58	14.19	222.4	clear
1300	12.62	9.70	80	6.57	0.202	3.5	7.60	14.12	229.6	clear
1310	12.87	10.50	80	6.43	0.198	4.1	7.64	14.04	237.4	clear
1320	13.06	11.30	80	6.10	0.195	5.7	7.65	13.99	242.3	clear
1330	13.18	12.10	80	5.95	0.188	3.7	7.63	14.15	243.4	clear
1340	13.35	12.90	80	5.83	0.188	2.3	7.65	14.25	236.6	clear
1350	13.53	13.70	80	5.70	0.186	2.6	7.70	14.24	238.8	clear
1400	13.68	14.50	80	4.02	0.184	4.1	7.74	14.26	242.6	clear
1410	13.88	15.30	80	3.68	0.184	2.9	7.71	14.36	240.9	clear
1420	14.04	16.10	80	3.55	0.182	2.5	7.74	14.34	249.9	clear
1430	14.25	16.90	80	3.50	0.181	1.7	7.74	14.28	250.4	clear
1440	14.43	17.70	80	3.45	0.183	1.4	7.78	14.26	254.1	clear
1450	14.58	18.50	80	3.46	0.187	0.50	7.76	14.26	250.9	clear
1500	14.76	19.30	80	3.55	0.191	2.5	7.76	14.32	250.0	clear
1510	14.95	20.10	80	3.55	0.197	1.2	7.79	14.34	248.9	clear, end purge
1515										Start sample

Water Quality Meter (SN) 04C3884 AB
Control Box type (SN) Geopump 2 # 347
Turbidity Meter (SN) 1728 - 1600

Pump Intake 16.81' bTOR

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT 00301
Sample Location: 08MWT 03
Sampled By: T. Rojahn
C.O.C. No.: 3248
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6-2-05	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time: 1950								
Method: SAME	Clear	—	5.78	0.392	14.49	8.19	7.09	+190

PURGE DATA:

Date: 6-2-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: Bladder								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2" Ø PVC								
Total Well Depth (TD): 62.75								
Static Water Level (WL): 53.22								
One Casing Volume(gal/L)								
Start Purge (hrs): 1735								
End Purge (hrs): 1945								
Total Purge Time (min): 130								
Total Vol. Purged (gal/L) 20.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWT — -F

62.75
-53.22
9.53 × 0.163 = 1.6 gal or 5.9

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Ty Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MWT03
DATE: 6-2-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1735	53.22	–	–	–	–	–	–	–	–	Start Purge
1745	53.23	1300	130	5.80	0.411	112	5.41	15.05	+183	Sl. Cloudy
1755	53.25	2600	130	5.69	0.405	121	5.39	14.76	189	Sl. Cloudy
1805	53.25	3900	130	5.67	0.404	104	5.73	14.64	191	Sl. Cloudy
1815	53.25	4200	130	5.70	0.403	97.5	5.06	14.65	187	V. Sl Cloudy
1825	53.25	5500	130	5.76	0.414	107	6.51	15.28	186	Sl. Cloudy
1835	53.25	6800	130	5.72	0.413	129	7.36	14.59	196	Sl. Cloudy
1845	53.27	8800	200	5.76	0.412	119	7.27	14.58	189	Sl. Cloudy
1855	53.27	10800	200	5.75	0.403	61.3	7.16	14.49	189	V.Sl. Cloudy
1905	53.27	12800	200	5.77	0.401	39.2	7.22	14.54	189	CLEAR
1915	53.27	14800	200	5.79	0.402	29.6	7.15	14.57	187	CLEAR
1925	53.27	16800	200	5.79	0.398	19.2	7.15	14.57	188	CLEAR
1935	53.27	18800	200	5.78	0.395	14.2	7.13	14.53	190	CLEAR
1945	53.27	20800	200	5.78	0.392	8.19	7.09	14.49	190	CLEAR
1950	–	–	–	–	–	–	–	–	–	Start Purge

Water Quality Meter (SN) 0120702 AF
Control Box type (SN) MP10 - 1334
Turbidity Meter (SN) 2843 - 4501

Pump Intake 58'

SIGNATURE(S): Terry Rogit

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT 00401
Sample Location: 08MWT 04
Sampled By: T. ROJAHN
C.O.C. No.: 3248
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 6/3/05								
Time: 1542								
Method: SAME	Clear	–	6.69	0.396	15.75	9.3	0.19	-51

PURGE DATA:

Date: 6-3-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" ø PVC								
Total Well Depth (TD): 15.20								
Static Water Level (WL): 8.15								
One Casing Volume(gal/L): 4.4								
Start Purge (hrs): 1415								
End Purge (hrs): ~~1545~~ → 1540 (TR)								
Total Purge Time (min): 85								
Total Vol. Purged (gal/L): 10.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWT ___-F

7.05' x 0.163 = 1.1 gal or 4.4L

Circle if Applicable:

MS/MSD ✓ Duplicate ID No.: ___

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MWT04
DATE: 6-3-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1415	8.15	0	–	–	–	–	–	–	–	Start Purge
1425	8.31	1200	120	6.60	0.390	160	0.42	16.43	-30	Sl. Cloudy
1435	8.34	2400	120	6.53	0.392	99.2	0.34	16.27	-32	V. Sl. Cloudy
1445	8.34	3600	120	6.57	0.392	63.0	0.28	15.94	-37	V. Sl. Cloudy
1455	8.34	4800	120	6.57	0.392	55.1	0.23	15.89	-37	V. Sl. Cloudy
1505	8.34	6000	120	6.54	0.394	35.9	0.22	16.10	-36	CLEAR
1515	8.34	7200	120	6.58	0.391	26.6	0.20	15.60	-44	CLEAR
1525	8.34	8400	120	6.63	0.392	18.8	0.19	15.65	-43	CLEAR
1535	8.34	9600	120	6.67	0.391	13.0	0.19	15.60	-47	CLEAR
1540	8.34	10200	120	6.69	0.396	9.3	0.19	15.75	-51	CLEAR
1542	–	–	–	–	–	–	–	–	–	Start SAMPLING

Water Quality Meter (SN) 0160702 AF
Control Box type (SN) 328
Turbidity Meter (SN) 2843-4501

Pump Intake 12.5'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT 005 01
Sample Location: 08MWT 05
Sampled By: T. ROJAHN
C.O.C. No.: 3248
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6/3/05	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time: 1235								
Method: SAME	CLEAR	–	5.70	0.582	20.25	5.75	6.14	215

PURGE DATA:

Date: 6-3-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: Bladder								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2"ϕ, PVC								
Total Well Depth (TD): 62.70								
Static Water Level (WL): 52.42								
One Casing Volume(gal/L): 6.3								
Start Purge (hrs): 1042								
End Purge (hrs): 1232								
Total Purge Time (min): 110								
Total Vol. Purged (gal/L) 8.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWT — -F

10.28 × 0.163 = 1.7 gal or 6.3L

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08 MWT05
DATE: 6-03-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1042	52.42	0	—	—	—	—	—	—	—	START PURGE
1052	52.80	900	90	5.56	0.524	84.3	8.16	17.32	197	V. SL. Cloudy
1102	53.00	1800	90	5.54	0.514	73.4	7.87	16.92	199	" " "
1112	53.12	2700	90	5.52	0.513	55.5	7.67	17.04	201	" " "
1122	53.25	3600	90	5.52	0.514	32.4	7.30	17.36	201	CLEAR
1132	53.34	4500	90	5.60	0.528	28.3	7.08	17.56	200	CLEAR
1142	53.42	5400	90	5.63	0.534	25.6	6.90	17.74	198	CLEAR
1152	53.50	6300	90	5.69	0.545	16.7	6.76	18.09	198	CLEAR
1208	53.45	6900	60	5.77	0.561	13.1	6.52	18.91	200	CLEAR
1212	53.45	7500	60	5.68	0.561	12.3	6.52	18.73	206	CLEAR
1222	53.45	8100	60	5.77	0.574	7.56	6.27	19.83	205	CLEAR
1227	53.45	8400	60	5.75	0.582	6.20	6.14	20.33	210	CLEAR
1232	53.45	8700	60	5.70	0.582	5.75	6.14	20.25	215	CLEAR
1235	—	—	—	—	—	—	—	—	—	START SAMPLING

Water Quality Meter (SN) 0160702 AF
Control Box type (SN) MP10-1334
Turbidity Meter (SN) 2843-4501

Pump Intake 60'

SIGNATURE(S): Tony Ngai

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT0601
Sample Location: 08MWT06
Sampled By: CO
C.O.C. No.: 3248 & 3250
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: (6-3-05)-(6-4-05)	Color	NA	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 0900	Visual		Standard	mS/cm	°C	NTU	mg/l	mV
Method: peristaltic	v cloudy	—	7.95	0.736	14.34	>1000	1.78	217.4

PURGE DATA:

Date: 6-2-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 20.83'								
Static Water Level (WL): 18.21'								
One Casing Volume(gal/L): 1.62								
Start Purge (hrs): 1000								
End Purge (hrs): 1038								
Total Purge Time (min): 38								
Total Vol. Purged (gal/L): 4.9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected	COC #
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes	3248
Semivolatiles 8270C (1,4-dioxane only)	4°C	(1) ~~(2)~~ L Glass Amber	Yes	
Total Metals plus Tin (TAL)	4°C/HNO_3	6/4/05 (1) L HDPE 1600 Hrs	Yes	3250
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	6/4/05 (1) L HDPE 1600 Hrs	Yes/No	

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[✓] No[ ] 08GWT0601-F

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Eli Jordan

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MW06
DATE: 6/2/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume ~~(mL/Min.)~~ L	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1000	18.21									start purge, brown
1010	18.88	2.00	200	7.46	0.697	550	4.23	13.82	246.0	cloudy
1020	19.48	3.50	150	7.78	0.676	>1000	3.14	13.88	240.2	v. cloudy.
1030	20.30	4.20	70	7.95	0.736	>1000	1.78	14.34	217.4	v. cloudy.
1038										went dry, end purge
	Will sample	on	6/3/05							

Water Quality Meter (SN) 04C 3884 AB
Control Box type (SN) Geopump 2 # 347
Turbidity Meter (SN) 1728 - 1600

Pump Intake 20.33 BTOR

SIGNATURE(S): Glin Dodson

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT00701
Sample Location: 08MWT 07
Sampled By: T. Rolahn
C.O.C. No.: 3248
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 6-02-05								
Time: 1450								
Method: SAME	Clear	–	5.69	0.173	19.89	47.9	2.90	+198

PURGE DATA:

Date: 6-2-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: Peristaltic								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2"ϕ, PVC								
Total Well Depth (TD): 34.90								
Static Water Level (WL): 14.43								
One Casing Volume(gal/L): 12.6								
Start Purge (hrs): 1045								
End Purge (hrs): 1445								
Total Purge Time (min): 240								
Total Vol. Purged (gal/L): 30.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	MS/MSD	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	9	(2) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	4	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[X] No[ ] 08GWT 00701 -F 20.47' x 0.163 = 3.3 gal or 12.6L

Circle if Applicable:

MS/MSD YES

Duplicate ID No.: —

Signature(s): Terry Kogel

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MW07
DATE: 6-2-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1045	14.43	—	—	—	—	—	—	—	—	Start PURGE
1055	14.50	1300	130	6.07	0.237	+1000	4.64	14.47	+175	Lt. BRN
1105	14.61	2600	130	5.94	0.223	+1000	4.10	14.41	+186	Lt. BRN
1115	14.63	3900	130	5.87	0.218	+1000	3.99	14.39	+189	Lt. BRN
1125	14.64	4200	130	5.81	0.214	914	3.87	14.37	+191	Lt. BRN
1135	14.64	5500	130	5.79	0.208	704	3.68	14.40	+191	Cloudy
1145	14.64	6800	130	5.78	0.203	487	3.53	14.41	+191	Cloudy
1155	14.64	8100	130	5.79	0.198	298	3.41	14.33	+187	Cloudy
1205	14.64	9400	130	5.79	0.195	270	3.34	14.34	+189	Cloudy
1215	14.64	10,700	130	5.78	0.189	215	3.23	14.37	+186	Sl. Cloudy
1225	14.64	12000	130	5.77	0.185	166	3.14	14.46	+186	Sl. Cloudy
1235	14.64	13,300	130	5.75	0.182	155	3.36	14.55	+192	Sl. Cloudy
1245	14.64	14,600	130	5.72	0.178	137	3.11	14.53	+191	Sl. Cloudy
1255	14.62	15,900	130	5.77	0.178	114	3.02	14.77	+190	Sl. Cloudy
1305	14.61	17,200	130	5.77	0.178	102	3.01	14.88	+190	Sl. Cloudy
1315	14.60	18500	130	5.70	0.175	94.8	2.97	14.77	+195	V. Sl. Cloudy
1325	14.60	19800	130	5.72	0.174	88.3	2.95	14.82	+194	V. Sl. Cloudy
1335	14.60	21100	130	5.72	0.173	83.9	2.93	14.79	+194	V. Sl. Cloudy
1345	14.60	22,400	130	5.74	0.175	81.5	2.97	14.83	+194	V. Sl. Cloudy
1355	14.60	23,700	130	5.75	0.176	79.0	3.00	14.87	+194	V. Sl. Cloudy
1405	14.59	25,000	130	5.71	0.175	62.7	2.93	15.01	+196	V. Sl. Cloudy
1415	14.59	26,300	130	5.69	0.174	59.1	2.85	15.07	+197	V. Sl. Cloudy
1425	14.59	27,600	130	5.67	0.173	61.2	2.90	14.98	+199	V. Sl. Cloudy
1435	14.59	28,900	130	5.67	0.172	58.9	2.88	14.97	+200	V. Sl. Cloudy
1445	14.59	30,200	130	5.69	0.173	47.9	2.90	14.99	+198	CLEAR
1450	—	—	—	—	—	—	—	—	—	Start sampling

Water Quality Meter (SN) 01L0702 4F
Control Box type (SN) 328
Turbidity Meter (SN) 2843-4501

Pump Intake 27'

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT 008 01
Sample Location: 08MWT 08
Sampled By: T. Rosahn
C.O.C. No.: 3250
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6/4/05	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time: 1135								
Method: SAME	CLEAR	–	5.52	0.308	18.41	2.32	4.10	+297

PURGE DATA:

Date: 6/4/05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: Peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" ø PVC								
Total Well Depth (TD): 32.60								
Static Water Level (WL): 11.35								
One Casing Volume(gal/L): 13.1								
Start Purge (hrs): 0850								
End Purge (hrs): 1130								
Total Purge Time (min): 160								
Total Vol. Purged (gal/L): 14.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWT ——— -F

21.25' x 0.163 = 3.5 gal or 13.1L

15' SCREEN 32.60
−15.00
17.60 Top of Screen

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Ty Rosahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MW108
DATE: 6-04-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0850	11.35	—	—	—	—	—	—	—	—	START PURGE
0900	12.40	1400	140	5.73	0.286	22.1	4.58	16.97	+198	CLEAR
0910	12.53	2400	100	5.68	0.277	10.18	4.48	17.05	207	CLEAR
0920	12.63	3400	100	5.58	0.266	7.78	4.40	17.22	229	CLEAR
0930	12.71	4400	100	5.55	0.267	9.61	4.33	17.35	235	CLEAR
0940	12.79	5400	100	5.57	0.276	10.75	4.26	17.52	247	CLEAR
0950	12.85	6400	100	5.60	0.281	13.2	4.19	17.61	256	CLEAR
1000	12.99	7600	120	5.50	0.284	6.58	4.13	17.90	275	CLEAR
1010	12.88	8400	80	5.75	0.289	5.43	4.09	18.45	268	CLEAR
1020	12.83	9200	80	5.75	0.292	4.53	4.13	18.59	270	CLEAR
1030	12.81	10000	80	5.73	0.295	4.19	4.11	18.67	272	CLEAR
1040	12.81	10800	80	5.67	0.299	3.48	4.11	18.77	277	CLEAR
1050	12.81	11600	80	5.66	0.302	3.08	4.12	18.73	283	CLEAR
1100	12.81	12400	80	5.60	0.303	3.06	4.12	18.70	288	CLEAR
1110	12.84	13200	80	5.58	0.304	3.01	4.13	18.50	309	CLEAR
1115	12.82	13600	80	5.69	0.308	2.90	4.12	18.54	292	CLEAR
1120	12.81	14000	80	5.58	0.307	2.72	4.11	18.50	295	CLEAR
1125	12.82	14400	80	5.50	0.307	2.51	4.13	18.25	295	CLEAR
1130	12.82	14800	80	5.52	0.308	2.32	4.10	18.41	297	CLEAR
1135	—	—	—	—	—	—	—	—	—	START SAMPLING

Water Quality Meter (SN) 0L0702 AF
Control Box type (SN) 328
Turbidity Meter (SN) 2843-4501

Pump Intake 25'

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT0901
Sample Location: 08MWT09
Sampled By: CD
C.O.C. No.: 3248
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6-3-05	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time: 1405								
Method: peristaltic	clear	–	4.47	0.700	15.77	4.9	5.22	196.0

PURGE DATA:

Date: 6-3-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: peristaltic								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 32.61'								
Static Water Level (WL): 18.86'								
One Casing Volume(gal/L): 8.29								
Start Purge (hrs): 1000								
End Purge (hrs): 1400								
Total Purge Time (min): 240								
Total Vol. Purged (gal/L) 20.1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[✓] 08GWT_____-F

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Colin Dooley

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MWT09
DATE: 6-3-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume ~~(mL/Min.)~~ L	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1000	18.86									Start purge, clear
1010	19.37	0.80	80	6.96	0.754	30	6.89	15.84	157.8	clear
1020	19.78	1.60	80	5.62	0.743	16	6.24	15.16	156.3	clear
1030	20.24	2.60	100	5.21	0.738	14	6.55	15.29	157.7	clear
1040	20.75	3.60	100	5.12	0.728	8.5	6.52	14.74	160.8	clear
1050	21.39	4.60	100	5.10	0.726	9.8	6.47	14.71	162.3	clear
1100	21.95	5.60	100	5.11	0.720	9.9	6.35	14.70	163.5	clear
1110	22.48	6.60	100	5.11	0.706	11	6.28	14.56	167.5	clear
1120	22.69	7.30	70	5.17	0.705	11	6.08	16.14	166.7	clear
1130	22.89	8.00	70	5.11	0.710	11	6.12	16.41	169.0	clear
1140	23.04	8.70	70	5.03	0.713	9.7	6.08	16.81	172.9	clear
1150	23.23	9.40	70	4.87	0.708	6.3	5.91	17.54	182.2	clear
1200	23.40	10.10	70	4.65	0.691	6.4	5.81	17.27	200.1	clear
1210	23.61	10.80	70	4.52	0.679	3.6	5.72	16.84	207.9	clear
1220	23.83	11.50	70	4.41	0.680	3.7	5.62	17.01	210.4	clear
1230	24.10	12.30	80	4.36	0.683	3.7	5.59	17.11	211.5	clear
1240	24.31	13.10	80	4.34	0.691	3.1	5.49	17.59	210.1	clear
1250	24.49	13.90	80	4.39	0.691	5.3	5.42	17.37	209.6	clear
1300	24.63	14.70	80	4.40	0.703	2.6	5.33	17.91	207.8	clear
1310	24.82	15.50	80	4.44	0.705	2.5	5.31	17.73	206.4	clear
1320	24.96	16.30	80	4.38	0.704	3.0	5.26	17.70	205.9	clear
1330	25.10	17.10	80	4.38	0.711	3.1	5.21	17.83	209.8	clear
1340	25.31	18.10	100	4.48	0.705	3.8	5.24	17.16	201.5	clear
1350	25.58	19.10	100	4.46	0.709	4.2	5.21	16.88	197.9	clear
1400	25.96	20.10	100	4.47	0.700	4.9	5.22	15.77	196.0	clear, end ~~[illegible]~~ purge
1405										Start sample

Water Quality Meter (SN) 04C3884 AB
Control Box type (SN) geopump 2 # 347
Turbidity Meter (SN) 1728 - 1600

Pump Intake 32.11' BTOC

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT0001
Sample Location: 08MWT10
Sampled By: CD
C.O.C. No.: 3250
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 6-3-05								
Time: 1705								
Method: peristaltic	clear	—	7.41	0.503	14.22	5.0	1.59	41.5

PURGE DATA:

Date: 6-3-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 32.97'								
Static Water Level (WL): 15.44'								
One Casing Volume(gal/L): 10.53								
Start Purge (hrs): 1530								
End Purge (hrs): 1700								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 11.70								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[✓] 08GWT_____-F

Circle if Applicable:

MS/MSD —

Duplicate ID No.: _____

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MWT10
DATE: 6-3-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1530	15.44									Start purge, clear
1540	16.19	1.30	130	6.71	0.516	60	4.83	14.50	178.7	clear
1550	16.57	2.60	130	6.90	0.510	26	4.60	14.37	160.8	clear
1600	16.76	3.90	130	6.87	0.507	18	4.27	14.23	147.0	clear
1610	16.92	5.20	130	6.93	0.506	12	3.40	14.22	94.1	clear
1620	16.98	6.50	130	6.99	0.506	6.6	2.72	14.18	67.4	clear
1630	16.94	7.80	130	7.15	0.507	6.5	2.36	14.29	64.9	clear
1640	16.96	9.10	130	7.09	0.507	7.2	2.17	14.36	53.8	clear
1650	16.98	10.40	130	7.38	0.505	6.0	1.75	14.33	46.5	clear
1655	17.00	11.05	130	7.40	0.501	3.7	1.67	14.00	43.3	clear
1700	17.02	11.70	130	7.41	0.503	5.0	1.59	14.22	41.5	clear, end purge
1703										Start sample

Water Quality Meter (SN) 04C3884 AB
Control Box type (SN) geopump 2 #347
Turbidity Meter (SN) 1728-1600

Pump Intake 14.94' bTOC

SIGNATURE(S): Colin Jordan

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 08GWT0101
Sample Location: 08MWT11
Sampled By: CD
C.O.C. No.: 3250
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 6-4-05								
Time: 1245								
Method: peristaltic	cloudy	—	5.98	0.223	17.13	485	5.05	293.8

PURGE DATA:

Date: 6-4-05	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method: peristaltic								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC								
Total Well Depth (TD): 32.80'								
Static Water Level (WL): 9.16'								
One Casing Volume(gal/L): 14.25								
Start Purge (hrs): 0840								
End Purge (hrs): 1240								
Total Purge Time (min): 240								
Total Vol. Purged (gal/L): 26.9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes
Dissolved Metals plus Tin (TAL)	4°C/HNO_3	(1) L HDPE	Yes/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[✓] No[ ] 08GWT 0101 -F

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Chris Jacobs

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 1245

WELL ID.: 08MWT11
DATE: 6-4-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (mL/Min.)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0840	9.16									clear, start purge
0850	11.20	1.50	150	5.74	0.215	42.4	6.78	15.04	256.3	clear
0900	12.98	3.00	150	5.77	0.213	33.2	6.79	14.95	258.0	clear
0910	14.81	4.50	150	5.70	0.205	27.8	6.62	14.83	255.5	clear
0920	16.38	6.00	150	5.53	0.193	16.5	6.29	14.87	252.2	clear
0930	17.80	7.50	150	5.40	0.187	12.1	5.96	15.35	248.1	clear
0940	18.48	9.00	150	5.37	0.183	8.06	5.99	15.21	243.8	clear
0950	18.97	10.50	150	5.39	0.188	44.5	5.73	16.67	238.8	clear
1000	19.23	11.50	100	5.57	0.196	60.5	5.68	16.67	234.3	slightly cloudy
1010	19.50	12.30	80	5.60	0.202	82.9	5.67	17.37	239.5	slightly cloudy
1020	19.81	13.10	80	5.57	0.203	121	5.66	17.18	246.0	sltly. cloudy
1030	20.14	13.90	80	5.56	0.205	142	5.60	17.35	253.0	sltly. cloudy
1040	20.08	14.90	100	5.66	0.220	149	5.23	20.73	248.8	sltly. cloudy, pump stopped
1050	20.49	15.90	100	5.60	0.207	171	5.61	16.84	258.8	slightly cloudy
1100	20.81	16.90	100	5.45	0.205	181	5.65	16.19	267.5	sltly. cloudy
1110	21.18	17.90	100	5.67	0.209	220	5.55	16.70	268.3	sltly. cloudy
1120	21.48	18.90	100	5.78	0.210	270	5.47	16.71	268.7	cloudy
1130	21.80	19.90	100	5.79	0.212	295	5.47	17.04	271.6	cloudy
1140	22.13	20.90	100	5.79	0.214	293	5.43	17.25	277.5	cloudy
1150	22.48	21.90	100	5.85	0.218	310	5.38	17.51	277.5	cloudy
1200	22.81	22.90	100	5.84	0.219	337	5.34	17.73	283.3	cloudy
1210	23.05	23.90	100	5.92	0.220	341	5.17	17.23	287.6	cloudy
1220	23.31	24.90	100	5.99	0.224	412	5.01	17.36	287.5	cloudy
1230	23.63	25.90	100	5.97	0.222	445	4.91	17.31	289.7	cloudy
1240	23.92	26.90	100	5.98	0.223	485	5.05	17.13	293.8	cloudy, end purge
1245										start sample

Water Quality Meter (SN) 04C3884 AB
Control Box type (SN) geopump 2 # 347
Turbidity Meter (SN) 1728-1606

Pump Intake 32.30' bTOC

SIGNATURE(S): Chris Dooley

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: 08GWTW –
Sample Location: 08TW05
Sampled By: –
C.O.C. No.: –
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 6/04/05	Color	NA	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: –	Visual		Standard	mS/cm	°C	NTU	mg/l	mV
Method: –	NA							

PURGE DATA:

Date: NA	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ NO
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	~~Yes~~
Total Metals plus Tin	4°C/HNO_3	(1) L HDPE	~~Yes~~
Dissolved Metals plus Tin	4°C/HNO_3	(1) L HDPE	~~Yes~~/No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWTW_____-F

Converted Boring 08SB NA

DRY

Circle if Applicable:

MS/MSD	Duplicate ID No.:
–	–

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: 08GWTW006
Sample Location: 08TW06
Sampled By: T. ROJAHN
C.O.C. No.: 3250
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 8/04/05								
Time: 1345								
Method: Peristaltic	Light Brn	NA						

PURGE DATA:

Date: NA	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Collected
Volatiles 8260B	4°C/HCl	6/04	(3) 40ml Vials	Yes
Semivolatiles 8270C (1,4-dioxane only)	4°C	6/04 (1)	(2) L Glass Amber ~ 500ml	Yes
Total Metals plus Tin (TAL)	4°C/HNO_3		(1) L HDPE	Yes No
Dissolved Metals plus Tin (TAL)	4°C/HNO_3		(1) L HDPE	Yes No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWTW — -F

Converted Boring 08SB NA

All available water went to sampling.
No vol. for metals samples.

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Tony Rojahn

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, SWMU 8
Project No.: N1245

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temporary Well
[] QA Sample Type:

Sample ID No.: 08GWTW —
Sample Location: 08TW07
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	NA	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Date: 6/04/05								
Time: —								
Method: —	NA							

PURGE DATA:

Date: NA	Volume	Time	pH	S.C.	Temp. (C)	Turbidity	DO	ORP
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles 8260B	4°C/HCl	(3) 40ml Vials	~~Yes~~ NO
Semivolatiles 8270C (1,4-dioxane only)	4°C	(2) L Glass Amber	Yes
Total Metals plus Tin	4°C/HNO_3	(1) L HDPE	~~Yes~~
Dissolved Metals plus Tin	4°C/HNO_3	(1) L HDPE	~~Yes~~ No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 08GWTW_____-F

Converted Boring 08SB NA

DRY

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): [illegible]

ROUND 3

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT00102
Well ID	08MWT01
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/13/05
Modified By	John Wright
Modified Date	2/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/13/05
Purge Method	Low flow - Peristaltic
Sampling Method	Low flow - Peristaltic
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	50.14
Total Well Depth (ft.)	55.0
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 04C2866 AB
Pump Control Box	Yes MP10 1843
Turbidity Meter	Yes 4079 1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/13/05	12:55	50.41	100	Other	NA	NA	NA	NA	NA	NA	NA	NA	0
10/13/05	13:05	50.51	100	Slightly Turbid	5.66	.853	9.10		16.06	236.6	NA	NA	1000
10/13/05	13:15	50.51	100	Slightly Turbid	5.70	.855	9.04	278	16.31	236.2	NA	NA	1000
10/13/05	13:25	50.51	100	Slightly Turbid	5.80	.862	8.85		16.50	240.1	NA	NA	1000

10/13/05	13:35	50.51	100	Slightly Turbid	5.76	.870	8.80	104.4	16.79	246.6	NA	NA	1000
10/13/05	13:45	50.51	100	Slightly Turbid	5.75	.865	8.85	87.5	16.45	258.1	NA	NA	1000
10/13/05	13:55	50.51	100	Slightly Turbid	5.71	.880	8.79	64.2	16.93	263.8	NA	NA	1000
10/13/05	14:05	50.51	100	Slightly Turbid	5.70	.885	8.83	54.6	17.16	268.4	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/13/05	14:05	50.51	100	Slightly Turbid	5.73	.893	8.73	43.2	17.31	268.1	NA	NA	1000
10/13/05	14:05	50.51	100	Slightly Turbid	5.73	.897	8.73	24.8	17.40	269.8	NA	NA	1000
10/13/05	14:05	50.51	100	Slightly Turbid	5.69	.898	8.70	21.7	17.46	272.9	NA	NA	1000
10/13/05	14:05	50.51	100	Clear	5.67	.894	8.76	17.0	17.25	276.1	NA	NA	1000
10/13/05	14:05	50.51	100	Clear	5.62	.895	8.70	15.1	17.47	275.7	NA	NA	1000
10/13/05	14:05	50.51	100	Clear	5.62	.894	8.78	8.7	17.28	267.9	NA	NA	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/13/05	15:10	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10142005-9
✓	10/13/05	15:10	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10142005-9

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT00202
Well ID	08MWT02
Sampled By	Jim Goerdt
Concentration	Low Concentration

Created By	John Wright
Created Date	10/10/05
Modified By	John Wright
Modified Date	2/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/11/05
Purge Method	Low flow - Peristaltic
Sampling Method	Low flow - Peristaltic
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	4.56
Total Well Depth (ft.)	14.50
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 04C2866AB
Pump Control Box	Yes 440
Turbidity Meter	Yes 4079-1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/11/05	09:10	4.56	110	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0

10/11/05	09:20	7.41	110	Clear	6.06	.527	3.62	15.6	17.60	16.3	NA	NA	1100
10/11/05	09:30	9.02	110	Clear	6.06	.526	3.92	5.15	17.66	15.5	NA	NA	1100
10/11/05	09:40	9.43	110	Clear	6.07	.505	4.00	4.89	17.84	60.3	NA	NA	1100
10/11/05	09:50	9.90	100	Clear	6.06	.478	4.59	2.09	17.98	107.3	NA	NA	1000
10/11/05	10:00	10.16	100	Clear	6.07	.465	4.44	1.87	17.87	56.1	NA	NA	1000
10/11/05	10:10	10.38	100	Clear	6.10	.458	4.77	1.72	17.88	40.2	NA	NA	1000
10/11/05	10:20	10.67	100	Clear	6.09	.447	4.80	1.12	17.88	59.4	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/11/05	10:30	10.85	100	Clear	6.08	.435	4..54	1.64	17.85	70.9	NA	NA	1000
10/11/05	10:40	11.21	100	Clear	6.04	.431	3.97	1.61	17.85	76.8	NA	NA	1000
10/11/05	10:50	11.46	100	Clear	6.04	.426	3.28	1.95	17.85	94.9	NA	NA	1000
10/11/05	11:00	11.92	100	Clear	6.02	.423	3.21	2.34	17.84	98.7	NA	NA	1000
10/11/05	11:10	12.18	100	Clear	6.01	.413	2.91	2.48	17.82	106.5	NA	NA	1000
10/11/05	11:20	12.32	100	Clear	5.96	.400	2.74	2.51	17.79	118.0	NA	NA	1000
10/11/05	11:30	12.80	100	Clear	5.92	.396	2.71	2.56	17.79	129.7	NA	NA	1000
10/11/05	11:40	13.11	100	Clear	5.93	.401	2.73	2.74	17.76	137.5	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/11/05	11:40	13.32	100	Clear	5.97	.413	2.85	2.96	17.82	129.2	NA	NA	1000
10/11/05	11:40	14.23	100	Clear	6.05	.447	2.8	2.75	17.70	144.2	NA	NA	5000
10/11/05	11:40	14.78	100	Clear	6.08	.453	2.65	1.84	17.64	142.4	NA	NA	1000
10/11/05	11:40	15.27	100	Clear	6.05	.456	2.54	1.16	17.56	143.9	NA	NA	1000
10/11/05	11:40	15.51	100	Clear	6.06	.454	2.41	1.27	17.56	142.4	NA	NA	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✗	10/11/05	09:30	NONE	NONE	-Select-		-Select-	-Select-		
✓	10/11/05	13:13	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10122005-8
✓	10/11/05	13:13	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10122005-8
✗		13:13	NONE	NONE	-Select-		-Select-	-Select-		

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT00302
Well ID	08MWT03
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/14/05
Modified By	John Wright
Modified Date	2/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/14/05
Purge Method	Low flow - Peristaltic
Sampling Method	Low flow - Peristaltic
MS/MSD Collected	N
Duplicate Collected/b>	Y
Duplicate ID	08FD10140501

Static Water Level (ft.)	53.32
Total Well Depth (ft.)	60.00
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes
Pump Control Box	Yes
Turbidity Meter	Yes

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/14/05	09:35	53.32	150	Other	NA	NA	NA	NA	NA	NA	NA	NA	0
10/14/05	09:45	53.60	150	Slightly Turbid	5.67	.410	1.19	82.1	16.63	226.4	NA	NA	1500
10/14/05	09:55	53.60	150	Slightly Turbid	5.79	.413	1.02	54.3	17.06	228.3	NA	NA	1500
10/14/05	10:05	53.60	150	Slightly Turbid	5.96	.405	0.931	51.6	16.61	225.6	NA	NA	1500

10/14/05	10:15	53.60	150	Clear	6.06	NA	NA	NA	NA	NA	NA	NA	1500
10/14/05	10:25	53.60	150	Clear	5.48	.414	5.78	48.2	16.76	263.4	NA	NA	1500
10/14/05	10:35	53.57	150	Clear	5.47	.414	5.82	44.3	16.95	268.7	NA	NA	1500
10/14/05	10:45	53.58	150	Clear	5.47	.414	5.96	46.2	17.00	272.1	NA	NA	1500

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

GROUNDWATER SAMPLE LOG

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/14/05	10:55	53.58	150	Clear	5.46	.414	5.46	47.7	16.94	285.3	NA	NA	1500
10/14/05	11:05	53.94	150	Clear	5.42	.414	6.35	37.3	17.24	296.3	NA	NA	1500
10/14/05	11:15	53.98	150	Clear	5.42	.414	6.49	32.7	17.10	303.4	NA	NA	1500
10/14/05	11:25	53.58	150	Clear	5.42	.415	6.43	27.3	17.12	309.8	NA	NA	1500
10/14/05	11:35	53.95	150	Clear	5.40	.413	6.51	25.2	17.14	317.5	NA	NA	1500
10/14/05	11:45	53.97	150	Clear	5.39	.413	6.40	24.7	17.08	322.3	NA	NA	1500
10/14/05	11:55		150	Clear	5.39	.416	6.20	21.1	17.29	327.8	NA	NA\	1500
10/14/05	12:05	53.60	150	Clear	5.39	.421	6.24	19.2	17.81	328.6	NA	NA	1500

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/14/05	12:05	53.58	150	Clear	5.39	.427	6.39	14.1	18.22	333.3	NA	NA	1500
10/14/05	12:05	53,59	150	Clear	5.38	.429	6.40	11.3	18.31	334.1	NA	NA	1500
10/14/05	12:05	53.98	150	Clear	5.38	.431	6.43	9.2	18.39	337.2	NA	NA	1500

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/14/05	12:40	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10142005-9
✓	10/14/05	12:40	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10142005-9

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT00402
Well ID	08MWT04
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/11/05
Modified By	John Wright
Modified Date	2/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/11/05
Purge Method	Low flow - Peristaltic
Sampling Method	Low flow - Peristaltic
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	8.71
Total Well Depth (ft.)	12.00
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 04C2866 AB
Pump Control Box	Yes 440
Turbidity Meter	Yes 4079 1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/11/05	15:40	8.71	130	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
10/11/05	15:50	8.93	130	Slightly Turbid	6.56	.472	0.60	112	19.11	-80.8	NA	NA	1300
10/11/05	16:00	8.92	130	Slightly Turbid	6.56	.464	0.41	98	19.03	-82.5	NA	NA	1300
10/11/05	16:10	8.92	130	Slightly Turbid	6.62	.467	0.33	22	18.89	-93.1	NA	NA	1300

10/11/05	16:20	8.92	130	Clear	6.65	.467	0.29	7.37	18.78	-98.1	NA	NA	1300
10/11/05	16:33	8.93	130	Clear	6.66	.468	0.28	5.5	18.65	-100.7	NA	NA	1690
10/11/05	16:40	8.92	130	Clear	6.67	.468	0.26	4.6	18.63	-102.8	NA	NA	910

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/11/05	16:45	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10122005-8
✓	10/11/05	16:45	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10122005-8

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

GROUNDWATER SAMPLE LOG

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT00502
Well ID	08MWT05
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/14/05
Modified By	John Wright
Modified Date	2/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/14/05
Purge Method	Low flow - Bladder
Sampling Method	Low flow - Bladder
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	54.61
Total Well Depth (ft.)	60.00
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 04C2866 AB
Pump Control Box	Yes MP10 1483
Turbidity Meter	Yes 4079 1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/14/05	15:05	54.61	120	Other	NA	NA	NA	NA	NA	NA	NA	NA	0
10/14/05	15:15	55.39	120	Slightly Turbid	5.15	.499	3.47	164	17.22	251.1	NA	NA	1200
10/14/05	15:25	55.70	120	Slightly Turbid	5.03	.498	3.38	88.6	17.18	276.5	NA	NA	1200
10/14/05	15:35	55.85	120	Slightly Turbid	5.04	.495	3.59	52.7	17.30	291.6	NA	NA	1200

10/14/05	15:45	56.10	120	Slightly Turbid	5.09	.501	3.88	44.5	17.23	299.2	NA	NA	1200
10/14/05	15:55	55.92	120	Slightly Turbid	5.13	.507	3.90	39.7	17.26	308.5	NA	NA	1200
10/14/05	16:05	56.08	120	Slightly Turbid	5.14	.508	3.87	28.2	17.10	311.0	NA	NA	1200
10/14/05	16:15	56.17	120	Clear	5.16	.506	3.82	22.7	17.12	307.8	NA	NA	1200

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

GROUNDWATER SAMPLE LOG

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/14/05	16:15	56.20	100	Clear	5.19	.512	3.78	13.10	17.10	313.2	NA	NA	1000
10/14/05	16:15	56.10	100	Clear	5.22	.518	3.73	8.29	17.42	311.5	NA	NA	1000

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Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/14/05	16:40	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10172005-10
✓	10/14/05	16:40	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10172005-10

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Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT00602
Well ID	08MWT06
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/11/05
Modified By	John Wright
Modified Date	2/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/11/05
Purge Method	Low flow - Peristaltic
Sampling Method	Low flow - Peristaltic
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	18.66
Total Well Depth (ft.)	20.83
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 04C2866 AB
Pump Control Box	Yes 440
Turbidity Meter	Yes 4079-1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/11/05	14:15	18.66	100	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
10/11/05	14:25	19.21	100	Cloudy	5.98	.695	0.59	213	17.49	77.7	NA	NA	1000
10/11/05	14:35	19.73	100	Cloudy	5.74	.568	0.44	187	17.41	91.8	NA	NA	1000
10/11/05	14:45	20.65	100	Cloudy	5.78	.608	0.37	154	17.33	84.2	NA	NA	1000

10/11/05	14:49	NA	100	Cloudy	5.78	.608	0.37	154	17.33	84.2			400
10/11/05	14:50		100	Cloudy	NA	NA	NA	NA	NA	NA	NA	NA	100

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/12/05	11:25	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10122005-8
✓	10/13/05	16:45	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10142005-9

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08GWT00702	**Created By**	James Goerdt
TtNUS Project #	112GN1245	**Well ID**		**Created Date**	10/15/05
Task/Contract #	CTO 0331	**Sampled By**	James Goerdt	**Modified By**	
WBS Code #	Open	**Concentration**	Low Concentration	**Modified Date**	
Well Type	-Select-			**Printed By**	James Goerdt
QA Sample Type				**Printed Date**	3/30/06

Well and Sample Data

Date	10/15/05	**Static Water Level (ft.)**	14.84	**Water Quality Meter**	Yes 04C2866 AB
Purge Method	Low flow - Peristaltic	**Total Well Depth (ft.)**	34.90	**Pump Control Box**	Yes 440
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	Yes 4079 1103
MS/MSD Collected	N	**Well Volumes Req.**			
Duplicate Collected/b>	N	**Monitor Reading (ppm)**	NA		
Duplicate ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	13:15	14.84	130	Other	NA	NA	NA	NA	NA	NA	NA	NA	0
10/15/05	13:25	15.02	130	Slightly Turbid	6.12	.325	2.32	310	19.26	174.4	NA	NA	1300
10/15/05	13:35	15.08	130	Slightly Turbid	5.92	.320	2.33	207	18.96	203.3	NA	NA	1300
10/15/05	13:45	15.14	130	Slightly Turbid	5.88	.314	2.37	NA	18.91	213.5	NA	NA	1300

10/15/05	13:55	15.21	130	Slightly Turbid	5.90	.311	2.35	75	18.86	218.2	NA	NA	1300
10/15/05	14:05	15.18	100	Clear	5.96	.317	2.48	NA	19.72	215.7	NA	NA	1000
10/15/05	14:15	15.12	100	Clear	6.01	.318	2.43	24	19.65	212.2	NA	NA	1000
10/15/05	14:25		100	Clear	6.10	.318	2.34	NA	19.65	205.7	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	14:25		100	Clear	6.10	.315	2.31	NA	19.57	206.3	NA	NA	-2000
10/15/05	14:25		100	Clear	6.11	.316	2.28	NA	19.51	206.9	NA	NA	-1000
10/15/05	14:25	15.12	100	Clear	6.12	.316	2.25	NA	19.48	207.3	NA	NA	3000
10/15/05	14:25	15.12	100	Clear	6.11	.317	2.25	10	19.58	211.9	NA	NA	1000
10/15/05	14:25	15.12	100	Clear	6.09	.316	2.23	5.5	19.51	215.4	NA	NA	500

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/15/05	15:15	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112GN1245-10172005-10
✓	10/15/05	15:15	SW-846 8270C (1,4-dioxane only)	SVOC	4°C	2	Glass	1L Amber		112GN1245-10172005-10

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

GROUNDWATER SAMPLE LOG

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well Data
QA Sample Type	

Sample ID #	08GWT00802
Well ID	
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/15/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/15/05
Purge Method	Low flow - Peristaltic
Sampling Method	
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	10.97
Total Well Depth (ft.)	32.60
Well Riser Diameter (in.)	2"
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 04C2866 AB
Pump Control Box	Yes 440
Turbidity Meter	Yes 4079 1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	08:55	10.97	110	Other	NA	NA	NA	NA	NA	NA	NA	NA	0
10/15/05	09:05	11.99	110	Clear	6.09	.401	0.97	2.68	18.33	175.3	NA	NA	1100
10/15/05	09:15	12.21	110	Clear	6.11	.403	0.96	1.83	18.35	160.6	NA	NA	1100
10/15/05	09:25	12.34	110	Clear	6.11	.402	0.87	1.21	18.45	154.1	NA	NA	1100

10/15/05	09:35	12.46	110	Clear	6.12	.396	0.84	NA	18.37	153.1	NA	NA	1100
10/15/05	09:45	12.59	110	Clear	6.13	.390	0.79	NA	18.49	157.6	NA	NA	1100
10/15/05	09:55	12.66	110	Clear	6.14	.369	0.78	NA	18.53	167.1	NA	NA	1100
10/15/05	10:05	12.72	110	Clear	6.15	.332	0.80	NA	18.55	173.0	NA	NA	1100

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	10:05	12.81	110	Clear	6.17	.303	0.95	NA	18.62	177.9	NA	NA	1100
10/15/05	10:05	12.85	110	Clear	6.16	.291	1.13	1.25	18.76	184.8	NA	NA	1100
10/15/05	10:05	12.91	110	Clear	6.17	.290	1.27	1.29	18.88	191.4	NA	NA	1100
10/15/05	10:05	12.92	110	Clear	6.18	.287	1.43	NA	18.91	200.9	NA	NA	1100
10/15/05	10:05	12.95	110	Clear	6.17	.285	1.45	1.23	19.01	211.4	NA	NA	1100
10/15/05	10:05	12.94	110	Clear	6.16	.284	1.48	0.87	19.01	216.1	NA	NA	1100

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/15/05	11:10	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10172005-10
✓	10/15/05	11:10	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10172005-10

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	08GWT00902	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Well ID**		**Created Date**	10/15/05
Task/Contract #	CTO 0331	**Sampled By**	Terry Rojahn	**Modified By**	
WBS Code #	Open	**Concentration**	Low Concentration	**Modified Date**	
Well Type	Monitoring Well Data			**Printed By**	James Goerdt
QA Sample Type				**Printed Date**	3/30/06

Well and Sample Data

Date	10/15/05	**Static Water Level (ft.)**	21.64	**Water Quality Meter**	Yes 99K104 AB
Purge Method	Low flow - Peristaltic	**Total Well Depth (ft.)**	32.61	**Pump Control Box**	Yes 310
Sampling Method		**Well Riser Diameter (in.)**	2	**Turbidity Meter**	Yes 1759-1800
MS/MSD Collected	N	**Well Volumes Req.**			
Duplicate Collected/b>	N	**Monitor Reading (ppm)**	NA		
Duplicate ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	09:55	21.64	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
10/15/05	10:05	22.50	100	Clear	5.81	1.010	0.75	24	16.48	62	NA	NA	1000
10/15/05	10:15	23.05	100	Clear	5.41	0.770	0.75	15	16.86	101	NA	NA	1000
10/15/05	10:25	23.35	70	Clear	5.24	0.704	0.64	11	16.67	139	NA	NA	700

10/15/05	10:35	23.72	80	Clear	5.07	0.702	0.65	11	17.50	260	NA	NA	800
10/15/05	10:45	24.08	80	Clear	4.75	0.688	0.72	10	17.75	433	NA	NA	800
10/15/05	10:55	24.35	80	Clear	4.40	0.651	1.46	6.1	17.98	562	NA	NA	800
10/15/05	11:05	24.67	80	Clear	4.10	0.620	1.88	3.0	17.95	608	NA	NA	800

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	11:15	24.96	80	Clear	4.31	0.638	1.65	3.9	18.09	623	NA	NA	800
10/15/05	11:25	25.30	80	Clear	4.15	0.648	1.41	3.1	18.18	634	NA	NA	800
10/15/05	11:35	25.61	80	Clear	3.98	0.665	1.26	3.8	18.35	651	NA	NA	800
10/15/05	11:45	25.94	80	Clear	4.20	0.681	1.10	3.6	18.72	656	NA	NA	800
10/15/05	11:55	26.21	80	Clear	4.11	0.694	1.01	3.4	18.78	663	NA	NA	800
10/15/05	12:05	26.52	80	Clear	4.02	0.709	0.87	4.5	18.81	670	NA	NA	800
10/15/05	12:15	26.79	70	Clear	4.05	0.722	0.85	4.2	18.90	675	NA	NA	700
10/15/05	12:25	27.05	70	Clear	4.03	0.729	0.76	4.0	18.96	679	NA	NA	700

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	12:35	27.31	80	Clear	3.98	0.731	0.77	3.9	18.82	686	NA	NA	800
10/15/05	12:45	27.55	70	Clear	3.99	0.740	0.73	3.7	18.91	692	NA	NA	700
10/15/05	12:55	27.81	70	Clear	3.94	0.746	0.60	3.2	18.94	698	NA	NA	700
10/15/05	13:05	28.05	70	Clear	4.17	0.752	0.55	3.3	18.96	697	NA	NA	700
10/15/05	13:15	28.30	70	Clear	4.08	0.748	0.54	4.0	18.66	702	NA	NA	700
10/15/05	13:25	28.55	70	Clear	3.97	0.747	0.55	4.8	18.52	710	NA	NA	700
10/15/05	13:35	28.79	70	Clear	4.02	0.746	0.57	6.3	18.39	713	NA	NA	700
10/15/05	13:45	29.01	70	Clear	4.08	0.749	0.51	5.2	18.26	714	NA	NA	700

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	13:45	29.25	70	Clear	4.22	0.762	0.47	4.2	18.06	709	NA	NA	700

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/15/05	13:57	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10172005-10
✓	10/15/05	13:57	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10172005-10

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well Data
QA Sample Type	MS/MSD

Sample ID #	08GWT01002
Well ID	
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/12/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/12/05
Purge Method	Low flow - Peristaltic
Sampling Method	
MS/MSD Collected	
Duplicate Collected/b>	
Duplicate ID	

Static Water Level (ft.)	15.09
Total Well Depth (ft.)	33
Well Riser Diameter (in.)	2"
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes
Pump Control Box	Yes 440
Turbidity Meter	Yes 4079 1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/12/05	08:45	15.09		Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
10/12/05	08:55	15.71	130	Slightly Turbid	6.50	.561	0.71	327	15.34	-6.9	NA	NA	1300
10/12/05	09:05	15.86	130	Slightly Turbid	6.53	.558	0.56	165	15.20	-10.4	NA	NA	1300
10/12/05	09:15	15.93	130	Slightly Turbid	6.57	.554	0.46	111	15.19	-14.5	NA	NA	1300

10/12/05	09:25	15.98	130	Clear	6.60	.554	0.43	56.0	15.21	-18.9	NA	NA	1300
10/12/05	09:35	16.02	130	Clear	6.62	.553	0.40	17.0	15.20	-22.0	NA	NA	1300
10/12/05	09:45	15.98	120	Clear	6.66	.550	0.40	12.0	15.37	-25.0	NA	NA	1200
10/12/05	09:55	15.96	120	Clear	6.68	.549	0.39	9.51	15.38	-26.7	NA	NA	1200

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/12/05	09:55	15.99	120	Clear	6.69	.548	0.38	7.81	15.46	-27.6	NA	NA	1200
10/12/05	09:55	15.98	120	Clear	6.71	.547	0.37	8.05	15.53	-29.4	NA	NA	1560

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/12/05	10:20	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	9	Glass	40ml vials		112GN1245-10122005-8
✓	10/12/05	10:20	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	6	Glass	1L Amber		112GN1245-10122005-8

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well Data
QA Sample Type	

Sample ID #	08GWT01102
Well ID	
Sampled By	James Goerdt
Concentration	Low Concentration

Created By	James Goerdt
Created Date	10/12/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/12/05
Purge Method	Low flow - Peristaltic
Sampling Method	
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	9.75
Total Well Depth (ft.)	32.80
Well Riser Diameter (in.)	2"
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 04C2866 AB
Pump Control Box	Yes 440
Turbidity Meter	Yes 4079 1103

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/12/05	13:20	9.75	160	Other	NA	NA	NA	NA	NA	NA	NA	NA	0
10/12/05	13:30	12.16	160	Slightly Turbid	5.89	.214	0.42	64.4	16.96	96.8	NA	NA	1600
10/12/05	13:40	13.32	100	Clear	5.83	.216	0.47	48.1	18.13	118.0	NA	NA	1000
10/12/05	13:50	14.12	100	Clear	5.76	.206	0.43	22.8	17.74	139.2	NA	NA	1000

10/12/05	14:00	15.35	100	Clear	5.72	.198	0.45	15.8	17.38	168.9	NA	NA	1000
10/12/05	14:10	16.59	100	Clear	5.67	.193	0.46	6.66	17.29	170.6	NA	NA	1000
10/12/05	14:20	17.69	100	Clear	5.64	.189	0.46	5.81	17.25	179.6	NA	NA	1000
10/12/05	14:30	17.98	100	Clear	5.63	.188	0.47	3.65	17.28	181.9	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/12/05	14:40	17.98	100	Clear	5.62	.178	0.52	2.57	17.64	183.5	NA	NA	1000
10/12/05	14:50	17.98	100	Clear	5.62	.174	0.57	1.93	17.45	185.8	NA	NA	1000
10/12/05	15:00	17.98	100	Clear	5.67	.169	0.89	1.18	17.47	170.7	NA	NA	-3000
10/12/05	15:10	17.98	100	Clear	5.64	.170	0.91	1.09	17.42	179.6	NA	NA	-2000
10/12/05	15:20	17.99	100	Clear	5.67	.171	1.15	2.10	17.17	182.3	NA	NA	-1000
10/12/05	15:30	18.32	100	Clear	5.68	.173	1.23	34	17.02	181.4	NA	NA	4000
10/12/05	15:40	18.47	100	Clear	5.71	.182	1.23	65	17.34	173.5	NA	NA	-1000
10/12/05	15:50	18.76	100	Clear	5.74	.192	1.24	87	17.51	168.3	NA	NA	2000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/12/05	16:00	19.43	100	Slightly Turbid	5.71	.187	1.36	122	17.63	156.8	NA	NA	1000
10/12/05	16:10	19.69	100	Slightly Turbid	5.71	.185	1.46	128	17.58	159.1	NA	NA	1000
10/12/05	16:20	19.73	100	Slightly Turbid	5.70	.183	1.58	131	17.34	163.5	NA	NA	1000
10/12/05	16:30	19.81	100	Slightly Turbid	5.72	.185	1.59	140	17.30	164.8	NA	NA	1000
10/12/05	16:40	19.81	100	Slightly Turbid	5.72	.189	1.56	141	17.37	164.3	NA	NA	1000
10/12/05	16:50	20.34	100	Slightly Turbid	5.74	.192	1.46	143	17.14	158.6	NA	NA	1000
10/12/05	17:00	21.08	100	Slightly Turbid	5.75	.194	1.34	151	16.95	148.9	NA	NA	0
10/12/05	17:10	20.73	100	Slightly Turbid	5.75	.192	1.40	144	16.99	153.0	NA	NA	2000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/12/05	17:10	21.15	100	Slightly Turbid	5.76	.195	1.27	108	16.78	143.2	NA	NA	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/12/05	17:25	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10142005-9
✓	10/12/05	17:25	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10142005-9

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well Data
QA Sample Type	

Sample ID #	08GWT01201
Well ID	
Sampled By	Terry Rojahn
Concentration	Low Concentration

Created By	Terry Rojahn
Created Date	10/17/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/17/05
Purge Method	Low flow - Bladder
Sampling Method	
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	52.88
Total Well Depth (ft.)	76.00
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 99K1014 AB
Pump Control Box	Yes MP10-1843
Turbidity Meter	Yes 1759-1800

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/17/05	10:10	52.88	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
10/17/05	10:20	53.00	100	Clear	4.59	0.985	1.31	40	14.78	293	NA	NA	1000
10/17/05	10:30	53.02	120	Slightly Turbid	4.58	0.978	0.44	55	14.49	261	NA	NA	1200
10/17/05	10:40	53.05	120	Slightly Turbid	4.58	0.974	0.24	60	14.50	233	NA	NA	1200

10/17/05	10:50	53.07	120	Clear	4.53	0.980	0.23	35	14.71	227	NA	NA	1200
10/17/05	11:00	53.08	120	Clear	4.52	0.984	0.23	23	14.83	222	NA	NA	1200
10/17/05	11:10	53.09	120	Clear	4.48	0.988	0.26	14	14.96	222	NA	NA	1200
10/17/05	11:20	53.10	120	Clear	4.46	0.990	0.27	9.9	15.04	223	NA	NA	1200

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/17/05	11:20	53.10	120	Clear	4.45	0.992	0.31	7.4	15.16	221	NA	NA	1200
10/17/05	11:20	53.10	120	Clear	4.43	0.997	0.26	5.5	15.40	217	NA	NA	1200
10/17/05	11:20	53.10	120	Clear	4.42	0.999	0.24	4.1	15.52	214	NA	NA	1200
10/17/05	11:20	53.10	120	Clear	4.39	1.003	0.24	3.8	15.75	222	NA	NA	1200
10/17/05	11:20	53.10	120	Clear	4.38	1.005	0.24	3.3	15.80	225	NA	NA	1200
10/17/05	11:20	53.10	120	Clear	4.35	1.008	0.24	3.0	15.89	227	NA	NA	1200

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/17/05	12:23	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10172005-10
✓	10/17/05	12:23	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10172005-10

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT01301
Well ID	08MWT13
Sampled By	Terry Rojahn
Concentration	-Select-

Created By	Terry Rojahn
Created Date	10/15/05
Modified By	James Goerdt
Modified Date	3/15/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/15/05
Purge Method	Bailer
Sampling Method	-Select-
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	122.93
Total Well Depth (ft.)	
Well Riser Diameter (in.)	
Well Volumes Req.	1
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 99K1014 AB
Pump Control Box	No Teflon Bailer
Turbidity Meter	Yes 1759-1800

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	16:50	122.93	0	Highly Turbid	NA	NA	NA	NA	NA	NA	NA	NA	0
10/15/05	17:05	NA	127	Highly Turbid	11.96	1.061	0.59	>1000	15.86	85	NA	NA	0

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/16/05	14:50	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	2	Glass	1L Amber		112GN1245-10172005-10
✓	10/16/05	14:50	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10172005-10

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT01401
Well ID	08MWT14
Sampled By	Terry Rojahn
Concentration	-Select-

Created By	Terry Rojahn
Created Date	10/16/05
Modified By	James Goerdt
Modified Date	3/15/06
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/15/05
Purge Method	Bailer
Sampling Method	Bailer
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	115.78
Total Well Depth (ft.)	
Well Riser Diameter (in.)	
Well Volumes Req.	1
Monitor Reading (ppm)	NA

Water Quality Meter	Yes 99K104 AB
Pump Control Box	No Teflon Bailer
Turbidity Meter	Yes 1759-1800

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/15/05	16:00	115.78	0	Highly Turbid	NA	NA	NA	NA	NA	NA	NA	NA	0
10/15/05	16:07	NA	172	Highly Turbid	9.48	0.512	3.42	>1000	16.45	214	NA	NA	1204
10/15/05	16:15	NA	150	Highly Turbid	9.22	0.650	2.80	>1000	16.52	241	NA	NA	1200
10/15/05	16:24	NA	134	Highly Turbid	9.03	0.724	2.61	>1000	16.69	261	NA	NA	1206

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/16/05	14:15	SW-846 8270C (1,4-dioxane only)	SVOC	4° C	1	Glass	1L Amber		112GN1245-10172005-10
✓	10/16/05	14:15	SW-846 8260B	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials		112GN1245-10172005-10

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Well Type	Monitoring Well
QA Sample Type	

Sample ID #	08GWT01401
Well ID	
Sampled By	Terry Rojahn
Concentration	Low Concentration

Created By	Terry Rojahn
Created Date	10/30/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Well and Sample Data

Date	10/27/05
Purge Method	Bailer
Sampling Method	
MS/MSD Collected	N
Duplicate Collected/b>	N
Duplicate ID	

Static Water Level (ft.)	NA - Resample
Total Well Depth (ft.)	117.90
Well Riser Diameter (in.)	2
Well Volumes Req.	
Monitor Reading (ppm)	NA

Water Quality Meter	No
Pump Control Box	No
Turbidity Meter	No

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp(C)	ORP (mV)	Salinity	Other	Incremental (mL)
10/27/05	13:20	0	0	Cloudy	NA	NA	NA	NA	NA	NA	NA	NA	0

Analysis Records

Co	Da	Tir	An Me	De of	Pr	Co	Ty	Re	Co	Ch

✓	10/28/05	09:15	SW-846 8270C (1,4-dioxane only)	SVOC	4°C	2	Glass	1L Amber		112GN1245-10312005-13

ROUND 4

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/25/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW08-DRY
TtNUS Project #	112GN1245	**Well ID**	08TW08
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	-Select-

Well and Sample Data

Date		**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	-Select-	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method	-Select-	**Well Riser Diameter (in.)**		**Turbidity Meter**	
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)

Final Purge / Sample Data

One Casing Volume	**Method**	-Select-	**Dissolved Oxygen (mg/L)**
Total Vo. Purge (L)	**Waterlevel (ft.)**		**Turbidity (NTUs)**
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**
End Purge (hrs.)	**Color**		**ORP (mV)**
Total Purge Time (min.)	**pH (S.U.)**		**Salinity**
	Conductivity (mS/cm)		**Other**

General Observations and Notes

Associated soil boring is 08SB48. Total well depth = 9.80' Stick up = 2.8'. The well was dry.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/25/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW09-DRY
TtNUS Project #	112GN1245	**Well ID**	08TW09
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	-Select-

Well and Sample Data

Date		**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	-Select-	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method	-Select-	**Well Riser Diameter (in.)**		**Turbidity Meter**	
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)

Final Purge / Sample Data

One Casing Volume	**Method**	-Select-	**Dissolved Oxygen (mg/L)**
Total Vo. Purge (L)	**Waterlevel (ft.)**		**Turbidity (NTUs)**
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**
End Purge (hrs.)	**Color**		**ORP (mV)**
Total Purge Time (min.)	**pH (S.U.)**		**Salinity**
	Conductivity (mS/cm)		**Other**

General Observations and Notes

Associated soil boring is 08SB53. Total well depth = 9.80' Stick up = 3.3'. The well was dry.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/24/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW10-NA
TtNUS Project #	112GN1245	**Well ID**	08MWT10
Task/Contract #		**Well Type**	Monitoring Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	-Select-

Well and Sample Data

Date		**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	-Select-	**Total Well Depth (ft.)**	30.00	**Pump Control Box**	
Sampling Method	-Select-	**Well Riser Diameter (in.)**	2	**Turbidity Meter**	
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)

Final Purge / Sample Data

One Casing Volume	**Method**	-Select-	**Dissolved Oxygen (mg/L)**
Total Vo. Purge (L)	**Waterlevel (ft.)**		**Turbidity (NTUs)**
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**
End Purge (hrs.)	**Color**		**ORP (mV)**
Total Purge Time (min.)	**pH (S.U.)**		**Salinity**
	Conductivity (mS/cm)		**Other**

General Observations and Notes

Well was never placed due to shallowness of soil boring.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/25/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW11-DRY
TtNUS Project #	112GN1245	**Well ID**	08TW11
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	-Select-

Well and Sample Data

Date	10/24/06	**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	-Select-	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method	-Select-	**Well Riser Diameter (in.)**		**Turbidity Meter**	
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)

Final Purge / Sample Data

One Casing Volume

Total Vo. Purge (L)

Start Purge (hrs.)

End Purge (hrs.)

Total Purge Time (min.)

Method -Select-

Waterlevel (ft.)

Flowrate (mL/min)

Color

pH (S.U.)

Conductivity (mS/cm)

Dissolved Oxygen (mg/L)

Turbidity (NTUs)

Temp (C)

ORP (mV)

Salinity

Other

General Observations and Notes

Well was dry. Associated soil boring is 08SB55. Stick up = 16" Total well depth = 9.77'

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW12
TtNUS Project #	112GN1245	**Well ID**	08TW12
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	Low concentration

Well and Sample Data

Date	10/24/06	**Static Water Level (ft.)**	8.17	**Water Quality Meter**	4143008
Purge Method	Low flow - peristaltic	**Total Well Depth (ft.)**		**Pump Control Box**	103
Sampling Method	Low flow - peristaltic	**Well Riser Diameter (in.)**		**Turbidity Meter**	3596-3502
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
10/24/06	15:28	8.17		Clear	NA	NA	NA	NA	NA	NA	NA	NA	0

Final Purge / Sample Data

One Casing Volume	**Method**	Low flow - peristaltic	**Dissolved Oxygen (mg/L)**
Total Vo. Purge (L)	**Waterlevel (ft.)**		**Turbidity (NTUs)**
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**
End Purge (hrs.)	**Color**		**ORP (mV)**
Total Purge Time (min.)	**pH (S.U.)**		**Salinity**
	Conductivity (mS/cm)		**Other**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/25/06	08:05	SW-846 8260B	VOCs	4°C/HCL	3	Glass	40ml vials		112GN1245-10252006-3

General Observations and Notes

Associated soil boring is 08SB56. Stick up equals 12". Well dried out after 2 minutes of purge. The well was allowed to recharge for 1 hour where the well dried again after 1 minute of pumping. A total of approximately 100 ml was collected and retained.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	11/14/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW13
TtNUS Project #	112GN1245	**Well ID**	08TW13
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	Low concentration

Well and Sample Data

Date	10/24/06	**Static Water Level (ft.)**	7.38	**Water Quality Meter**	4143008
Purge Method	Low flow - peristaltic	**Total Well Depth (ft.)**		**Pump Control Box**	103
Sampling Method	Low flow - peristaltic	**Well Riser Diameter (in.)**		**Turbidity Meter**	3596-3502
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)

Final Purge / Sample Data

One Casing Volume	**Method**	Low flow - peristaltic	**Dissolved Oxygen (mg/L)**
Total Vo. Purge (L)	**Waterlevel (ft.)**		**Turbidity (NTUs)**
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**
End Purge (hrs.)	**Color**		**ORP (mV)**
Total Purge Time (min.)	**pH (S.U.)**		**Salinity**
	Conductivity (mS/cm)		**Other**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/25/06	13:30	SW-846 8260B	VOCs	4°C/HCL	3	Glass	40ml vials		112GN1245-10252006-3
✓	10/25/06	13:30	SW-846 8270C	SVOCs	4°C	1	Glass	1L Amber		112GN1245-10252006-3

General Observations and Notes

Associated soil boring is 08SB57. Total well depth = 9.79' Stick up = 2.4'. Well dried out after 2 minutes. Approximately 200 ml was retained for sample. The well was dry.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/25/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW14
TtNUS Project #	112GN1245	**Well ID**	08TW14
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	Low concentration

Well and Sample Data

Date	10/24/06	**Static Water Level (ft.)**	5.87	**Water Quality Meter**	4143008
Purge Method	Low flow - peristaltic	**Total Well Depth (ft.)**		**Pump Control Box**	103
Sampling Method	Low flow - peristaltic	**Well Riser Diameter (in.)**		**Turbidity Meter**	3596-3502
MS/MSD Collected?	Y	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
10/24/06	14:10	5.87		Cloudy	6.84	0.687	7.43	176	NA	109	NA	NA	0

Final Purge / Sample Data

One Casing Volume	**Method**	Low flow - peristaltic	**Dissolved Oxygen (mg/L)**	7.43
Total Vo. Purge (L)	**Waterlevel (ft.)**	5.87	**Turbidity (NTUs)**	176
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**	NA
End Purge (hrs.)	**Color**	Cloudy	**ORP (mV)**	109
Total Purge Time (min.)	**pH (S.U.)**	6.84	**Salinity**	NA
	Conductivity (mS/cm)	0.687	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	14:25	SW-846 8270C	SVOCs	4°C	5	Glass	1L Amber		112GN1245-10252006-3
✓	10/24/06	14:25	SW-846 8260B	VOCs	4°C/HCL	9	Glass	40ml vials		112GN1245-10252006-3

General Observations and Notes

Associated soil boring is 08SB59. Stick up equals 15". Approximately 4 liters of water was removed prior to collecting samples.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	12/11/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW15
TtNUS Project #	112GN1245	**Well ID**	08TW15
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	-Select-

Well and Sample Data

Date	10/24/06	**Static Water Level (ft.)**	5.86	**Water Quality Meter**	4143008
Purge Method	Low flow - peristaltic	**Total Well Depth (ft.)**		**Pump Control Box**	103
Sampling Method	Low flow - peristaltic	**Well Riser Diameter (in.)**		**Turbidity Meter**	3596-3502
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	Y	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID	08FD10240602				

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
10/24/06	13:45	5.86		Cloudy	6.75	0.596	9.31	183	NA	109	NA	NA	0

Final Purge / Sample Data

One Casing Volume	**Method**	Low flow - peristaltic	**Dissolved Oxygen (mg/L)**
Total Vo. Purge (L)	**Waterlevel (ft.)**		**Turbidity (NTUs)**
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**
End Purge (hrs.)	**Color**		**ORP (mV)**
Total Purge Time (min.)	**pH (S.U.)**		**Salinity**
	Conductivity (mS/cm)		**Other**

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	13:45	SW-846 8270C	SVOCs	4°C	2	Glass	1L Amber		112GN1245-10252006-3
✓	10/24/06	13:45	SW-846 8260B	VOCs	4°C/HCL	3	Glass	40ml vials		112GN1245-10252006-3

General Observations and Notes

Associated soil boring is 08SB60. Stick up equals 14". Approximately 4 liters of water was removed prior to collecting samples.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/25/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW16-DRY
TtNUS Project #	112GN1245	**Well ID**	08TW16
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	-Select-

Well and Sample Data

Date		**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	-Select-	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method	-Select-	**Well Riser Diameter (in.)**		**Turbidity Meter**	
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)

Final Purge / Sample Data

One Casing Volume

Total Vo. Purge (L)

Start Purge (hrs.)

End Purge (hrs.)

Total Purge Time (min.)

Method -Select-

Waterlevel (ft.)

Flowrate (mL/min)

Color

pH (S.U.)

Conductivity (mS/cm)

Dissolved Oxygen (mg/L)

Turbidity (NTUs)

Temp (C)

ORP (mV)

Salinity

Other

General Observations and Notes

Associated soil boring is 08SB61. Total well depth = 9.80' Stick up = 3.3'. The well was dry.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/25/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW17
TtNUS Project #	112GN1245	**Well ID**	08TW17
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	Low concentration

Well and Sample Data

Date	10/24/06	**Static Water Level (ft.)**	7.23	**Water Quality Meter**	4143008
Purge Method	Low flow - peristaltic	**Total Well Depth (ft.)**		**Pump Control Box**	103
Sampling Method	Low flow - peristaltic	**Well Riser Diameter (in.)**		**Turbidity Meter**	3596-3502
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
10/24/06	15:45	7.23		Highly Turbid	7.21	0.502	10.15	176	NA	121	NA	NA	0

Final Purge / Sample Data

One Casing Volume	**Method**	Low flow - peristaltic	**Dissolved Oxygen (mg/L)**	10.15
Total Vo. Purge (L)	**Waterlevel (ft.)**	7.23	**Turbidity (NTUs)**	176
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**	NA
End Purge (hrs.)	**Color**	Highly Turbid	**ORP (mV)**	121
Total Purge Time (min.)	**pH (S.U.)**	7.21	**Salinity**	NA
	Conductivity (mS/cm)	0.502	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	10/24/06	15:45	SW-846 8260B	VOCs	4°C/HCL	3	Glass	40ml vials		112GN1245-10252006-3
✓	10/25/06	09:35	SW-846 8270C	SVOCs	4°C	2	Glass	1L Amber		112GN1245-10252006-3

General Observations and Notes

Associated soil boring is 08SB62. Stick up equals 3.9'. Purge water was retained as sample. Well intially dried out after 10 minutes in which (3) 40 ml vials and 1.2 liters was collected. The well will be revisited the enxt day for additional sample collection.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	10/24/06	**Modified Date**	10/25/06	**Printed Date**	12/11/06

Project Information

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	08GWTW18-DRY
TtNUS Project #	112GN1245	**Well ID**	08TW18
Task/Contract #		**Well Type**	Temporary Well
WBS Code #		**Sampled By**	James Goerdt
Status	Complete	**Concentration**	-Select-

Well and Sample Data

Date		**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	-Select-	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method	-Select-	**Well Riser Diameter (in.)**		**Turbidity Meter**	
MS/MSD Collected?	N	**Well Volumes Req.**	1		
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)

Final Purge / Sample Data

One Casing Volume	**Method**	-Select-	**Dissolved Oxygen (mg/L)**
Total Vo. Purge (L)	**Waterlevel (ft.)**		**Turbidity (NTUs)**
Start Purge (hrs.)	**Flowrate (mL/min)**		**Temp (C)**
End Purge (hrs.)	**Color**		**ORP (mV)**
Total Purge Time (min.)	**pH (S.U.)**		**Salinity**
	Conductivity (mS/cm)		**Other**

General Observations and Notes

Associated soil boring is 08SB47. Total well depth = 9.82' Stick up = 1.9'. The well was dry.

- End of Report -

C.5 CHAIN OF CUSTODY RECORDS

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 0138

PAGE 1 OF 1

PROJECT NO: CTO N1245 0331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: T. ROJAHN	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX. AB # 8447 8135 6336	

LABORATORY NAME AND CONTACT: LAUCKS / ANN MO

ADDRESS: SOUTH 940 HARNEY STREET

CITY, STATE: SEATTLE WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS

RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW846 8260B	SVOCS, PAHS & PCBS	SVOCS w/ PAHS	TAL METALS & SN					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G						
PRESERVATIVE USED									4°C	4°C	4°C						
TYPE OF ANALYSIS																	
12/08	0800	TB20080401	QC	-	-	QC	G	2	2								TRIP BLANK GLASS w/HCl
12/08	1000	1555120002	155B 012	0	2	SO	G	4	3	1							
12/08	1010	155B120206	↓	2	6	SO	G	4	3	*1							
12/08	1020	1555013 0002	155B 013	0	2	SO	G	4	3	1							
12/08	1030	155B0130206	↓	2	6	SO	G	4	3	*1							
12/08	1035	155B0110002 (TB)	155B 011	0	2	SO	G	4	3	1							
12/08	1040	155B0110206	↓	2	6	SO	G	4	3	*1							
12/08	1120	1555090002	155B 009	0	2	SO	G	5	3		1	1					
12/08	1125	155B0090206	↓	2	6	SO	G	5	3		1	1					
12/08	1130	155B0090610	↓	6	10	SO	G	5	3		1	1					
12/08	1240	1555010 0002	155B 010	0	2	SO	G	5	3		1	1					
12/08	1245	155B0100206	↓	2	6	SO	G	5	3		1	1					
12/08	1250	155B0100610	↓	6	10	SO	G	5	3		1	1					

1. RELINQUISHED BY [signature]	DATE 12/08/04	TIME 1800	1. RECEIVED BY FED EX.	DATE 12/08/04	TIME 1800
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * = EXTRACT & HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 0141 PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 0331	NSWC CRANE	RALPH BASWSKI	(412) 921-8308	LAUCKS / ANN HO
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		T. ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 8447 8135 6336		SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT 3&8 COMMENTS
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P P G G
PRESERVATIVE USED: 4°C 4°C 4°C 4°C

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: VOLATILES 8260B	SVOCS w/PAHS	TAL METALS & SN	SVOCS PAHS & HERBICIDES				COMMENTS
12/08	1255	1558008 0002	1558 008	0	2	SO	G	5	3	1	1					
12/08	1300	1558008 0206	↓	2	6	SO	G	5	3	1	1					
12/08	1305	1558008 0610	↓	6	10	SO	G	5	3	1	1					
12/08	1335	1558007 0002	1558 007	0	2	SO	G	5	3		1	1				
12/08	1340	1558007 0206	↓	2	6	SO	G	5	3		** 1	* 1				
12/08	1400	1558002 0002	1558 002	0	2	SO	G	5	3		1	1				
12/08	1405	1558002 0206	↓	2	6	SO	G	5	3		** 1	* 1				
12/08	1430	1558006 0002	1558 006	0	2	SO	G	5	3		1	1				
12/08	1435	1558006 0206	↓	2	6	SO	G	13	9	-	** 2	* 2				DO MS/MSD
12/08	1520	1558005 0002	1558 005	0	2	SO	G	5	3		1	1				
12/08	1525	1558005 0206	↓	2	6	SO	G	5	3		** 1	* 1				
12/08	0000	FD12080401	QC	—	—	SO	G	5	3		** 1	* 1				FROM 1558006 0206

1. RELINQUISHED BY Taylor	DATE 12/8/04	TIME 1800	1. RECEIVED BY FEDERAL EXPRESS	DATE 12/8/04	TIME 1800
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM TtNUS-001 4/02R

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 0143 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / ANN HG
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		T. ROJAHN	(412) 921-8857	940 SOUTH HARNEY STREET
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 6325		SEATTLE WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: VOLATILES SW846 8260	SVOCS W/PAHS, PCBS	HERBICIDE & PESTICIDE	TAL METALS & SW						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)										G	G	G						
PRESERVATIVE USED										4°C	4°C	4°C						
12/09	0730	15TB12090401	QC	-	-	QC	G	2	2		1	1						TRIP BLANK GLASS W/HCl
12/09	1025	15SS0290002	15SB 029	0	2	SO	G	5	3		1	1						
12/09	1030	15SB0290206	↓	2	6	SO	G	5	3	*	1	**	1					
12/09	1050	15SS0310002	15SB 031	0	2	SO	G	5	3		1	1						
12/09	1055	15SB0310206		2	6	SO	G	5	3	*	1	**	1					
12/09	1100	15SB0310610		6	10	SO	G	5	3	*	1	**	1					
12/09	1105	15SB0311014	↓	10	14	SO	G	5	3	*	1	**	1					
12/09	1130	15SS0320002	15SB 032	0	2	SO	G	5	3		1	1						
12/09	1135	15SB0320206	↓	2	6	SO	G	5	3	*	1	**	1					
12/09	1150	15SS0350002	15SB 035	0	2	SO	G	5	3		1	1						
12/09	1155	15SB0350206	↓	2	6	SO	G	5	3	*	1	**	1					
12/09	1205	15SS0370002	15SB 037	0	2	SO	G	5	3		1	1						
12/09	1210	15SB0370206	↓	2	6	SO	G	5	3	*	1	**	1					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Tony Agit	12/09/04	1830	1. RECEIVED BY FEDERAL EXPRESS	12/09/04	1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * Extract & HCLO ** HCLO

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 0144 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / ANH HO
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		T. ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 8447 8135 6325		SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G
PRESERVATIVE USED: 4°C 4°C

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: VOLATILES SW 846 8260B	SVOCS W/ PAHS & HERBICIDE SW	TAL METALS					COMMENTS
12/09	0910	1555001 0002	155B 001	0	2	SO	G	5	3	1	1					
12/09	0915	1558001 0206	↓	2	6	SO	G	5	3	* 1	** 1					
12/09	0935	1555003 0002	155B 003	0	2	SO	G	5	3	1	1					
12/09	0940	1558003 0206	↓	2	6	SO	G	5	3	* 1	** 1					
12/09	0955	1556004 0002	155B 004	0	2	SO	G	5	3	1	1					
12/09	1000	1558004 0206	↓	2	6	SO	G	5	3	* 1	** 1					
12/09	1520	1555048 0002	155B 048	0	2	SO	G	5	3	1	1					
12/09	1525	1558048 0206		2	6	SO	G	13	9	2	2					PO MS/MSD
12/09	1530	1558048 0610	↓	6	10	SO	G	5	3	* 1	** 1					
12/09	1550	1558048 1015	↓	10	15	SO	G	5	3	* 1	** 1					
12/09	1610	1555047 0002	155B 047	0	2	SO	G	5	3	1	1					
12/09	[illegible]	FD120904 01	QC	–	–	SO	G	5	3	1	1					DUP FROM 1558048 0206

1. RELINQUISHED BY Terry Rojahn	DATE 12/9/04	TIME 1830	1. RECEIVED BY FEDERAL EXPRESS	DATE 12/9/04	TIME 1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM: TINUS-001 4/02R

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 0145 | PAGE 1 OF 1

PROJECT NO: CTO N1245 0331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: T ROJAHN	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX. AB # 8447 8135 6439	

LABORATORY NAME AND CONTACT: LAUCKS / ANN HO

ADDRESS: 940 SOUTH HARNEY ST.

CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS

RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Volatiles SW 846 8260B	SVOCs w/PAHs, PCBs	Pesticides & Herbicides	TAL Metals + SN						COMMENTS
								CONTAINER TYPE PLASTIC (P) or GLASS (G)		P	G	G						
								PRESERVATIVE USED		4°C	4°C	4°C						
12/10	0800	15TB/2100401	QC	-	-	QC	G	2	2									TRIP BLANK Glass w/HCl
12/10	0850	15SS046 0002	15SB 046	0	2	SO	G	5	3	1	1							
12/10	0855	15SB046 0206	↓	2	6	SO	G	5	3	1	1							
12/10	0900	15SB046 0610	↓	6	10	SO	G	5	3	* 1	** 1							
12/10	0915	15SB046 1020	↓	10	20	SO	G	5	3	* 1	** 1							
12/10	1000	15SS045 0002	15SB 045	0	2	SO	G	5	3	1	1							
12/10	1005	15SB045 0206	↓	2	6	SO	G	5	3	1	1							
12/10	1010	15SB045 0610	↓	6	10	SO	G	5	3	* 1	** 1							
12/10	1015	15SB045 1012	↓	10	12	SO	G	5	3	* 1	** 1							
12/10	1235	15SS019 0002	15SB 019	0	2	SO	G	5	3	1	1							
12/10	1240	15SB019 0206	↓	2	6	SO	G	5	3	* 1	** 1							
12/10	1280	15SS023 0002 (TB)	15SB 023	0	2	SO	G	5	3	1	1							
12/10	1255	15SB023 0206	↓	2	6	SO	G	13	9	* 2	** 2							

1. RELINQUISHED BY [signature]	DATE 12/10/04	TIME 1880	1. RECEIVED BY FEDERAL EXPRESS	DATE 12/10/04	TIME 1880
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 0146 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / ANN HO
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		T. ROJAHN	(412) 921-8857	940 SOUTH HARNEY STREET
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 8447 8135 6439		SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): P G G
PRESERVATIVE USED: 4°C 4°C 4°C

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: VOLATILES SW 8260B	SVOCS W/PAHS	TAL METALS & SN					COMMENTS
12/10	1045	15SS0430002	15SB043	0	2	SO	G	5	3	1	1					
12/10	1050	15SB0430206	↓	2	6	SO	G	5	3	* 1	** 1					
12/10	1100	15SS042 0002	15SB042	0	2	SO	G	5	3	1	1					
12/10	1105	15SB042 0206	↓	2	6	SO	G	5	3	* 1	** 1					
12/10	1115	15SS044 0002	15SB044	0	2	SO	G	5	3	1	1					
12/10	1120	15SB044 0206	↓	2	6	SO	G	5	3	* 1	** 1					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Tony Rojahn	12/10/04	1830	1. RECEIVED BY FEDERAL EXPRESS	12/10/04	1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 0147

PAGE 1 OF 1

PROJECT NO: CTO N1245 0331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: T. ROJAHN	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED EX AB# 8447 8135 6439	

LABORATORY NAME AND CONTACT: LAUCKS / ANN HO

ADDRESS: 940 SOUTH HARNEY ST.

CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS

RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOC W/ PAHS/PCBS	PESTICIDE & HERBICIDE SW	TAL METALS &	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G		
PRESERVATIVE USED									4°C	4°C	4°C		
12/10	1315	1558020 0002	1558 020	0	2	SO	G	5	3	1	1		
12/10	1320	1558020 0206	↓	2	6	SO	G	5	3	*1	**1		
12/10	1330	1558022 0002	1558 022	0	2	SO	G	5	3	1	1		
12/10	1335	1558022 0206	↓	2	6	SO	G	5	3	*1	**1		
12/10	1340	1558021 0002 ~~1558~~	1558 021	0	2	SO	G	5	3	1	1		
12/10	1345	1558021 0206	↓	2	6	SO	G	5	3	*1	**1		
12/10	1445	1558040 0002	1558 040	0	2	SO	G	5	3	1	1		
12/10	1450	1558040 0206	↓	2	6	SO	G	5	3	*1	**1		
12/10	1510	1558039 0002	1558 039	0	2	SO	G	5	3	1	1		
12/10	0000	FD12100401	QC	-	-	SO	G	5	3	*1	**1		

1. RELINQUISHED BY: [signature]	DATE 12/10/04	TIME 1830	1. RECEIVED BY: FEDERAL EXPRESS	DATE 12/10/04	TIME 1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3645 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
N1245 CTO 331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / ANH HO
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		T. ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 6450		SEATTLE WA 98108

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260	SVOCS, PANS, PCBS	HERBICIDES & Pesticides	TAL METALS + SN	NITROAROMATICS & NITRAMINES	PERCHLORATES	TOC			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P	G	P	G				
PRESERVATIVE USED									4°C/HCl	4°C	4°C/HNO3	4°C	4°C	4°C/H2SO4				
12/11	0800	TB12110401	QC	-	-	QC	G	2	2									
12/11	0740	~~TS~~ RB12110401	QC	-	-	QC	G	9	3	5	1	-	-	-				DRIVE SHOE
12/12	0830	RB12120401	QC	-	-	QC	G	13	3	5	1	1	1	2				DISPOSABLE SLEEVE
12/12	0930	RB12120402	QC	-	-	QC	G	11	3	5	1	1	1	-				DISPOSABLE TROWEL
12/12	1030	~~TS~~ RB12120403	QC	-	-	QC	G	7	-	-	-	1	1	-				DRIVE SHOE
12/12	1230	SB12120401	QC	-	-	QC	G	11	3	5	1	1	1	-				DI H_2O
12/12	1650	SB12120402	QC	-	-	QC	G	11	3	5	1	1	1	-				DPT Rig TANK

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	12/13/04	1830	1. RECEIVED BY FEDERAL EXPRESS	12/13/04	1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3646

PAGE 1 OF 1

PROJECT NO: CTO N1245 0331

FACILITY: NSWC CRANE

PROJECT MANAGER: RALPH BASINSKI

PHONE NUMBER: (412) 921-8308

LABORATORY NAME AND CONTACT: LAUCKS / ANN MO

SAMPLERS (SIGNATURE)

FIELD OPERATIONS LEADER: T. ROJAHN

PHONE NUMBER: (412) 921-8857

ADDRESS: 940 SOUTH HARNEY ST.

CARRIER/WAYBILL NUMBER: FED. EX. AB # 8447 8135 6450

CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS

RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	PESTICIDES & HERBICIDES	TAL METALS & SN	SVOCS w/PAHS							COMMENTS
								CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G	G							
								PRESERVATIVE USED	4°C	4°C	4°C							
12/11	0855	155S0170002	155B 017	0	2	SO	G	2	1	1								
12/11	0900	155B0170206	↓	2	6	SO	G	2	*1	**1								
12/11	0905	155S0160002	155B 016	0	2	SO	G	2	1	1								
12/11	0910	155B0160206	↓	2	6	SO	G	2	*1	**1								
12/11	0915	155S0150002 (TR)	155B 015	0	2	SO	G	2	1	1								
12/11	0920	155B0150206	↓	2	6	SO	G	2	*1	**1								
12/11	0925	155S0180002	155B 018	0	2	SO	G	2	1	1								
12/11	0930	155B0180206	↓	2	6	SO	G	2	*1	**1								
12/11	0935	155S0140002	155B 014	0	2	SO	G	2	1	1								
12/11	0940	155B0140206	↓	2	6	SO	G	4	*2	**2								MS/MSD
12/11	0000	FD12110401	QC	–	–	SO	G	2	*1	**1								DUP OF 155B0140206
12/11	1010	155S0250002	155B 025	0	2	SO	G	1	–	–	1							
12/11	1015	155B0250206	↓	2	6	SO	G	1	–	–	*1							

1. RELINQUISHED BY	DATE 12-13-04	TIME 1830	1. RECEIVED BY FEDERAL EXPRESS	DATE 12-13-04	TIME 1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

FORM NO. TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3647

PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / ANH HO
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		T. ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 844781356450		SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: SVOCs w/ PAHs	COMMENTS
12/11	1020	15SS0240002	15SB024	0	2	SO	G	1	1	
12/11	1025	15SB0240206 (FR)	↓	2	6	SO	G	1	* 1	
12/11	1030	15SS0260002	15SB026	0	2	SO	G	1	1	
12/11	1035	15SB0260206	↓	2	6	SO	G	1	* 1	
12/11	1040	15SS0280002	15SB028	0	2	SO	G	1	1	
12/11	1045	15SB0280206	↓	2	6	SO	G	2	* 2	DO MS/MSD
12/11	1100	15SS0270002	15SB027	0	2	SO	G	1	1	
12/11	1105	15SB0270206	↓	2	6	SO	G	1	* 1	
12/11	0000	FD12110402	QC	-	-	SO	G	1	* 1	DUP OF 15SB0280206

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: Terry Rogers	12-13-04	1830	1. RECEIVED BY: FEDERAL EXPRESS	12-13-04	1830
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS: * EXTRACT & HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3648

PROJECT NO: N1245 CTO 0331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE): S. Conti		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX. AB# 8447 8135 6450	

LABORATORY NAME AND CONTACT: LAUCKS / ANN HO

ADDRESS: 940 SOUTH HARNEY ST.

CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOCS w/ PAHs	Explosives - Nitroaromatics Nitramines & Perchlorates	TAL METALS + SW	SVOCS w/ PAHs & PCBs					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									P	G	G	G	G					
PRESERVATIVE USED									4°C	4°C	4°C	4°C	4°C					
12/11	1305	0855001 0002	085B 001	0	2	SO	G	6	3	1	1	1						
12/11	1330	085S002 0002 (FR)	085B 002	0	2	SO	G	6	3	1	1	1						
12/11	1350	0855003 0002	085B 003	0	2	SO	G	5	3	–	–	1	1					
12/11	1405	0855005 0002	085B 005	0	2	SO	G	6	3	1	1	1						
12/11	1410	0858005 0206	↓	2	6	SO	G	6	3	1	1	1						
12/11	1430	0855004 0002	085B 004	0	2	SO	G	6	3	1	1	1						
12/11	1435	0858004 0206	↓	2	6	SO	G	6	3	1	1	1						
12/12	0905	0855006 0002	085B 006	0	2	SO	G	6	3	–	1	1	1					
12/12	0910	0858006 0206	↓	2	6	SO	G	6	3	–	1	1	1					
12/12	0915	0858006 0610	↓	6	10	SO	G	6	3	–	1	1	1					
12/12	0925	085S009 0002 (FR)	085B 009	0	2	SO	G	6	3	–	1	1	1					
12/12	0930	0858009 0206	↓	2	6	SO	G	6	3	–	1	1	1					
12/12	0935	0858009 0610	↓	6	10	SO	G	15	9	–	2	2	2					DO MS/MSD

1. RELINQUISHED BY: Terry Rojahn	DATE 12/13/04	TIME 1830	1. RECEIVED BY: FEDERAL EXPRESS	DATE 12-13-04	TIME 1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3649 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
N1245 CTO 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / ANH HO
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	940 SOUTH HARNEY St.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 6450		SEATTLE, WA 98108

STANDARD TAT ☒ EXCEPT FOR COMMENTS
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: VOLATILES SW 846 8260B	SVOCS W/PAHS & NITROAROMATICS, PCBS	EXPLOSIVES/NITROAROMATICS	TAL METALS & SW	SVOCS W/PAHS, PCBS & PESTICIDES & HERBICIDES				COMMENTS
								CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G	G	G	G				
								PRESERVATIVE USED	4°C	4°C	4°C	4°C	4°C				
12/12	1020	08SS008 0002	08SB008	0	2	SO	G	6	3	1	1	1					
12/12	1025	08SB008 0206	↓	2	6	SO	G	6	3	1	1	1					
12/12	1030	08SB008 0610	↓	6	10	SO	G	6	3	1	1	1					
12/12	1045	08SS007 0002	08SB007	0	2	SO	G	6	3	1	1	1					
12/12	1050	08SB007 0206	↓	2	6	SO	G	6	3	1	1	1					
12/12	1055	08SB007 0610	↓	6	10	SO	G	6	3	1	1	1					
12/12	1100	08SB007 1013	↓	10	13	SO	G	6	3	1	1	1					
12/12	1135	08SB010 0002 (TR)	08SB010	0	2	SO	G	5	3	–	–	1	1				
12/12	1140	08SB010 0206	↓	2	6	SO	G	5	3	–	–	1	1				
12/12	1145	08SB010 0610	↓	6	10	SO	G	5	3	–	–	** 1	* 1				
12/12	1200	08SB010 1013	↓	10	13	SO	G	5	3	–	–	** 1	* 1				
12/12	1355	08SS011 0002	08SB011	0	2	SO	G	5	3	–	–	1	1				
12/12	1400	08SB011 0206	↓	2	6	SO	G	5	3	–	–	1	1				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rojahn	12-13-04	1830	1. RECEIVED BY FEDERAL EXPRESS	12-13-04	1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * HOLD & EXTRACT ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM: TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3650

PAGE 1 OF 1

PROJECT NO: CTO N1245 0331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: T. ROJAHN	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX. AB# 8478135 6450	

LABORATORY NAME AND CONTACT: LAUCKS / ANN HO

ADDRESS: 940 SOUTH HARNEY ST.

CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒ DRAFT FOR COMMENTS

RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE: PLASTIC (P) or GLASS (G)

PRESERVATIVE USED

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B (P, 4°C)	SVOCS W/PAHS, PCBS PESTICIDES & HERBICIDES (G, 4°C)	TAL METALS & SN (G, 4°C)	CEC, PH & TOC (G, 4°C)	SVOCS W/PAHS & PCBS (G, 4°C)	Energetics-Nitroaromatics Nitramines & Perchlorates (G, 4°C)		COMMENTS
12/12	1410	0855012 0002	0858 012	0	2	SO	G	5	3	1	1					
12/12	1415	0858012 0206		2	6	SO	G	13	9	2	2					DO MS/MSD
12/12	1420	0858012 0610		6	10	SO	G	5	3	* 1	** 1					
12/12	1430	0858012 1018		10	18	SO	G	5	3	* 1	** 1					
12/12	1450	0855013 0002	0858 013	0	2	SO	G	5	3	1	1					
12/12	1455	0858013 0206		2	6	SO	G	5	3	1	1					
12/12	1500	0858013 0610		6	10	SO	G	5	3	* 1	** 1					
12/12	1505	0858013 1013		10	13	SO	G	5	3	* 1	** 1					
12/12	1525	0855014 0002	0858 014	0	2	SO	G	1	-	-	-	1				DO MS/MSD ON CEC ONLY
12/12	0000	FD12120401	QC	-	-	SO	G	6	3	-	1	-	1	1		DUP FROM 0858009 0610
12/12	0000	FD12120402	QC	-	-	SO	G	5	3	1	1					DUP FROM 0858012 0206

1. RELINQUISHED BY: Terry Rogalski	DATE: 12-13-04	TIME: 1830	1. RECEIVED BY: FEDERAL EXPRESS	DATE: 12-13-04	TIME: 1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R

FORM NO. TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3651

PROJECT NO: N1245 CTO 331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
LABORATORY NAME AND CONTACT: LAUCKS / ANH HO	SAMPLERS (SIGNATURE): S Conte, Terry Rojahn	FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857
ADDRESS: 940 SOUTH HARNEY ST.	CARRIER/WAYBILL NUMBER: FED. EX. AB# 8447 8135 5682	CITY, STATE: SEATTLE, WA 98108	

STANDARD TAT ☒ EXCEPT FOR COMMENTS
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE: PLASTIC (P) or GLASS (G) — G G G
PRESERVATIVE USED — HCL HCL HCL

DATE YEAR 2004	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOCS W/ PAHS	PCBS PESTICIDES & HERBICIDES	TAL METALS & SN					COMMENTS
12/14	0800	TB12140401	QC	–	–	QC	G	2	2								TRIP BLANK, GLASS W/HCL
12/14	0915	1555030 0002	1558 030	0	2	SO	G	5	3	1	1						
12/14	0920	1558030 0206	1558 030	2	6	SO	G	5	3	*1	**1						
12/14	0950	1555033 0002	1558 033	0	2	SO	G	5	3	1	1						
12/14	1000	1555036 0002	1558 036	0	2	SO	G	5	3	1	1						
12/14	1015	1555034 0002	1558 034	0	2	SO	G	5	3	1	1						
12/14	1050	1555041 0002	1558 041	0	2	SO	G	5	3	1	1						
12/14	1145	1555038 0002	1558 038	0	2	SO	G	5	3	1	1						
12/14	1330	1555062 0002	1558 062	0	2	SO	G	13	9	2	2						DO MS/MSD
12/14	1340	1555062 0206	↓	2	6	SO	G	5	3	*1	**1						
12/14	1430	1555049 0002	1558 049	0	2	SO	G	5	3	1	1						
12/14	0000	FD12140201	QC	–	–	SO	G	5	3	1	1						DUP OF 1555062.0002
						~~SO~~ QC											

1. RELINQUISHED BY: Terry Rojahn	DATE: 12-14-04	TIME: 1830	1. RECEIVED BY: FEDERAL EXPRESS	DATE: 12-14-04	TIME: 1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: * EXTRACT & HOLD ** HOLD

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (RETAINED COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3652

PAGE 1 OF 1

PROJECT NO: CTO N1245 331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINKI	PHONE NUMBER: 412 921-8308
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: 412 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX. AB# 8447 8135 5627	

LABORATORY NAME AND CONTACT: LAUCKS / HUGH PRENTICE

ADDRESS: 940 SOUTH HARNEY STREET

CITY, STATE: SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	Total Metals plus Tin	Dis. Metals plus Tin	SVOCs & PANs	PCBs	Herbicides & Pesticides	Nitroaromatics & Nitramines	Perchlorates	COMMENTS
									4°C/HCl	4°C/HNO3	4°C/HNO3	4°C	4°C	4°C	4°C	4°C	
									G	P	P	G	G	G	G	P	
01/05	0800	TB01050501	QC	-	-	QC	G	2	2								TRIP BLANK
01/05	1320	15GWTW005	15TW 005	-	-	GW	G	14	3	1	-	4	2	4			
01/05	1320	15GWTW005-F	↓	-	-	GW	G	1	-	-	1	-	-	-			
01/06	1025	08GWTW003	08TW 003	-	-	GW	G	17	3	1	-	4	-	-	6	3	MS/MSD ON ENERGETICS
~~01/06~~	~~1025~~	~~08GWTW003-F~~	↓	~~-~~	~~-~~	~~GW~~	~~G~~	~~1~~	~~-~~	~~-~~	~~1~~	~~-~~	~~-~~	~~-~~	~~-~~	~~-~~	~~TR~~
01/06	1315	08GWTW002	08TW 002	-	-	GW	G	8	3	1	-	2	-	-	1	1	MIN. VOL
01/06	1315	08GWTW002-F	↓	-	-	GW	G	1	-	-	1	-	-	-	-	-	
TR ~~01/06~~	~~0000~~ 0000	08FD01060501	QC	-	-	GW	G	3	-	-	-	-	-	-	2	1	
~~000~~ TR																	

1. RELINQUISHED BY [signature]	DATE 1/06/05	TIME 1830	1. RECEIVED BY FEDERAL EXPRESS	DATE 1/06/05	TIME 1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3653

PROJECT NO: CTO 331 N1245	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: 412 921-8308
LABORATORY NAME AND CONTACT: EC LABS / JAC PADGETT			
SAMPLERS (SIGNATURE): Terry Hyde		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: 412 921-8857
ADDRESS: 11422 N. US HIGHWAY 41			
CARRIER/WAYBILL NUMBER: PICK UP BY EC LABS			CITY, STATE: FARMERSBURG, IN

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS: FECAL COLIFORM METHOD 9222D	COMMENTS
									P	4°C*		
1/07	0705	08GWTW004	STW 004	—	-	GW	G	1	1			
1/07	0715	08GWTW003	STW 003	—	-	GW	G	1	1			
1/07	0735	08GWTW002	STW 002	—	—	GW	G	1	1			
1/07	0745	08GWTW001	STW 001	—	—	GW	G	1	1			
1/07	0000	08FD010705 01	QC	—	—	GW	G	1	1			FROM 08GWTW002

1. RELINQUISHED BY: Terry Hyde	DATE: 1-07-05	TIME: 0922	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY: [illegible] (MR. COPLAND)	DATE: 1/7	TIME: [illegible]

COMMENTS: * Sodium thiosulfate

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM TTNUS-001 4/02R

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3655

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PROJECT NO: CTO N1245 331

FACILITY: NSWC CRANE

PROJECT MANAGER: RALPH BAZINSKI

PHONE NUMBER: (412) 921-8308

LABORATORY NAME AND CONTACT: LAUCKS / HUGH PRENTICE

SAMPLERS (SIGNATURE): [signature] FOR J. GOFORTH

FIELD OPERATIONS LEADER: TERRY ROJAHN

PHONE NUMBER: (412) 921-8857

ADDRESS: 940 SOUTH HARNEY ST.

CARRIER/WAYBILL NUMBER: FED. EX. AB # 8447 8135 5638

CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P P P G G G

PRESERVATIVE USED: 4°C/HCl 4°C 4°C 4°C/HNO3 4°C/HNO3 4°C 4°C 4°C

TYPE OF ANALYSIS: VOLATILES SW 846 8260B; NITROAROMATICS & NITRAMINES; PERCHLORATES; TOTAL METALS + TIN; DIS. METALS + TIN; SVOCS + PAHS; PCBS; HERBICIDES & PESTICIDES

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	NITROAROMATICS & NITRAMINES	PERCHLORATES	TOTAL METALS + TIN	DIS. METALS + TIN	SVOCS + PAHS	PCBS	HERBICIDES & PESTICIDES	COMMENTS
1/06	1230	TB01060501	QC	-	-	QC	G	2	2	-	-	-	-	-	-	-	
1/06	1440	08GWTW001	BTW 001	-	-	GW	G	8	3	1	1	1	-	2	-	-	MIN. VOL.
1/06	1440	08GWTW001-F	↓	-	-	GW	G	1	-	-	-	-	1	MS/MSD ONLY			
1/06	1612	08GWTW004	BTW 004	-	-	GW	G	8	3	1	1	1	-	2	-	-	MIN. VOL.
1/06	1612	08GWTW004-F	↓	-	-	GW	G	1	-	-	-	-	1	-	-	-	
1/07	1006	15GWTW008	15TW 008	-	-	GW	G	14	3	-	-	1	-	4	2	4	
1/07	1006	15GWTW008-F	↓	-	-	GW	G	1	-	-	-	-	1	-	-	-	
1/07	1115	15GWTW006	15TW 006	-	-	GW	G	32	9	-	-	3	-	8	4	8	DO MS/MSD
TR ~~1/07~~		~~15GWTW006-F~~															
1/07	1500	15GWTW007	15TW 007	-	-	GW	G	14	3	-	-	1	-	4	2	4	
1/07	1500	15GWTW007-F	↓	-	-	GW	G	1	-	-	-	-	1	-	-	-	
1/07	0000	15FD01070501	QC	-	-	GW	G	14	3	-	-	1	-	4	2	4	FROM 15GWTW006

1. RELINQUISHED BY [signature]	DATE 1/07/05	TIME 1900	1. RECEIVED BY FEDERAL EXPRESS	DATE 1/07/05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3656 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857	ADDRESS: 940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER: FED. EX. AB# 8447 8135 6358		CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, P, P, G, G, G, G, P
PRESERVATIVE USED: 4°C, 4°C/HCl, 4°C/HNO3, 4°C/HNO3, 4°C, 4°C, 4°C, 4°C, 4°C

DATE (YEAR 2005)	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Volatiles SW 846 8260B	Total Metals + Tin	Dis Metals + Tin	SVOCs + PAHs	PCBs	Herbicides & Pesticides	Nitroaromatics & Nitramines	Perchlorates	COMMENTS
1/08	0730	TB01080501	QC	–	–	QC	G	2	2								TRIP BLANK
1/08	0904	15GWTW004	15TW 004	–	–	GW	G	9	3	1	–	2	1	2			MIN. VOL
1/08	0904	15GWTW004-F	↓	–	–	GW	G	1	–	–	1	–	–	–			
1/08	0950	15GWTW002	15TW 002	–	–	GW	G	9	3	1	–	4	1	–			
1/08	0950	15GWTW002-F	↓	–	–	GW	G	1	–	–	1	–	–	–			
1/08	1300	15GWTW001	15TW 001	–	–	GW	G	9	3	1	–	4	1	–			
1/08	1525	15GWTW003	15TW 003	–	–	GW	G	10	3	1	–	4	2	–			
1/08	1525	15GWTW003-F	↓	–	–	GW	G	1	–	–	1	–	–	–			
1/08	1630	RB01080501	QC	–	–	QC	G	11	3	1	–	2	1	2	1	1	TUBING RINSATE
1/09	0855	08SW00901	8SW 009	–	–	SW	G	10	3	*1	–	3	1	–	1	1	
1/09	0855	08SW00901-F	↓	–	–	SW	G	1	–	–	*1	–	–	–	–	–	
1/09	0955	08SW00701	8SW 007	–	–	SW	G	30	9	*3	–	9	3	–	3	3	DO MS/MSD
1/09	0955	08SW00701-F	↓	–	–	SW	G	3	–	–	*3	–	–	–	–	–	DO MS/MSD

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	1/10/05	1900	1. RECEIVED BY: FEDERAL EXPRESS	1/10/05	1900
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS: * TAL METALS ONLY

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3657

PAGE 1 OF 1

PROJECT NO: CTO NIZ85 331	FACILITY: NSWIC GRANITE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE): Terry Rojahn		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX. AB# 8447 8135 6358	

LABORATORY NAME AND CONTACT: LAUCKS / HUGH PRENTICE

ADDRESS: 940 SOUTH HARNEY ST.

CITY, STATE: SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE: PLASTIC (P) or GLASS (G)
PRESERVATIVE USED

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B (4°C/HCl)	TAL METALS (TOTAL) (4°C/HNO3)	TAL METALS (DISSOLVED) (4°C/HNO3)	SVOCS & PAHS (4°C)	PCBS (4°C)	NITROAROMATICS & NITRAMINES (4°C)	PERCHLORATES (4°C)	PESTICIDES & HERBICIDES (4°C)	COMMENTS
1/09	1138	08SW00801	8SW 008	–	–	SW	G	10	3	1	–	3	1	1	1		
1/09	1138	08SW00801-F	↓	–	–	SW	G	1	–	–	1	–	–	–	–		
1/09	1340	08SW00601	8SW 006	–	–	SW	G	10	3	1	–	3	1	1	1		
1/09	1340	08SW00601-F	8SW 006	–	–	SW	G	1	–	–	1	–	–	–	–		
1/09	1415	08SW00301	8SW 003	–	–	SW	G	9	3	1	–	3	–	1	1		
1/09	1415	08SW00301-F	↓	–	–	SW	G	1	–	–	1	–	–	–	–		
1/09	1450	08SW00101	8SW 001	–	–	SW	G	9	3	1	–	3	–	1	1		
1/09	1450	08SW00101-F	↓	–	–	SW	G	1	–	–	1	–	–	–	–		
1/09	0000	08FD01090501	QC	–	–	SW	G	10	3	1	–	3	1	1	1		FROM 08SW00701 ↓
1/09	0000	08FD01090501-F	QC	–	–	SW	G	1	–	–	1	–	–	–	–		
1/09	1540	15SW01901	15SW 019	–	–	SW	G	10	3	*1	–	3	1	~~X~~	X	2	
1/09	1540	15SW01901-F	15SW 019	–	–	SW	G	1	–	–	*1	–	–	–	–	–	
1/09	1600	15SW01801	15SW 018	–	–	SW	G	10	3	*1	–	3	1	–	–	2	

1. RELINQUISHED BY: Terry Rojahn	DATE 1/14/05	TIME 1900	1. RECEIVED BY: FEDERAL EXPRESS	DATE 1/14/05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: * = plus TAL

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 3658 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	940 S. HARNEY ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 6358		SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOCS & PAHS	PCBS	PESTICIDES & HERBICIDES	TOTAL METALS + TIN	DIS METALS + TIN	NITROAROMATICS & NITRAMINES	PERCHLORATES	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	G	Q	Q	G	Q	
PRESERVATIVE USED									4°C/HCl	4°C	4°C	4°C	4°C/HNO3	4°C/HNO3	4°C	4°C	
1/09	1600	15SW01801-F	15SW 018	-	-	SW	G	1	-	-	-	-	-	1			
1/10	1000	08SW00502	8SW 005	-	-	SW	G	10	3	4	-	-	*1	-	1	1	DEEP
1/10	1020	08SW00501	↓	-	-	SW	G	10	3	4	-	-	*1	-	1	1	SHALLOW
1/10	1000	08SW00502-F		-	-	SW	G	1	-	-	-	-	-	*1	-	-	DEEP
1/10	1020	08SW00501-F	↓	-	-	SW	G	1	-	-	-	-	-	*1	-	-	SHALLOW
1/10	1045	08SW00402	8SW 004	-	-	SW	G	10	3	4	-	-	*1	-	1	1	DEEP
1/10	1045	08SW00402-F		-	-	SW	G	1	~~3~~	-	-	-	-	*1	-	-	DEEP
1/10	1115	08SW00401		-	-	SW	G	10	3	4	-	-	*1	-	1	1	SHALLOW
1/10	1115	08SW00401-F	↓	-	-	SW	G	1	~~3~~	-	-	-	-	*1	-	-	SHALLOW

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	1/10/05	1900	1. RECEIVED BY FEDERAL EXPRESS	1/10/05	1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * TAL METALS ONLY

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3660

PAGE 1 OF 1

PROJECT NO: CTO N1245 331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: TERRY ROLAND	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX AB# 8497 8135 6369	

LABORATORY NAME AND CONTACT: LAUCKS / HUGH PRENTICE

ADDRESS: 940 SOUTH HARNEY ST

CITY, STATE: SEATTLE, WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOCS & PAHS	PCBS	HERBICIDES & PESTICIDES	TOTAL METALS + CN	DIS METALS + CN			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	G	P	P			
PRESERVATIVE USED									4°C/HCl	4°C	4°C	4°C	4°C/HNO3	4°C/HNO3			
1/11	0700	TB01110501	QC	-	-	QC	G	2	2								
1/11	0945	15SW00201	15SW 002	-	-	SW	G	11	3	4	1	2	1	-			
1/11	0945	15SW00201-F	↓	-	-	SW	G	1	-	-	-	-	-	1			
1/11	1035	15SW00101	15SW 001	-	-	SW	G	11	3	4	1	2	1	-			
1/11	1035	15SW00101-F	↓	-	-	SW	G	1	-	-	-	-	-	1			
1/11	1110	*15SW01601	15SW 016	-	-	SW	G	11	3	4	1	2	1	-			
1/11	1110	*15SW01601-F	↓	-	-	SW	G	1	-	-	-	-	-	1			
1/11	1220	15SW01701	15SW 017	-	-	SW	G	11	3	4	1	2	1	-			
1/11	1220	15SW01701-F	↓	-	-	SW	G	1	-	-	-	-	-	1			
1/11	1315	15SW01501	15SW 015	-	-	SW	G	11	3	4	1	2	1	-			
1/11	1315	15SW01501-F	↓	-	-	SW	G	1	-	-	-	-	-	1			
1/11	1410	15SW01301	15SW 013	-	-	SW	G	11	3	4	1	2	1	-			
1/11	1410	15SW01301-F	↓	-	-	SW	G	1	-	-	-	-	-	1			

1. RELINQUISHED BY	DATE 1/12/05	TIME 1900	1. RECEIVED BY FEDERAL EXPRESS	DATE 1/12/05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * LABELS SHOULD READ 15SW016 not 15ST016 for this COC

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3662 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rojahn		TERRY ROJAHN	(412) 921-8857	940 S. HARNEY ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX AB # 8447 8135 6358		SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G G G G

PRESERVATIVE USED: 4°C 4°C 4°C 4°C 4°C 4°C

TYPE OF ANALYSIS: VOLATILES SW 846 8260B | SVOCS, PAHS | NI, AROMATICS & PERCHLORATE & NITRAMINES | SVOCS & PAHS | SVOC, PAHS, PCBs, HERBICIDES & PESTICIDES | TAL METALS PLUS TIN

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT) INCHES	BOTTOM DEPTH (FT) INCHES	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOCS, PAHS	NI, AROMATICS & PERCHLORATE & NITRAMINES	SVOCS & PAHS	SVOC, PAHS, PCBs, HERBICIDES & PESTICIDES	TAL METALS PLUS TIN			COMMENTS
1/09	0905	08SD009 0006	8SD 009	0	6	SD	G	3	1	1	1						
1/09	1008	08SD007 0006	8SD 007	0	6	SD	G	6	2	2	2						DO MS/MSD
1/09	1145	08SD008 0006	8SD 008	0	6	SD	G	3	1	1	1						
1/09	1350	08SD006 0006	8SD 006	0	6	SD	G	3	1	1	1						
1/09	1420	08SD003 0006	8SD 003	0	6	SD	G	3	1	–	1	1					
1/09	1450	08SD002 0006	8SD 002	0	6	SD	G	3	1	–	1	1					
1/09	1510	08SD001 0006	8SD 001	0	6	SD	G	3	1	–	1	1					
1/09	0000	08FD010905 02	QC	0	6	SD	G	3	1	1	1						FROM 08SD007 0006
1/09	1540	15SD019 0006	15SD 019	0	6	SD	G	3	1	–	–	–	1	1			
1/09	1605	15SD018 0006	15SD 018	0	6	SD	G	3	1	–	–	–	1	1			
1/10	1145	08SD004 0012	8SD 004	0	12	SD	G	3	1	–	1	1					
1/10	1200	08SD004 1224		12	24	SD	G	3	1	–	1	1					
1/10	1220	08SD005 0012	8SD 005	0	12	SD	G	3	1	–	1	1					
1/10	1235	08SD005 1224		12	24	SD	G	3	1	–	1	1					

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rojahn	1/10/05	1900	1. RECEIVED BY FEDERAL EXPRESS	1/10/05	1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3664 x 57 | 57

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PROJECT NO: CTO N1245 331

FACILITY: RALPH BASIWSKI

PROJECT MANAGER: RALPH BASIWSKI

PHONE NUMBER: (412) 921-8308

LABORATORY NAME AND CONTACT: LANCKS / HUGH PRENTICE

SAMPLERS (SIGNATURE): [signature]

FIELD OPERATIONS LEADER: TERRY ROJAHN

PHONE NUMBER: (412) 921-8857

ADDRESS: 940 SOUTH HARNEY ST.

CARRIER/WAYBILL NUMBER: FED. EX. AB# 8447 8135 6369

CITY, STATE: SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 8260 8260B	SVOCS & PAHS	PCBS	HERBICIDES & PESTICIDES	TOTAL METALS + SN	DIS. METALS + SN	NITROAROMATICS & NITROAMINES	PERCHLORATE	COMMENTS
								CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G	G	G	P	P	G	P	
								PRESERVATIVE USED	4°C	4°C/HCL	4°C	4°C	4°C/HNO3	4°C/HNO3	4°C	4°C	
1/11	1420	15SW01401	15SW014	–	–	SW	G	11	3	4	1	2	1	–			
1/11	1420	15SW01401-F	↓	–	–	SW	G	1	–	–	–	–	–	1			
1/11	1520	15SW00501	15SW005	–	–	SW	G	9	3	4	1	–	1	–			
1/11	1520	15SW00501-F	↓	–	–	SW	G	1	–	–	–	–	–	1			
1/11	1550	15SW00601	15SW006	–	–	SW	G	~~25~~ 27	9	~~4~~ 6	3	6	3	–			DO MS/MSD
1/11	1550	15SW00601-F	↓	–	–	SW	G	3	–	–	–	–	–	3			DO MS/MSD
1/11	0000	15FD01110501	15SW QC	–	–	SW	G	11	3	4	1	2	1	–			FROM 15SW006
1/11	0000	15FD01110501-F	↓	–	–	SW	G	1	–	–	–	–	–	1			↓
1/11	1700	08RB01110501	QC	–	–	QC	G	7	3	~~1~~ 2	–	–	–	–	1	1	WILDCO SLEEVE
1/12	0905	15SW00901	15SW009	–	–	SW	G	11	3	4	1	2	1	–			
1/12	0905	15SW00901-F	↓	–	–	SW	G	1	–	–	–	–	–	1			
1/12	0955	15ST01001	15SW010	–	–	~~SW~~ ST	G	10	3	3	1	2	1				
1/12	0955	15ST01001-F	↓	–	–	~~SW~~ ST	G	1	–	–	–	–	–	1			

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	1/12/05	1900	1. RECEIVED BY FEDERAL EXPRESS	1/12/05	1900
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3665

PAGE 1 OF 1

PROJECT NO: CTO N1245 331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308
LABORATORY NAME AND CONTACT: LAUCKS / HUGH PRENTICE	SAMPLERS (SIGNATURE)	FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857
ADDRESS: 940 SOUTH HARNEY ST.	CARRIER/WAYBILL NUMBER: FED. EX. AB# 8497 8135 6369	CITY, STATE: SEATTLE WA 98108	

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOCS, PAHS, PCBS	HERBICIDES & PESTICIDES	TAL METALS PLUS TIN	TOTAL CYANIDE					COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	G						
PRESERVATIVE USED									4°C	4°C	4°C	4°C						
1/11	1000	15SD002 0006	15SD 002	0	0.5	SD	G	3	1	1	1							
1/11	1040	15SD001 0006	15SD 001	0	0.5	SD	G	3	1	1	1							
1/11	1115	15SD016 0006	15SD 016	0	0.5	SD	G	3	1	1	–	1						
1/11	1225	15SD017 0006	15SD 017	0	0.5	SD	G	3	1	1	–	1						
1/11	1320	15SD015 0006	15SD 015	0	0.5	SD	G	3	1	1	–	1						
1/11	1415	15SD013 0006	15SD 013	0	0.5	SD	G	3	1	1	–	1						
1/11	1425	15SD014 0006	15SD 014	0	0.5	SD	G	3	1	1	–	1						
1/11	1525	15SD005 0006	15SD 005	0	0.5	SD	G	6	2	2	2							DO MS/MSD
1/11	0000	15FD011105 02	QC	0	0.5	SD	G	3	1	1	1							DUP OF 15SD005 0006
1/11	1555	15SD006 0006	15SD 006	0	0.5	SD	G	3	1	1	–	1						
1/12	0910	15SD009 0006	15SD 009	0	0.5	SD	G	3	1	1	–	1						

1. RELINQUISHED BY	DATE 1/12/05	TIME 1900	1. RECEIVED BY FEDERAL EXPRESS	DATE 1/12/05	TIME 1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM: TINUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3666

PROJECT NO: CTO N1245 331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASWSKI	PHONE NUMBER: (412) 921-8308
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857
		CARRIER/WAYBILL NUMBER: FED. EX AB# 8447 8135 6369	

LABORATORY NAME AND CONTACT: LAUCKS / HUGH PRENTICE
ADDRESS: 940 SOUTH HARNEY ST
CITY, STATE: SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW 846 8260B	SVOCS & PAHS	PCBS	HERBICIDES & PESTICIDES	TOTAL METALS X 23	DIS. METALS X 3			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	G	Q	Q			
PRESERVATIVE USED									4°C	4°C/HCl	4°C	4°C	4°C	4°C/HNO3	4°C/HNO3		
1/12	1035	15ST01101	15SW 011	–	–	ST	G	10	3	3	1	2	1	–			
1/12	1035	15ST01101-F	↓	–	–	ST	G	1	–	–	–	–	1	1			
1/12	1120	15ST00401	15SW 004	–	–	ST	G	10	3	3	1	2	1	–			
1/12	1120	15ST00401-F	↓	–	–	ST	G	1	–	–	–	–	–	1			
~~1/12~~ TR						~~ST~~	~~TR~~										
~~1/12~~ TR						~~ST~~	~~TR~~										

1. RELINQUISHED BY: [signature]	DATE: 1/12/05	TIME: 1900	1. RECEIVED BY: FEDERAL EXPRESS	DATE: 1/12/05	TIME: 1900
2. RELINQUISHED BY:	DATE:	TIME:	2. RECEIVED BY:	DATE:	TIME:
3. RELINQUISHED BY:	DATE:	TIME:	3. RECEIVED BY:	DATE:	TIME:

COMMENTS:

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3694 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO N1245 331	NSWC CRANE	RALPH BASIKSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EXAB 8447 8135 3695		SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: PESTICIDE / PCBS	COMMENTS
2/14	1420	1555047 0002	1558 047	0	2	SO	G	1	1	
2/14	1430	1555048 0002	1558 048	0	2	SO	G	1	1	
2/14	1448	1558048 0206	↓	2	6	SO	G	1	1	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	2/16/05	1830	1. RECEIVED BY FEDERAL EXPRESS	2/16/05	1830
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

FORM TtNUS-001 4/02R

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 3248 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 1245 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
TR FOR COLIN DOOLAN		TERRY ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 8447 8135 4804		SEATTLE WA 98108

Terry Rojahn

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	VOCs 8260B	SEMIVOLATILES 8270C Only 1,4-Dioxane	Total Metals + Tin	D.S. Metals + Tin	SEMIVOLATILES *				COMMENTS
									CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G	P	P	G			
									PRESERVATIVE USED	4°C/HCl	4°C	4°C/HNO3	4°C/HNO3	4°C			
6/02	0800	TB060205 01	QC	-	-	QC	G	2	2								TRIP BLANK
6/02	1450	08GWT00701	08MW T07	-	-	GW	G	19	9	4	3	3					DO MS/MSD
6/02	1515	08GWT00201 (TR)	08MW T02	-	-	GW	G	6	3	2	1						
6/02	1920	08GWT00101	08MW T01	-	-	GW	G	6	3	2	1						
6/02	1950	08GWT00301	08MW T03	-	-	GW	G	6	3	2	1						
6/02	0000	FD060205 01	QC	-	-	GW	G	6	3	2	1						FROM 08GWT00201
6/03	0850	08RB060305 01	QC	-	-	QC	G	6	3	2	1						BLADDER PUMP
6/03	0900	08SB060305 01	QC	-	-	QC	G	6	3	2	1	-	2				DI
6/03	0900	08GWT00601	08MW T06	-	-	GW	G	4	3	1	-	-					SLOW RECHARGE WELL MIN. VOL.
6/03	1235	08GWT00501	08MW T05	-	-	GW	G	6	3	2	1						
6/03	1405	08GWT00901	08MW T09	-	-	GW	G	6	3	2	1						
6/03	1542	08GWT00401	08MW T04	-	-	GW	G	6	3	2	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rojahn	6/03/05	1900	1. RECEIVED BY FEDERAL EXPRESS	6/03/05	1900
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS * SVOCs including 1,4-Dioxane but excluding PAHs, pentachlorophenol & hexachlorophenol.

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4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3250 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 1245 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
TR FOR C. DOOLAN		TERRY ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED EX AB# 8447 8135 4815		SEATTLE WA 98108

STANDARD TAT ☑
RUSH TAT ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	VOLATILES (8260B)	SVOCS (8270C) 1,4-DIOXANE ONLY	Total Metals + Tin	Dis. Metals + Tin	* SVOC (8270C) SEE COMMENTS				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P	P	G				
PRESERVATIVE USED									4°C/HCl	4°C	4°C/HNO3	4°C/HNO3	4°C				
6/03	1700	TB06030501	QC	-	-	QC	G	2	2								TRIP BLANK
6/03	1705	08GWT010 01	08MW T10	-	-	GW	G	6	3	2	1						
6/04	1135	08GWT008 01	08MW T08	-	-	GW	G	6	3	2	1						
6/04	1245	08GWT011 01	08MW T11	-	-	GW	G	TR ~~6~~ 7	3	2	1	1					
6/04	1345	08GWTW006	08TW 006	-	-	GW	G	4	3	1	-	-					MIN. VOL.
6/04	1435	08SP002 01	08SP 002	-	-	SP	G	6	3	1	1	1					
6/04	1600	08GWT006 01	08MW T06	-	-	GW	G	2	-	-	1	1					
6/05	0930	08SW014 01	08SW SD014	-	-	SW	G	TR ~~6~~ 7	3	-	1	1	2				
6/05	1015	08SW009 02	08SW SD009	-	-	SW	G	7	3	-	1	1	2				
6/05	1035	08SW007 02	08SW SD007	-	-	SW	G	7	3	-	1	1	2				
6/05	1105	08SW008 02	08SW SD008	-	-	SW	G	7	3	-	1	1	2				
6/05	1200	08SW015 01	08SW SD015	-	-	SW	G	21	9	-	3	3	6				DO MS/MSD
6/05	1400	08SW010 01	08SW SD010	-	-	SW	G	7	3	-	1	1	2				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6/6/05	1900	1. RECEIVED BY FED EXPRESS	6/06/05	1900
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS * Including 1,4-dioxane but excluding PCB's, pentachlorophenol, & hexachlorophene

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 3251 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 0331 1245	NSWIC CRANE	RALPH BASINSKI	(412)921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
TR FOR C. DOOLAN		TERRY ROJAHN	(412)921-8857	940 SOUTH HARNEY ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 4815		SEATTLE, WA 98108

Terry Rojahn

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT) INCHES	BOTTOM DEPTH (FT) INCHES	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Volatiles (8260B)	* SVOCs (8270C) SEE COMMENTS	Total Metals + Tin	Dis. Metals + Tin	Volatiles (8260B) 4oz Jar	*SVOCs (8270C) 4oz Jar	Total Metals + Tin 4oz Jar	COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P	P	G	G	G	
PRESERVATIVE USED									4°C/HCl	4°C	4°C/HNO3	4°C/HNO3	4°C	4°C	4°C	
6/05	1510	08SW01201	08SW SD012	–	–	SW	G	7	3	2	1	1	–	–	–	
6/05	1610	08SW00302	08SW SD003	–	–	SW	G	7	3	2	1	1	–	–	–	
6/05	0000	08FD060505 01	QC	–	–	SW	G	7	3	2	1	1	–	–	–	FROM 08SW01201
6/05	0935	08SD01401	08SW SD014	0	4	SD	G	3	–	–	–	–	1	1	1	
6/05	1020	08SD00902	08SW SD009	0	4	SD	G	1	–	–	–	–	–	1	–	
6/05	1040	08SD00702	08SW SD007	0	4	SD	G	1	–	–	–	–	–	1	–	
6/05	1110	08SD00802	08SW SD008	0	4	SD	G	1	–	–	–	–	–	1	–	
6/05	1135	08SD01101	08SW SD011	0	4	SD	G	3	–	–	–	–	1	1	1	
6/05	1205	08SD01501	08SW SD015	0	4	SD	G	6	–	–	–	–	2	2	2	DO MS/MSD
6/05	1405	08SD01001	08SW SD010	0	4	SD	G	3	–	–	–	–	1	1	1	
6/05	1450	08SD00602	08SW SD006	0	4	SD	G	1	–	–	–	–	–	1	–	
6/05	1515	08SD01201	08SW SD012	0	4	SD	G	3	–	–	–	–	1	1	1	
6/05	1615	08SD00302	08SW SD003	0	4	SD	G	1	–	–	–	–	–	1	–	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rojahn	6/6/05	1900	1. RECEIVED BY FEDERAL EXPRESS	6/06/05	1900
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS * Including 1,4-Dioxane but excluding PAHs, pentachlorophenol, & hexachlorophene

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3252

PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 1245 0331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
TR FOR C. DOOLAN		TERRY ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 4815		SEATTLE, WA 98108

Terry Rojahn

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (~~FT~~) INCHES	BOTTOM DEPTH (~~FT~~) INCHES	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	VOLATILES 4oz Jar (8260B)	*SVOC 4oz Jar (8270C)	Total Metals + Tin 4oz Jar	VOLATILES 8260B	*SVOCS (8270C)	Total Metals + Tin			COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	G	G	P			
PRESERVATIVE USED									4°C	4°C	4°C	4°C/HCl	4°C	4°C/HNO3			
6/05	1640	08SD00202	08SW SD002	0	4	SD	G	1	–	1	–						
6/05	1645	08SD00102	08SW SD001	0	4	SD	G	1	–	1	–						
6/05	1655	08SD01301	08SW SD013	0	4	SD	G	3	1	1	1						
6/05	0000	08FD06050502	QC	0	4	SD	G	3	1	1	1						FROM 08ED01201
6/06	1410	08RB06060501	QC	–	–	QC	G	5	–	–	–	3	1	1			DIS. TROWEL

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
Terry Rojahn	6/06/05	1900	FEDERAL EXPRESS	6/06/05	1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS
Including 1,4-Dioxane but excluding Ph[illegible], pentachlorophenol & hexachlorophen[illegible]

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW ([illegible]LD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 3256

PAGE 1 OF 1

PROJECT NO: CTO 1245 0331	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921 8308
		LABORATORY NAME AND CONTACT: EC LABS / JAC PADGETT	
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921 8857
		ADDRESS: 11422 NORTH U.S. HIGHWAY 41	
		CARRIER/WAYBILL NUMBER: PICK UP BY EC LABS	CITY, STATE: FARMERSBURG, IN 47850

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): Q
PRESERVATIVE USED: 4°C/*
TYPE OF ANALYSIS: Coliform Bacteria

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	Coliform Bacteria	COMMENTS
6/7	0650	08SP00201	08SP 002	–	–	SP	G	1	1	SEEP SAMPLE
6/7	0710	08SU00101	08SU 001	–	–	SU	G	1	1	SUMP SAMPLE
6/7	0000	08FD0607051	QC	–	–	QC	G	1	1	FROM 08SU00101

1. RELINQUISHED BY [signature]	DATE 6/7/05	TIME 0912	1. RECEIVED BY [signature]	DATE 6/7/05	TIME 0912
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * Sodium Thiosulfate

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3257 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 1245 331	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	940 S. HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 4826		SEATTLE, WA 98108

STANDARD TAT ☐
RUSH TAT ☐ SEE Comments ← PAHS only
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☒ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	* PAHs 4oz Jar	* METALS & TOC 4oz Jar	* GRAIN SIZE 8oz Jar	VOLATILES 8260B	**SVOCS (8270C)	Total Metals + Tin	Dis. Metals + Tin		COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	G	G	G	G	G	P	P
PRESERVATIVE USED									4°C	4°C	4°C	4°C/HCl		4°C	4°C/HNO3	4°C/HNO3	
6/7	0630	TB06070501	QC	-	-	QC	G	2	-	-	-	2					
6/7	1710	08SW00101	08SW 001	-	-	SW	G	7	-	-	-	3	2	1	1		
6/7	1215	15SD020 0006	15SW SD20	-	-	SD	G	3	1	1	1						
6/7	1305	15SD021 0006 (TR)	15SW SD21	-	-	SD	G	3	1	1	1						
6/7	1340	15SD022 0006 (TR)	15SW SD22	-	-	SD	G	3	1	1	1						
6/7	1430	15SD023 0006 (TR)	15SW SD23	-	-	SD	G	3	1	1	1						
6/7	1435	15SD026 0006	15SW SD26	-	-	SD	G	3	1	1	1						
6/7	1500	15SD025 0006	15SW SD25	-	-	SD	G	3	1	1	1						
6/7	1510	15SD024 0006	15SW SD24	-	-	SD	G	3	1	1	1						

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rojahn	6/08/05	1030	1. RECEIVED BY FEDERAL EXPRESS	6/08/05	1030
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

*COMMENTS * PAHs - 7 day TAT ; METALS, TOC & G[illegible] 5.25 HOLD
** INCLUDING 1,4 DIOXANE but EXCLUDING [illegible]S PENTACHLOROPHENOL & hexachlorophe[illegible]

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW ([illegible] COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 3258 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
1245 CTO 0331	NSWC CRAN	RALPH BASINSKI	(412) 921-8308	ENVIROSYSTEMS, INC / PETRA KARBE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rojahn		TERRY ROJAHN	(412) 921-8857	1 LAFAYETTE ROAD
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 8447 8135 4848		HAMPTON, NH 03843

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): Q
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: Toxicity *

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH ~~(FT)~~ INCHES	BOTTOM DEPTH ~~(FT)~~ INCHES	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	Toxicity *	COMMENTS
6/7	1215	15SD020 0006 ~~08~~ TR	155W SD020	0	4	SD	G	1	1	
6/7	1305	15SD021 0006	155W SD21	0	4	SD	G	1	1	
6/7	1340	15SD022 0006	155W SD 22	0	4	SD	G	1	1	
6/7	1430	15SD023 0006	155W SD 23	0	4	SD	G	1	1	
6/7	1435	15SD026 0006	155W SD26	0	4	SD	G	1	1	
6/7	1500	15SD025 0006	155W SD25	0	4	SD	G	1	1	
6/7	1510	15SD024 0006	155W SD24	0	4	SD	G	1	1	

1. RELINQUISHED BY Terry Rojahn	DATE 6/08/05	TIME 1030	1. RECEIVED BY FEDERAL EXPRESS	DATE 6/08/05	TIME 1030
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS * 10-DAY HYALELLA AZTECA SEDIMENT TOXICITY

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-9272005-1

Project No: **112GN1245**	Facility: **CRANE NSWC**	Project Manager: **Ralph Basinski 412-921-8308**	Carrier: **Federal Express**	Laboratory Name: **Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108**
Task No: **CTO 0331**	Turn Around Time: **Standard**	Field Ops Leader: **Terry Rojahn 412-921-8857**	Carrier/Waybill No. **8447 8135 7891**	Point of Contact: **Hugh Prentice 206-767-5060 x1028**

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
09/27/2005	08SS0360002	14:00	Percent Moisture	08SB36	S	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/27/2005	08SS0360002	14:00	SW-846 8260B	08SB36	S	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/27/2005	08SS0370002	14:13	Percent Moisture	08SB37	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/27/2005	08SS0370002	14:13	SW-846 8260B	08SB37	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/27/2005	08SS0380002	14:24	Percent Moisture	08SB38	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/27/2005	08SS0380002	14:24	SW-846 8260B	08SB38	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/27/2005	08SS0390002	14:35	Percent Moisture	08SB39	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/27/2005	08SS0390002	14:35	SW-846 8260B	08SB39	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/27/2005	RB09270501	15:30	SW-846 8260B		Rinsate Blank-AQ	Volatile Organic Compounds	4d C HCL	3	Glass	40 mL vial	Rinsate Blank - drilling shoe
09/27/2005	TB09270501	12:45	SW-846 8260B		Trip Blank-AQ	Volatile Organic Compounds	4d C HCL	2	Glass	40 mL vial	Trip Blank for Soils

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
John Wright	09/27/2005	18:00	**Federal Express**	09/27/2005	19:00
2. Relinquished By:	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**
3. Relinquished By:	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**

Comments:

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-9292005-2

Project No: 112GN1245	Facility: CRANE NSWC	Project Manager: Ralph Basinski 412-921-8308	Carrier: Federal Express	Laboratory Name: Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No: CTO 0331	Turn Around Time: Standard	Field Ops Leader: Terry Rojahn 412-921-8887	Carrier/Waybill No. 8447 8135 7870	Point of Contact: Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
09/29/2005	08FD09290501	00:00	Percent Moisture	QC	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08FD09290501	00:00	SW-846 8260B	QC	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0220608	11:05	Percent Moisture	08SB22	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SB0220608	11:05	SW-846 8260B	08SB22	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0250206	09:55	Percent Moisture	08SB25	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SB0250206	09:55	SW-846 8260B	08SB25	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0250608	10:06	Percent Moisture	08SB25	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SB0250608	10:06	SW-846 8260B	08SB25	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0260406	12:53	Percent Moisture	08SB26	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SB0260406	12:53	SW-846 8260B	08SB26	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0270406	10:35	Percent Moisture	08SB27	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SB0270406	10:35	SW-846 8260B	08SB27	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0280406	13:10	Percent Moisture	08SB28	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SB0280406	13:10	SW-846 8260B	08SB28	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0290406	13:28	Percent Moisture	08SB29	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SB0290406	13:28	SW-846 8260B	08SB29	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SB0310406	13:52	Percent Moisture	08SB31	SO	Percent Moisture	4d C	3	Glass	4 oz. wide-mouth clear w/Teflon cap	Do MS/MSD
09/29/2005	08SB0310406	13:52	SW-846 8260B	08SB31	SO	Volatile Organic Compounds	4d C	9	EnCore	EnCore Sampler - 5 gram	Do MS/MSD
09/29/2005	08SS0220002	10:52	Percent Moisture	08SB22	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SS0220002	10:52	SW-846 8260B	08SB22	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SS0250002	09:45	Percent Moisture	08SB25	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SS0250002	09:45	SW-846 8260B	08SB25	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SS0260002	12:45	Percent Moisture	08SB26	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SS0260002	12:45	SW-846 8260B	08SB26	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	

09/29/2005	08SS0270002	10:28	Percent Moisture	08SB27	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SS0270002	10:28	SW-846 8260B	08SB27	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SS0280002	13:04	Percent Moisture	08SB28	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SS0280002	13:04	SW-846 8260B	08SB28	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SS0290002	13:20	Percent Moisture	08SB29	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SS0290002	13:20	SW-846 8260B	08SB29	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	08SS0310002	13:45	Percent Moisture	08SB31	SO	Percent Moisture	4d C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
09/29/2005	08SS0310002	13:45	SW-846 8260B	08SB31	SO	Volatile Organic Compounds	4d C	3	EnCore	EnCore Sampler - 5 gram	
09/29/2005	TB09290501	09:00	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4 ° C / HCL	2	Glass	40ml vials	

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
John Wright	09/29/2005	17:02	Federal Express	09/29/2005	18:02
2. Relinquished By:	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**
3. Relinquished By:	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**

Comments:

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-9302005-4

Project No: 112GN1245	Facility: CRANE NSWC	Project Manager: Ralph Basinski 412-921-8308	Carrier: Federal Express	Laboratory Name: Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No: CTO 0331	Turn Around Time: Standard	Field Ops Leader: Terry Rojahn 412-921-8857	Carrier/Waybill No. 8447 8135 7869	Point of Contact: Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
09/30/2005	08RB09300501	13:20	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4 ° C / HCL	2	Glass	40ml vials	Drilling sleeve
09/30/2005	08RB09300502	13:35	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4 ° C / HCL	2	Glass	40ml vials	Trowel
09/30/2005	08SB09300501	13:10	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4 ° C / HCL	2	Glass	40ml vials	

1. Relinquished By: John Wright	Date: 09/30/2005	Time: 17:58	Received By: Federal Express	Date: 09/30/2005	Time: 18:58
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-1022005-5

Project No: 112GN1245	Facility: CRANE NSWC	Project Manager: Ralph Basinski 412-921-8308	Carrier: Federal Express	Laboratory Name: Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No: CTO 0231	Turn Around Time: Standard	Field Ops Leader: Terry Rojahn 412-921-8867	Carrier/Waybill No. 8447 8136 7988	Point of Contact: Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Size	Comments
10/02/2005	05FD10020501	00:00	Percent Moisture	QC	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05FD10020501	00:00	SW-846 8260B	QC	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0340406	11:18	Percent Moisture	05SB34	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0340406	11:18	SW-846 8260B	05SB34	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0350305	11:30	Percent Moisture	05SB35	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0350305	11:30	SW-846 8260B	05SB35	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0410406	07:47	Percent Moisture	05SB41	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0410406	07:47	SW-846 8260B	05SB41	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0420406	08:14	Percent Moisture	05SB42	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0420406	08:14	SW-846 8260B	05SB42	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0430305	08:38	Percent Moisture	05SB43	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0430305	08:38	SW-846 8260B	05SB43	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0450204	09:29	Percent Moisture	05SB45	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0450204	09:29	SW-846 8260B	05SB45	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0300002	09:59	Percent Moisture	05SB30	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0300002	09:59	SW-846 8260B	05SB30	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0340002	11:06	Percent Moisture	05SB34	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0340002	11:06	SW-846 8260B	05SB34	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0350002	11:26	Percent Moisture	05SB35	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0350002	11:26	SW-846 8260B	05SB35	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0410002	07:45	Percent Moisture	05SB41	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0410002	07:45	SW-846 8260B	05SB41	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0420002	08:09	Percent Moisture	05SB42	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0420002	08:09	SW-846 8260B	05SB42	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0430002	08:28	Percent Moisture	05SB43	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0430002	08:28	SW-846 8260B	05SB43	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05SB0440002	08:49	Percent Moisture	05SB44	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SB0440002	08:49	SW-846 8260B	05SB44	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	

10/02/2005	05SS0450002	09:19	Percent Moisture	05SS45	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/02/2005	05SS0450002	09:19	SW-846 8260B	05SS45	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/02/2005	05TB10020501	07:00	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C	2	Glass	40ml vials	
10/02/2005	05SS0440204	08:57	Percent Moisture	05SS44	SO	Percent Moisture	4° C	3	Glass	4 oz. wide-mouth clear w/Teflon cap	Do MS/MSD
10/02/2005	05SS0440204	08:57	SW-846 8260B	05SS44	SO	Volatile Organic Compounds	4° C	9	EnCore	EnCore Sampler - 5 gram	Do MS/MSD

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
John Wright TW	10/3/05	18:00	Federal Express	10/3/05	18:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:
Shipment on 10/3/05 for weekend sampling

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-1032005-6

Project No: 112GN1245	Facility: CRANE NSWC	Project Manager: Ralph Basinski 412-921-8306	Carrier: Federal Express	Laboratory Name: Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No: CTO 0031	Turn Around Time: Standard	Field Ops Leader: Terry Rojahn 412-921-8857	Carrier/Waybill No. 8447 8135 7888	Point of Contact: Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Size	Comments
10/03/2005	06SB0150406	15:29	Percent Moisture	06SB15	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0150406	15:29	SW-846 8260B	06SB15	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0180204	16:08	Percent Moisture	06SB18	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0180204	16:08	SW-846 8260B	06SB18	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0200204	14:41	Percent Moisture	06SB020	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0200204	14:41	SW-846 8260B	06SB020	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0210204	14:54	Percent Moisture	06SB21	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0210204	14:54	SW-846 8260B	06SB21	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0240203	15:07	Percent Moisture	06SB24	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0240203	15:07	SW-846 8260B	06SB24	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0150002	15:20	Percent Moisture	06SB15	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0150002	15:20	SW-846 8260B	06SB15	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0170002	15:49	Percent Moisture	06SB17	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0170002	15:49	SW-846 8260B	06SB17	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0180002	16:02	Percent Moisture	06SB18	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0180002	16:02	SW-846 8260B	06SB18	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0190002	14:30	Percent Moisture	06SB19	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0190002	14:30	SW-846 8260B	06SB19	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0200002	14:37	Percent Moisture	06SB20	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0200002	14:37	SW-846 8260B	06SB20	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0210002	14:50	Percent Moisture	06SB21	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0210002	14:50	SW-846 8260B	06SB21	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/03/2005	06SB0240002	15:03	Percent Moisture	06SB024	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/03/2005	06SB0240002	15:03	SW-846 8260B	06SB024	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	

1. Relinquished By:	Date:	Time:	Received By: Federal Express	Date:	Time:

John Wright (TK)	10/03/2005	1800 (TK) 17:09		10/03/2005	1800 (TK) 18:09
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:
Samples shipped with 08TB10020501 from Chain of Custody 112GN1249-1022005-S

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-1042005-7

Project No:	Facility:	Project Manager:	Carrier:	Laboratory Name:
112GN1245	CRANE NSWC	Ralph Basinski 412-921-8308	Federal Express	Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No:	**Turn Around Time:**	**Field Ops Leader:**	**Carrier/Waybill No.**	**Point of Contact:**
CTO 0331	Standard	Terry Rojahn 412-921-8887	8447 8135 7847	Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
10/04/2005	08FD10040501	00:00	Percent Moisture	QC	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08FD10040501	00:00	SW-846 8260B	QC	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	08RB10040501	08:00	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	Bucket Auger
10/04/2005	08SB0160203	10:23	Percent Moisture	08SB16	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08SB0160203	10:23	SW-846 8260B	08SB16	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	08SB0320607	13:42	Percent Moisture	08SB32	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08SB0320607	13:42	SW-846 8260B	08SB32	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	08SB0400204	11:45	Percent Moisture	08SB40	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08SB0400204	11:45	SW-846 8260B	08SB40	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	08SS0160002	10:17	Percent Moisture	08SB16	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08SS0160002	10:17	SW-846 8260B	08SB16	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	08SS0230002	12:54	Percent Moisture	08SB23	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08SS0230002	12:54	SW-846 8260B	08SB23	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	08SS0320002	13:16	Percent Moisture	08SB32	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08SS0320002	13:16	SW-846 8260B	08SB32	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	08SS0400002	11:31	Percent Moisture	08SB40	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	
10/04/2005	08SS0400002	11:31	SW-846 8260B	08SB40	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	
10/04/2005	TB10040501	00:00	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C / HCL	2	Glass	40ml vials	
10/04/2005	08SB0330406	11:13	Percent Moisture	08SB33	SO	Percent Moisture	4° C	1	Glass	4 oz. wide-mouth clear w/Teflon cap	Potential hot sample
10/04/2005	08SB0330406	11:13	SW-846 8260B	08SB33	SO	Volatile Organic Compounds	4° C	3	EnCore	EnCore Sampler - 5 gram	Potential hot sample
10/04/2005	08SS0330002	10:36	Percent Moisture	08SB33	SO	Percent Moisture	4° C	3	Glass	4 oz. wide-mouth clear w/Teflon cap	Do MS/MSD
10/04/2005	08SS0330002	10:36	SW-846 8260B	08SB33	SO	Volatile Organic Compounds	4° C	9	EnCore	EnCore Sampler - 5 gram	Do MS/MSD

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

John Wright	10/04/2005	1800 TR ~~15:51~~	Federal Express	10/04/2005	1800 TR ~~16:51~~
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-10122005-8

Project No: 112GN1245	Facility: CRANE NSWC	Project Manager: Ralph Basinski 412-921-8308	Carrier: Federal Express	Laboratory Name: Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No: CTO 0331	Turn Around Time: Standard	Field Ops Leader: Terry Rojahn 412-921-8887	Carrier/Waybill No. 8447 8135 7814	Point of Contact: Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Size	Comments
10/11/2005	08GWT00202	13:13	SW-846 8260B	08MWT002		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/11/2005	08GWT00202	13:13	SW-846 8270C (1,4-dioxane only)	08MWT002		SVOC	4° C	2	Glass	1L Amber	
10/11/2005	08GWT00402	16:45	SW-846 8260B	08MWT004		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/11/2005	08GWT00402	16:45	SW-846 8270C (1,4-dioxane only)	08MWT004		SVOC	4° C	2	Glass	1L Amber	
10/11/2005	TB10110501	09:00	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C / HCL	2	Glass	40ml vials	Trip Blank
10/12/2005	08GWT00602	11:25	SW-846 8260B	08MWT006		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/12/2005	08GWT01002	10:20	SW-846 8260B	08MWT010		Volatile Organic Compounds	4° C / HCL	9	Glass	40ml vials	MS/MSD
10/12/2005	08GWT01002	10:20	SW-846 8270C (1,4-dioxane only)	08MWT010		SVOC	4° C	6	Glass	1L Amber	MS/MSD

1. Relinquished By: Terry Rojahn	Date: 10/12/2005	Time: 18:00	Received By: Federal Express	Date: 10/12/2005	Time: 18:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-10142005-9

Project No:	Facility:	Project Manager:	Carrier:	Laboratory Name:
112GN1245	CRANE NSWC	Ralph Basinski 412-921-8308	Federal Express	Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No:	**Turn Around Time:**	**Field Ops Leader:**	**Carrier/Waybill No.**	**Point of Contact:**
CTO 0331	Standard	Terry Rojahn 412-921-8857	8447 8135 7799	Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
10/12/2005	08GWT01102	17:25	SW-846 8260B	08MWT011		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/12/2005	08GWT01102	17:25	SW-846 8270C (1,4-dioxane only)	08MWT011		SVOC	4° C	2	Glass	1L Amber	
10/12/2005	TB10120501	15:30	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C / HCL	2	Glass	40ml vials	Trip Blank
10/13/2005	08GWT00102	15:10	SW-846 8260B	08MWT001		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/13/2005	08GWT00102	15:10	SW-846 8270C (1,4-dioxane only)	08MWT001		SVOC	4° C	2	Glass	1L Amber	
10/13/2005	08GWT00602	16:45	SW-846 8270C (1,4-dioxane only)	08MWT006		SVOC	4° C	2	Glass	1L Amber	
10/14/2005	08FD10140501	00:00	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/14/2005	08FD10140501	00:00	SW-846 8270C (1,4-dioxane only)	QC	AQ	SVOC	4° C	2	Glass	1L Amber	
10/14/2005	08GWT00302	12:40	SW-846 8260B	08MWT003		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/14/2005	08GWT00302	12:40	SW-846 8270C (1,4-dioxane only)	08MWT003		SVOC	4° C	2	Glass	1L Amber	

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Terry Rojahn	10/14/2005	18:00	Federal Express	10/14/2005	18:00
2. Relinquished By:	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**
3. Relinquished By:	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**

Comments:

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-10172005-10

Project No: 112GN1245	Facility: CRANE NSWC	Project Manager: Ralph Basinski 412-921-8308	Carrier: Federal Express	Laboratory Name: Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No: CTO 0331	Turn Around Time: Standard	Field Ops Leader: Terry Rojahn 412-921-8857	Carrier/Waybill No. 8447 8136 7777	Point of Contact: Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
10/14/2005	08GWT00502	16:40	SW-846 8260B	08MWT005		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/14/2005	08GWT00502	16:40	SW-846 8270C (1,4-dioxane only)	08MWT005		SVOC	4° C	2	Glass	1L Amber	
10/15/2005	TB10150501	07:05	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C / HCL	2	Glass	40ml vials	Trip Blank
10/15/2005	08GWT00702	15:15	SW-846 8260B	08MWT007		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/15/2005	08GWT00702	15:15	SW-846 8270C (1,4-dioxane only)	08MWT007		SVOC	4° C	2	Glass	1L Amber	
10/15/2005	08GWT00802	11:10	SW-846 8260B	08MWT008		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/15/2005	08GWT00802	11:10	SW-846 8270C (1,4-dioxane only)	08MWT008		SVOC	4° C	2	Glass	1L Amber	
10/15/2005	08GWT00902	13:57	SW-846 8260B	08MWT009		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/15/2005	08GWT00902	13:57	SW-846 8270C (1,4-dioxane only)	08MWT009		SVOC	4° C	2	Glass	1L Amber	
10/16/2005	08GWT01301	14:50	SW-846 8260B	08MWT013		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/16/2005	08GWT01301	14:50	SW-846 8270C (1,4-dioxane only)	08MWT013		SVOC	4° C	2	Glass	1L Amber	
10/16/2005	08GWT01401	14:15	SW-846 8260B	08MWT014		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/16/2005	08GWT01401	14:15	SW-846 8270C (1,4-dioxane only)	08MWT014		SVOC	4° C	1	Glass	1L Amber	Min sample volume
10/17/2005	08RB10170501	07:10	SW-846 8270C (1,4-dioxane only)	QC	AQ	SVOC	4° C	2	Glass	1L Amber	Bladder Pump
10/17/2005	08GWT01201	12:23	SW-846 8260B	08MWT012		Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	
10/17/2005	08GWT01201	12:23	SW-846 8270C (1,4-dioxane only)	08MWT012		SVOC	4° C	2	Glass	1L Amber	
10/17/2005	08RB10170501	07:10	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4° C / HCL	3	Glass	40ml vials	Bladder Pump

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
John Wright	10/17/2005	16:41	Federal Express	10/17/2005	17:41
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-10262005-1/1 (T2)

Project No:	Facility:	Project Manager:	Carrier:	Laboratory Name:
112GN1245	CRANE NSWC	Ralph Basinski 412-921-8308	Federal Express	Laucks Testing Laboratories 940 South Harney Street Seattle, WA 98108
Task No:	**Turn Around Time:**	**Field Ops Leader:**	**Carrier/Waybill No.**	**Point of Contact:**
CTO 0331	Standard	Terry Rojahn 412-921-8857	8447 8135 7733	Hugh Prentice 206-767-5060 x1028

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
10/25/2005	08FD10250501	00:00	SW-846 8260B	QC	SW	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	DUP
10/25/2005	08SP00202	13:20	SW-846 8260B	08SP002		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW00102	16:15	SW-846 8260B	08SW/SD001		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW00201	16:05	SW-846 8260B	08SW/SD002		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW00303	15:55	SW-846 8260B	08SW/SD003		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW00403	14:40	SW-846 8260B	08SW/SD004		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW00803	11:30	SW-846 8260B	08SW/SD008		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW00903	10:40	SW-846 8260B	08SW/SD009		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW01002	13:55	SW-846 8260B	08SW/SD010		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW01101	13:00	SW-846 8260B	08SW/SD011		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW01301	16:25	SW-846 8260B	08SW/SD013		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW01402	10:25	SW-846 8260B	08SW/SD014		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW01502	13:40	SW-846 8260B	08SW/SD015		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW01701	11:05	SW-846 8260B	08SW/SD017		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW01801	15:15	SW-846 8260B	08SW/SD018		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW02001	09:55	SW-846 8260B	08SW/SD020		Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials	
10/25/2005	08SW02101	09:25	SW-846 8260B	08SW/SD021		Volatile Organic Compounds	4°C/HCL	9	Glass	40ml vials	Do MS/MSD
10/25/2005	TB10250501	09:00	SW-846 8260B	QC	AQ	Volatile Organic Compounds	4°C/HCL	2	Glass	40ml vials	Trip Blank

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Terry Rojahn	10/26/2005	19:00	Federal Express	10/26/2005	19:00
2. Relinquished By:	**Date:**	**Time:**	**Received By:**	**Date:**	**Time:**

3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments:
This COC -12 will be modified to -11, Comments:
lab should refer to it as -11.

TETRA TECH NUS, INC

CHAIN OF CUSTODY
NUMBER: 112GN1245-10312005-1~~3~~2 (TR)

Project No:	Facility:	Project Manager:	Carrier:	Laboratory Name:
112GN1245	**CRANE NSWC**	**Ralph Basinski** **412-921-8308**	**Federal Express**	**Laucks Testing Laboratories** **940 South Harney Street** **Seattle, WA 98108**
Task No:	Turn Around Time:	Field Ops Leader:	Carrier/Waybill No.	Point of Contact:
CTO 0331	**Standard**	**Terry Rojahn** **412-921-8857**	**8447 8135 7700**	**Hugh Prentice** **206-767-5060 x1028**

Date	Sample ID #	Time	Analysis	Loc ID	Matrix	Description	Preservative	Container Count	Container Type	Container Reqs	Comments
10/28/2005	08GWT01401	09:15	**SW-846 8270C (1,4-dioxane only)**	08MWT014	GW	SVOC	4°C	2	Glass	1L Amber	Resampled

1. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Terry Rojahn	10/31/2005	18:00	**Federal Express**	10/31/2005	18:00
2. Relinquished By:	Date:	Time:	Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Comments: REFER to this COC AS 112GN1245-10312005-12

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**PM Telephone**		**Created Date**	10/23/06
Task/Contract #		**Field Op Leader (FOL)**	David Hickey	**Modified By**	
WBS Code #		**FOL Phone**		**Modified Date**	
Chain of Custody ID	112GN1245-10232006-1	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	8494 1921 6110	**Printed Date**	12/11/06

Chain of Custody Information

Chain of Custody #	**112GN1245-10232006-1**	**Lab Name**	Laucks Testing Labs	**Relenquished By**	Terry Rojahn
		Address	940 South Harney Street	**Date**	10/23/2006
Carrier	Federal Express	**City, State, Zip**	Seattle, WA 98108	**Time**	18:30
Carrier/Waybill No.	8494 1921 6110	**Lab Contact**	Elaine Walker	**Received By:**	Federal Express
		Lab Telephone	206-767-5060	**Date**	10/23/06
				Time	18:30

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
											Rinsate of

10/22/06	08RB10220601	18:40	SW-846 8260B	VOCs	QC	AQ	4°C/HCL	3	Glass	40ml vials	DPT Sleeve and drilling shoe
10/22/06	08TB10220601	18:30	SW-846 8260B	VOCs	QC	AQ	4°C/HCL	2	Glass	40ml vials	Trip Blank
10/23/06	08SB530507	14:50	SW-846 8260B	VOCs	08SB53	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/23/06	08SB540204	15:25	SW-846 8260B	VOCs	08SB54	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/23/06	08SB550709	13:40	SW-846 8260B	VOCs	08SB55	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/23/06	08SB560709	13:20	SW-846 8260B	VOCs	08SB56	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/23/06	08SB570608	14:27	SW-846 8260B	VOCs	08SB57	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/23/06	08SB590709	10:35	SW-846 8260B	VOCs	08SB59	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
10/23/06	08SB600709	10:55	SW-846 8260B	VOCs	08SB60	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/23/06	08SB610507	15:08	SW-846 8260B	VOCs	08SB61	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/23/06	08SB620406	11:30	SW-846 8260B	VOCs	08SB62	SO	4°C	9	EnCore	EnCore Sampler - 5 gram	DO MS/MSD

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**PM Telephone**		**Created Date**	10/24/06
Task/Contract #		**Field Op Leader (FOL)**	David Hickey	**Modified By**	
WBS Code #		**FOL Phone**		**Modified Date**	
Chain of Custody ID	112GN1245-10242006-2	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	8494 1921 6121	**Printed Date**	12/11/06

Chain of Custody Information

Chain of Custody #	**112GN1245-10242006-2**	**Lab Name**	Laucks Testing Laboratories, Inc	**Relenquished By**	Terry Rojahn
Carrier	Federal Express	**Address**	940 South Harney Street	**Date**	10/24/2006
Carrier/Waybill No.	8494 1921 6121	**City, State, Zip**	Seattle, WA 98108	**Time**	18:30
		Lab Contact	Hugh Prentice	**Received By:**	Federal Express
		Lab Telephone	206-767-5060	**Date**	10/24/06
				Time	18:30

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
10/24/06	08FD10240601	10:55	SW-846 8260B	VOCs	QC	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	Hydrocarbon odor
			SW-846							EnCore	

10/24/06	08SB460608	09:50	8260B	VOCs	08SB46	SO	4°C	3	EnCore	Sampler - 5 gram	
10/24/06	08SB470608	09:30	SW-846 8260B	VOCs	08SB47	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/24/06	08SB480507	09:15	SW-846 8260B	VOCs	08SB48	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/24/06	08SB490507	10:10	SW-846 8260B	VOCs	08SB49	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/24/06	08SB500608	10:30	SW-846 8260B	VOCs	08SB50	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/24/06	08SB510204	10:55	SW-846 8260B	VOCs	08SB51	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	Hydrocarbon odor
10/24/06	08SB520103	11:05	SW-846 8260B	VOCs	08SB52	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
10/24/06	08SB580709	11:30	SW-846 8260B	VOCs	08SB58	SO	4°C	3	EnCore	EnCore Sampler - 5 gram	
10/24/06	08TB10240601	08:00	SW-846 8260B	VOCs	QC	AQ	4°C/HCL	2	Glass	40ml vials	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	James Goerdt
TtNUS Project #	112GN1245	**PM Telephone**		**Created Date**	10/25/06
Task/Contract #		**Field Op Leader (FOL)**	David Hickey	**Modified By**	
WBS Code #		**FOL Phone**		**Modified Date**	
Chain of Custody ID	112GN1245-10252006-3	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	849419216143	**Printed Date**	12/11/06

Chain of Custody Information

Chain of Custody #	**112GN1245-10252006-3**	**Lab Name**	Laucks Testing Laboratories, Inc	**Relenquished By**	James Goerdt
Carrier	Federal Express	**Address**	940 South Harney Street	**Date**	10/25/2006
Carrier/Waybill No.	849419216143	**City, State, Zip**	Seattle, WA 98108	**Time**	17:07
		Lab Contact	Hugh Prentice	**Received By:**	Federal Express
		Lab Telephone	206-767-5060	**Date**	10/25/06
				Time	18:07

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
10/24/06	08FD10240602	00:00	SW-846 8260B	VOCs	QC	GW	4°C/HCL	3	Glass	40ml vials	
10/24/06	08FD10240602	00:00	SW-846 8270C	SVOCs	QC	GW	4°C	2	Glass	1L Amber	

10/24/06	08GWTW14	14:25	SW-846 8270C	SVOCs	08TW14	GW	4°C	5	Glass	1L Amber	Do MS/MSD
10/24/06	08GWTW14	14:25	SW-846 8260B	VOCs	08TW14	GW	4°C/HCL	9	Glass	40ml vials	Do MS/MSD
10/24/06	08GWTW15	13:45	SW-846 8270C	SVOCs	08TW15	GW	4°C	2	Glass	1L Amber	
10/24/06	08GWTW15	13:45	SW-846 8260B	VOCs	08TW15	GW	4°C/HCL	3	Glass	40ml vials	
10/24/06	08GWTW17	15:45	SW-846 8260B	VOCs	08TW17	GW	4°C/HCL	3	Glass	40ml vials	
10/25/06	08GWTW12	08:05	SW-846 8260B	VOCs	08TW12	GW	4°C/HCL	3	Glass	40ml vials	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
10/25/06	08GWTW13	13:30	SW-846 8260B	VOCs	08TW13	GW	4°C/HCL	3	Glass	40ml vials	
10/25/06	08GWTW13	13:30	SW-846 8270C	SVOCs	08TW13	GW	4°C	1	Glass	1L Amber	Min Vol- Approx 800 ml
10/25/06	08GWTW17	09:35	SW-846 8270C	SVOCs	08TW17	GW	4°C	2	Glass	1L Amber	

General Observations and Notes

No Notes

- End of Report -

C.6 EQUIPMENT CALIBRATION LOGS

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: NSWC CRANE

PROJECT NO.: N1245

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		
12-8-04	PID PHOTOVAC	ED HE 322	SJC	—	—	95.8	100 PPM	00250-03 EXP 2-17-05	
12-9-04	"	"	SJC	—	—	98	100 PPM	"	
12-10-04	"	"	SJC	—	—	95	"	"	
12-11-04	"	"	SJC	—	—	92	"	"	
12-12-04	"	"	SJC	—	—	95	100 PPM	"	
12-13-04	"	"	"	—	—	95	100 "	"	
12-14-04	"	"	"	—	—	94	100 "	"	

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: Swmus 08/15 12/13/16

PROJECT NO.: 1245 6878/7448

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		
1-5-05	LaMotte	4175-1503	JD	0	–	9.96	10.0	NA	ok
1-6-05	"		JD	0	–	9.99	10.0		ok
1-7-05	"		JD	0	–	10.00	10.0		ok
1-8-05	"		JD	0	–	10.0	10.0		ok
1-9-05	"		CO	0.05	0	10.0	10.0		ok
1-10-05	"		CO	0	–	10.0	–		ok
1-11-05	"		CO	0	0	10.0	10.0		ok
1-12-05	"		CO	0	0	9.87	10.0		ok
1-22-05	"		CO	0	–	10.0	–		ok
1-23-05	"		TA	0	0	10.0	–		ok
1-25-05	"		CO	0.0	–	10.0	–		ok

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: Swmus 08/15 12/13/16

PROJECT NO.: 1245 6878 / 7448

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		
1-5-05	Lamotte	4536-3303	QS	0	–	9.98	10.0		ok
1-6-05	"		QS	0	–	10.0	–		ok
1-7-05	"		QS	0	–	10.0	–		"
1-8-05	"		QS	0	–	10.0	–		ok
1-12-05	"		CD	0	–	10.0	–		OK
1-22-05	"		CD	0	–	10.0	–		OK
1-23-05	"		JK	0	0	10.0	–		OK
1-25-05	"		CD	0.0	–	10.0	–		OK

Turbidity Meter
LaMotte
0355-4197

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: NSWC CRANE

PROJECT NO.: 7440/6878

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		
2-2-05	2020	0355-4197	TR	0.0	0.0	0.0	0.0	Provided by Vendor	ok
2-3-05			[illegible]	0	0	11	9.9		ok
2-5-05			[illegible]	0	0	9.2	10		
2-6-05			LO	0	0	10	10		ok
2-7-05			TR	0	0	10	10		ok

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: SWMU 13/16, RD 4 12 Rd 2

PROJECT NO.: 7448/6878

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		
2-1-05	Lamotte	4536-3303	QD	0	0	10	10	NA	
2-2-05			QD	0	0	10	10		
2-3-05			QD	0	0	10	10		
2-4-05			QD	0	0	11	10		
2-5-05			QD	0	0	10	10		
2-6-05			CD	0	0	10	10		OK
2-7-05			TR	0	0	10	10		
2-8-05			QD	0	0	9.8	10		
2-15-05			CD	0	0	9.9	10		OK
2-16-05			CD	0	0	10	10		OK
2-17-05			CD	0	0	9.5	10		ok
2-18-05			CD	0	0	10	10		ok
2-19-05			CD	0	0	10	10		ok
2-20-05			CD	0	0	10	10		OK
2-21-05			CD	0	0	10.31	10		OK
2-22-05			CD	0	0	10.64	10		OK

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: SWMU 13/16 BZ4 12 Rd 2

PROJECT NO.: 7448 6878

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		
2-1-05	Lamotte	4175-1503	QD	0	0	10	10	NA	
2-2-05			QD	0	0	10	10		
2-3-05			QD	0	0	9.97	10		
2-4-05			CD	0	0	10.12	10		
2-5-05			QD	0.7	0	9.98	10		
2-6-05			CD	0	0	9.90	10		OK
2-7-05			TR	0	0	10	10		OK
2-15-05			CD	0	0	9.27	10		replaced battery
2-16-05			CD	0	0	10.54	10		ok
2-17-05			CD	0	0	9.41	10		ok
2-18-05			CD	0	0	9.95	10		ok
2-19-05			CD	0	0	10.26	10		OK
2-20-05			CD	0	0	10	10		OK
2-21-05			CD	0	0	10.07	10		OK
2-21-05			CD	0	0	10.56	10		OK

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

SITE NAME: SWMUs 08 &15 12/13/16

PROJECT No.: N1245, CTO 0331 6878/7448

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 01009 56 AA

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
1/5/05	JG CD	6.99	4.05	455	9.87	256.5 17.61	7.00	4.00	1000	9.50	237.4 17.33	7.0 4110 8/23/05 4.0 4098 8/18/05	
1/6/05	JG CD	7.06	3.92	1069	9.22	219.3 17.61	6.99	4.00	1001	9.10	237.6 17.69	SPC 4387 1/21/05 ORP 032 0667	10/05
1/7/05	CD	7.01	4.21	1009	10.04	238.1 16.55	7.00	4.00	1000	9.61	238.0 16.68	"	
1/8/05	CD	7.10	3.79	946	9.74	250.2 15.07	7.00	4.00	1000	9.97	234.6 15.30	"	
1/9/05	CD	7.01	3.99	1094	9.94	232.8 15.47	7.00	4.00	1000	9.63	238.5 15.55	"	
1/11/05	CD	7.01	4.00	1005	7.64	227.6 17.28	7.00	4.00	1001	9.11	236.8 17.43	"	
1/12/05	TR	7.06	3.90	990	9.15	246 19.25	7.00	4.00	1000	9.07	237.4 19.32	"	
1/22/05	CD	7.04	3.96	1014	8.40	227.3 14.53	7.00	4.00	1000	8.60	238.2 14.62	"	replaced DO membrane
1/23/05	CD	7.00	4.03	998	10.53	242.2 10.63	7.00	4.00	1000	9.62	236.7 10.57	"	
1/25/05	CD	7.00	3.99	1101	10.96	227.9 15.31	7.00	4.00	1000	8.88	238.2 16.62	"	
							SWMU 13/16 R&4						
2/1/05	CD	6.98	4.01	940	10.40	240.6 17.93	7.00	4.00	1000	8.79	237.5 17.57	SPC 4599 7/27/05	
2/2/05	JG	7.06	3.97	8.65	11.36	233.8 18.05	7.00	4.00	1000	9.42	237.5 18.12	"	
2/3/05	JG	6.86	4.00	1100	9.86 ~~11.09~~	241.6 18.23	7.00	4.00	1000	9.45	237.6 18.10	"	
2/5/05	CD	7.10	3.89	1109	4.77	235.6 16.24	7.00	4.00	1000	9.12	237.2 16.30	"	replaced DO membrane
2/6/05	CD	7.03	4.00	1036	9.12	238.6 17.10	7.00	4.00	1000	8.77	237.5 17.04	"	
2/7/05	JG	6.98	4.02	952	9.60	241.2 18.70	7.00	4.00	1000	8.92	238.6 18.60		
2/8/05	JG	6.58	4.03	1016	9.61	242.3 19.47	7.00	4.00	1000	9.15	237.5 19.89		

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

INSTRUMENT NAME/MODEL: YSI

SITE NAME: SWMUs 08 &15 12/13/16

MANUFACTURER: YSI

PROJECT No.: N1245, CTO 0331
6878 & 7498

SERIAL NUMBER: 99K1014 AG

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
1/5/05	JG CD	7.09	3.84	494	8.96	235.7 17.48	7.00	4.00	1000	9.40	239.8 17.51	7.00 4110 8/23/05 4.00 4098 8/18/05	
1/6/05	JG CD	7.03	3.89	536	8.63	268.7 18.38	7.00	4.01	1000	9.13	239.6 18.01	SPC 4387 1/21/05 ORP 03K0667 10/05	
1/7/05	JG	6.98	3.88	890	9.49	214.5 15.38	7.00	4.00	1000	9.66	240.0 15.63	"	
1/8/05	JG	6.92	3.90	826	9.24	220.7 14.37	7.00	4.00	1000	9.81	239.9 14.16	"	
1/10/05	CD	7.02	3.87	529	9.59	225.5 16.17	7.00	4.00	1000	9.71	251.6 16.44	"	
1/12/05	CD	7.06	3.89	1039	9.57	214.1 17.94	7.00	4.00	1000	9.26	253.1 17.89	"	
1/22/05	CD	6.99	3.89	1068	7.55	253.1 18.25	7.00	4.00	1000	8.43	235.1 18.34	"	replaced DO membrane
1/23/05	CD	7.04	3.82	1065	9.12	217.3 11.75	7.00	4.00	1000	9.91	252.5 11.75	"	
1/25/05	CD	7.08	3.84	1130	8.90	211.5 17.93	7.00	4.00	1000	8.85	252.9 17.92	"	
				SWMU			3/16		R2	4			
2/1/05	JG	7.02	3.88	978	14.73	210.1 18.40	7.00	4.00	1010	9.27	240.2 18.40	SPC 4599 7/27/05	
2/2/05	JG	7.04	3.95	947	15.62	18.56 208.8	7.00	4.00	1000	9.35	18.48 252.9		
2/3/05	JG	6.96	3.95	1155	12.01	18.14 221.7	7.00	4.00	1000	9.41	18.37 250.7		
2/4/05	JG	7.04	3.94	952	13.65	18.39 209.3	7.00	4.00	1000	9.37	18.32 237.4		
2/5/05	JG	7.00	3.92	945	12.95	18.88 208.6	7.00	4.00	1000	9.04	19.09 252.8		
2/6/05	JG	7.11	3.88	1151	12.52	19.74 208.3	7.00	4.00	1000	8.99	19.66 252.9		
2/7/05	JG	6.98	3.92	1173	10.05	208.2 19.29	7.00	4.00	1000	8.97	19.74 252.8		
2/8/05	JG	6.97	4.07	1154	9.02	211.2 19.70	7.00	4.00	1000	9.12	19.70 252.9		

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

SITE NAME: SWMUs ~~08 & 15~~ 13/16

PROJECT No.: N~~1245~~ 2448, CTO ~~0881~~ 357/6878 CTO 343

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 02A 0~~357~~ 527 AF

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
2/2/05	JG	6.97	3.94	1095	10.26	251.6 17.28	7.00	4.00	1000	9.25	237.5 17.27	7.0 4110 8/23/05 4.0 4098 8/18/05	
2/3/05	JG	6.87	4.05	888	11.11	234.7 ~~21.74~~ 19.0	7.00	4.00	1000	9.52	237.4 18.02	SPC ~~4099~~ 4099 7/27/05 ORP 03K 0667	10/05
2/5/05	JG	3.38	7.54	1153	9.39	14.11 242.6	7.00	4.00	1000	8.84	237.5 19.17	"	
2/6/05	CO	—	—	1014	6.91	236.5 17.01	—	—	1000	8.87	237.6 17.17	"	broken pH probe, replaced DO membrane
2/7/05	JG	—	—	1007	9.15	20.26 237.5	—	—	1000	9.12	20.29 237.5	"	"
2/8/05	JG	—	—	1005	9.42	18.50 236.8			1000	9.10	18.25 237.4	"	

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME.: NSWC CRANE

SITE NAME: SWMUs 08 &15 & 12

PROJECT No.: N1245, CTO 0331 6878

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 01D0956 AA

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
2/15/05	CD	7.03	3.99	1024	10.32	242.2 16.04	7.00	4.00	1000	9.47	237.7 16.08	4.0 4098 8/18/05 7.0 4594 7/28/06	
2/16/05	CD	6.97	4.03	1007	10.22	238.9 12.97	7.00	4.00	1000	9.75	236.4 13.03	SPC 4599 7/27/05 ORP 03150667	
2/17/05	CD	7.00	3.96	1015	9.38	~~216.1~~ ~~14.10~~	7.00	4.00	1000	9.48	~~237.9~~ ~~13.97~~	"	
						237.7 14.10					237.2 14.43		
2/18/05	CD	7.00	4.01	997	9.43	234.9 12.36	7.00	4.00	1000	9.77	237.3 12.36	"	
2/19/05	CD	6.99	3.97	1007	9.45	241.3 10.57	7.00	4.00	1000	9.90	237.3 10.57	"	
2/20/05	CD	7.00	4.04	1030	7.69	231.2 14.17	7.00	4.00	1000	9.56	237.5 14.17	"	
2/21/05	CD	7.03	3.99	1002	7.43	236.1 16.67	7.00	4.00	1000	9.41	237.5 16.62	"	
2/22/05	CD	7.03	4.01	1014	14.86	233.2 13.47	7.00	4.00	1000	9.55	237.5 13.74	"	
3/2/05	JG	7.02	4.18	1029	4.24	233.7 14.77	7.00	4.00	1000	9.75	237.5 14.72	"	
3/3/05	JG	6.98	3.99	974	8.80	236.3 14.26	7.00	4.00	1000	9.38	237.5 14.20	"	
3/4/05	JG	7.02	4.24	1065	5.78	234.5 17.62	7.00	4.00	1002	9.74	237.5 17.74	"	
3/5/05	JG	7.25	3.78	974	11.74	234.6 16.31	7.00	4.00	1001	9.23	237.5 16.00	"	
3/6/05	JG	6.97	3.94	995	9.25	235.7 16.72	7.00	4.00	1000	9.54	237.5 16.30	"	
3/7/05	JG	7.03	4.03	948	6.38	237.4 17.14	7.00	4.00	1001	9.15	237.5 17.10		

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

SITE NAME: SWMUs 08 &15 & 12

PROJECT No.: N1245, CTO 0331 & 6878

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 99K1014 AG

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
2/15/05	CD	7.10	3.84	1185	5.61	210.5 16.37	7.00	4.00	1000	9.31	252.9 16.37	4.0 4098 8/18/05 7.0 4594 7/28/06	replaced DO membrane
2/16/05	CD	7.07	3.83	1199	8.50	211.4 13.91	7.00	4.00	1000	9.53	252.9 13.73	SPC 4599 7/27/05 ORP 03K0667	
2/17/05	CD	7.00	3.95	1212	7.51	210.1 14.10	7.00	4.00	1000	9.35	252.9 13.93	"	
2/18/05	CD	7.05	3.85	1209	7.92	210.6 13.35	7.00	4.00	1000	9.49	252.9 13.29	"	
2/19/05	CD	7.06	3.90	1196	7.94	210.6 11.94	7.00	4.00	1000	9.63	252.9 11.32	"	
2/20/05	CD	6.98	3.93	1241	7.92	206.3 15.82	7.01	4.00	999	7.89	252.9 15.91	"	
2/21/05	CD	7.01	3.99	1262	8.21	203.2 16.39	7.00	4.00	1000	9.27	252.9 16.40	"	
2/22/05	CD	6.98	3.96	1268	8.88	202.2 14.46	7.00	4.00	1000	9.47	252.9 14.07	"	
3/2/05	JG	6.75	4.06	1305	10.54	201.3 16.95	7.00	4.00	1000	9.70	252.9 16.78	"	
3/3/05	JG	6.92	4.04	926	10.39	198.8 14.26	7.00	4.00	1000	9.33	252.9 14.71		
3/4/05	JG	6.94	4.04	1397	8.83	197.2 16.70	7.00	4.00	1000	9.33	252.9 16.50		

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE Summer 08 INSTRUMENT NAME/MODEL: YSI / 600 XL

SITE NAME: Mine Fill B (13) Mine Fill A (9) MANUFACTURER: YSI

PROJECT No.: 7448/00042/6878 SERIAL NUMBER: 04C3884 AB

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
5-3-05	JG/JW	7.12	3.89	1093	8.85	226.5 15.32	6.99	4.00	1000	9.50	237.5 15.98		
5-4-05	JG/JW	7.05	3.92	1021	9.62	236.5 17.41	7.00	4.00	1000	9.53	237.5 17.35		
5-5-05	JG	7.06	3.94	987	9.38	231.6 17.60	7.00	4.00	1000	9.36	237.5 17.48		
5-6-05	JG	6.99	3.94	1012	9.76	234.5 18.18	7.00	4.00	1000	9.32	237.5 18.23		
5-7-05	JG	7.02	4.06	1101	8.21	232.7 19.01	7.00	4.00	1000	9.51	237.5 18.33		
5-8-05	JG	7.09	3.92	982	8.99	234.5 19.37	7.00	4.00	1000	8.83	237.5 19.41	replaced DO membrane	
5-17-05	JG	6.89	3.88	963	9.20	237.7 18.48	7.00	4.00	1001	8.88	237.5 18.40	"not used"	
5-18-05	JG		Not used				–	–	–	–	–		
5-19-05	JG	6.99	4.01	checked			–	–	–	–	–		
5-21-05	JG	6.99	4.02	988	7.41	235.8 19.11	4.00 → 7.00		999	8.96	237.5 19.20		
5-22-05	JG	–	–	1082	9.78	236.7 18.26	–	–	999	8.98	237.5 18.33	pH bulb is broken	
5-23-05	JG	–	–	1004	9.93	236.2 19.53	–	–	1000	8.82	237.5 19.54		
6-1-05	CD	10.00	4.39	938	6.66	213.7 18.86	7.00	4.00	1000	8.96	~~237.7 18.46~~ 237.5 18.58		replaced DO membrane replaced pH bulb
											~~237.5~~ CD ~~18.46~~		
6-2-05	CD	5.68	6.73	1003	8.90	237.6 18.98	7.01	4.02	1000	8.80	237.5 18.87		
6-3-05	CD	5.35	3.92	1041	8.97	236.1 20.20	7.11	4.01	1000	8.76	237.5 20.01		
6-4-05	CD	7.13	4.14	1010	8.83	237.0 20.33	7.05	4.00	1000	8.76	237.5 20.02		
6-5-05	CD	7.10	3.25	1044	8.56	232.2 22.35	7.00	4.00	1000	8.34	237.5 22.29		

Summer 8

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE SWMU 09

INSTRUMENT NAME/MODEL: YSI / 6600 XLM

SITE NAME: Mine Fill B (13) Mine Fill A (12)

MANUFACTURER: YSI

PROJECT No.: 7448/0004 2/6878

SERIAL NUMBER: 01L0702AF

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
5-3-05	JG/JW	6.83	3.92	1136	9.71	241.2 16.76	7.00	4.00	1000	9.54	235.0 16.65	PH 4 4098 PH 7 4110	pH
5-4-05	JG/JW	7.06	3.99	1001	10.46	235.7 16.56	7.00	4.00	1000	9.61	234.9 16.61	SpC 4559 ORP 0341234	
5-5-05	JW/JG	7.03	4.09	990	6.54	232.0 17.26	7.00	4.00	1000	9.48	235.0 17.25		
5-6-05	JW	7.05	3.87	1122	11.65	234.6 19.68	7.00	4.00	1000	8.98	234.4 19.95		
5-7-05	JW	—	-	—	—	—	—	-	—	—	—		USE 5/6/05 CALIBRATION DO NOT USE INSTRUMENT
5-9-05	JW	6.93	4.16	992	4.93	229.6 19.37	7.00	4.00	1000	8.85	235.1 19.02		
5-18-05	TR	7.08	3.89	992	8.13	236.1 19.02	7.00	4.00	1000	9.10	235.0 18.0		
5-19-05	JG	6.90	3.79	1160	8.52	236.3 19.85	7.00	4.00	999	8.72	235.0 19.61		
5-20-05	JG	6.99	4.04	1002	9.10	241.3 19.94	7.00	4.00	999	8.88	235.0 19.95		
5-21-05	JG	7.12	3.98	995	11.07	232.3 18.93	7.00	4.00	1000	9.00	235.0 18.89		
5-22-05	JG	7.17	4.24	1040	8.61	227.0 19.55	7.00	4.00	1000	8.78	235.0 19.57		
5-23-05	JG	7.02	3.97	1016	6.77	235.2 19.70	7.00	4.00	1000	8.85	235.0 19.61		
5-24-05	JG	6.80	4.11	962	7.35	237.9 18.96	7.00	4.00	1000	9.06	235.0 18.83		
SWMU 8 6-1-05	CD	6.85	3.72	1063	11.47	229.8 17.79	7.00	4.00	1000	8.88	235.0 17.86	PH 4 4098 PH 7 4110	replaced DO membrane
6-2-05	CD	6.99	4.01	991	9.06	234.7 19.07	7.00	4.00	1000	8.80	235.0 18.91		
6-3-05	CD	6.94	3.97	997	8.66	235.4 20.01	7.00	4.00	1000	8.72	235.1 19.93		
6-4-05	CD	7.04	4.02	1000	8.83	234.0 20.08	7.00	4.00	1000	8.76	235.0 20.03		

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

SITE NAME: SWMU 9 Mine Fill B (13) Mine Fill A (12)

PROJECT No.: 74456/05042/6878

INSTRUMENT NAME/MODEL: Turbidimeter

MANUFACTURER: Lamotte

SERIAL NUMBER: 1728-1600

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
5/3/05		JW / JG	0.00	0.00	9.7	10		
5/4/05		JSW	0.00	0.00	9.86	10		
5/5/05		JSW	0.00	0.00	10	10		
5/6/05		JSW	0.00	0.00	10	10		
5/7/05		JSW	–	–	–	–		USE 5/6/05 CALIBRATION – DID NOT USE INSTRUMENT
5/8/05		JSW	0.00	0.00	9.8	10		
5/18/05		TR	0.00	0.00	10	10		
5/19/05		JG	0	0	11	10		
5/20/05		TR	0.00	0.00	10	10		
5/21/05		JG	0	0	10	10		
5/22/05		JG	0	0	10	10		
5/23/05		JG	0	0	9.9	10		
5/24/05		JG	0	0	10	10		
SWMU 8 6-1-05		CD	0	0	10	10		
6-2-05		CD	0	0	10	10		
6-3-05		CD	0	0	10	10		
6-4-05		CD	0	0	10	10		
6-5-05		CD	0	0	10.40	10.00		

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

INSTRUMENT NAME/MODEL: Turbidimeter

SITE NAME: Mine Fill B(13)

MANUFACTURER: LaMotte

PROJECT No.: 7448

SERIAL NUMBER: 2843-4501

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
5-3-05		JG/JW	0	0	9.5	9.9		OK
5-4-05		JG	0	0	10	10		
5-5-05		JG	0	0	9.9	10		
5-6-05		JG	0	0	10	10		
5-7-05		JG	0	0	9.9	10		
5-19-05		JG	0	0	10	10		
5-21-05		JG	0.65	0	9.7	10		
5-22-05		JG	0	0	10	10		
5-23-05		JG	0	0	10	10		
6-1-05		CD	0	0	9.38	10		
6-2-05		CD	0	0	10.45	10		
6-3-05		CD	0	0	8.89	10		
6-4-05		CD	0	0	10.59	10		

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SWMU 8

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

EQUIPMENT CALIBRATION LOG

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Client	

Instrument	PID
Manufacturer	Photovac 2020
Serial Number	ED JH 338

Created By	John Wright
Created Date	9/27/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Calibration Records

Date	Calibrator	Isobutylene - 100 ppm	Comments
9/27/05	John Wright/David Hickey	Pre: 0 Post: 100 Std: 003515 Exp: NA	
9/28/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
9/29/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
		Pre: 0 Post: 100	

9/30/05	John Wright	Std: 00335-04 Exp: 12/21/05	
10/1/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
10/2/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
10/3/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
10/4/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/2005	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Client	

Instrument	PID
Manufacturer	Photovac 2020
Serial Number	ED FM 304

Created By	John Wright
Created Date	9/28/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Calibration Records

Date	Calibrator	Isobutylene - 100 ppm	Comments
9/28/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
9/29/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
9/30/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
10/1/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/09	
		Pre: 0	

10/2/05	John Wright	Post: 100 Std: 00335-04 Exp: 12/21/05	
10/3/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	
10/4/05	John Wright	Pre: 0 Post: 100 Std: 00335-04 Exp: 12/21/05	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Client	

Instrument	Water Quality Meter
Manufacturer	YSI 600 Series
Serial Number	04C2866AB

Created By	James Goerdt
Created Date	10/11/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Calibration Records

Date	Calibrator	pH - 7 SU	pH - 4 SU	Conductivity	ORP	DO	Comments
10/11/05	James Goerdt	Pre: 7.21 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 4.03 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 0.755 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 247.6 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 19.31	Pre: 8.43 Post: 8.92 Std: Exp:	
10/12/05	James Goerdt	Pre: 7.00 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 4.12 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 1.016 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 231.8 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 20.54	Pre: 8.27 Post: 8.47 Std: NA Exp: NA	Replaced DO membrane.
10/13/05	James Goerdt	Pre: 6.91 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 3.97 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: .999 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 242.2 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 20.56	Pre: 8.23 Post: 9.02 Std: NA Exp: NA	
		Pre: 6.96 Post: 7.00	Pre: 4.00 Post: 4.00	Pre: 1.003 Post: 1.000	Pre: 231.4 Post: 237.5	Pre: 9.69 Post: 8.76	

10/14/05	James Goerdt	Std: 4319 Exp: 12/18/05	Std: 4439 Exp: 2/23/06	Std: 4958 Exp: 6/23/06	Std: 03L1234 Exp: 12/05 ORP: 20.87	Std: NA Exp: NA	
10/15/05	James Goerdt	Pre: 7.07 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 3.97 Post: 3.99 Std: 4439 Exp: 2/23/06	Pre: 1.004 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 239.3 Post: 237.4 Std: 03L1234 Exp: 12/05 ORP: 19.27	Pre: 8.34 Post: 8.61 Std: NA Exp: NA	
10/25/05	C. Doolan	Pre: 7.06 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 3.96 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 1047 Post: 1000 Std: 4958 Exp: 6/23/06	Pre: 233.0 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 18.44	Pre: 9.08 Post: 8.73 Std: NA Exp: NA	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Client	

Instrument	Turbidity Meter 2020
Manufacturer	LaMotte
Serial Number	4079 1103

Created By	James Goerdt
Created Date	10/12/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Calibration Records

Date	Calibrator	Turbidity - 0 NTU	Turbidity - 10 NTU	Comments
10/11/05	James Goerdt	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 9.93 Post: 10.0 Std: NA Exp: NA	
10/12/05	James Goerdt	Pre: 0.0.1 Post: 0.00 Std: NA Exp: NA	Pre: 9.72 Post: 10.01 Std: NA Exp: NA	
10/13/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 9.60 Post: 10.00 Std: NA Exp: NA	
10/14/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 10.24 Post: 10.00 Std: NA Exp: NA	

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

EQUIPMENT CALIBRATION LOG

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Client	

Instrument	Water Quality Meter
Manufacturer	YSI 600 Series
Serial Number	99K1014 AB

Created By	James Goerdt
Created Date	10/12/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Calibration Records

Date	Calibrator	pH - 7 SU	pH - 4 SU	Conductivity	ORP	DO	Comments
10/12/05	James Goerdt	Pre: 6.92 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 4.18 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 1.093 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 237.5 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 19.12	Pre: 8.62 Post: 9.05 Std: NA Exp: NA	
10/13/05	James Goerdt	Pre: 7.00 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 4.01 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: .986 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 249.4 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 19.09	Pre: 8.47 Post: 8.58 Std: NA Exp: NA	
10/14/05	James Goerdt	Pre: 6.99 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 4.00 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 1.032 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 271.5 Post: 237.4 Std: 03L1234 Exp: 12/05 ORP: 20.26	Pre: 8.58 Post: 8.85 Std: NA Exp: NA	
		Pre: 6.99 Post: 7.00	Pre: 4.01 Post: 4.00	Pre: .970 Post: 1.000	Pre: 195.9 Post: 237.5	Pre: 9.02 Post: 8.64	

10/15/05	James Goerdt	Std: 4319 Exp: 12/18/05	Std: 4439 Exp: 2/23/06	Std: 4958 Exp: 6/23/06	Std: 03L1234 Exp: 12/05 ORP: 19.76	Std: NA Exp: NA	
10/17/05	Terry Rojahn	Pre: 7.01 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 4.02 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 0.936 Post: 1.000 Std: 4958 Exp: 6/23/06	Pre: 288.5 Post: 240.7 Std: 03L1234 Exp: 12/05 ORP: 17.5	Pre: 8.01 Post: 9.22 Std: NA Exp: NA	

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

EQUIPMENT CALIBRATION LOG

Project Information

Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	CTO 0331
WBS Code #	Open
Client	

Instrument	Turbidity
Manufacturer	LaMotte 2020
Serial Number	1759-1800

Created By	Terry Rojahn
Created Date	10/13/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Calibration Records

Date	Calibrator	Turbidity - 0 NTU	Turbidity - 1 NTU	Comments
10/12/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 10.0 Post: 10.0 Std: NA Exp: NA	
10/13/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 10.17 Post: 10.00 Std: NA Exp: NA	
10/14/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 9.72 Post: 10.00 Std: NA Exp: NA	
10/15/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 9.90 Post: 10.00 Std: NA Exp: NA	
		Pre: 0.00 Post: 0.00	Pre: 9.9 Post: 10.00	

10/17/05	Terry Rojahn	Std: NA Exp: NA	Std: NA Exp: NA	
10/25/05	C. Doolan	Pre: 0 Post: 0 Std: NA Exp: NA	Pre: 10 Post: 10 Std: NA Exp: NA	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	PID	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Manufacturer**	Photovac 2020 Pro Plus	**Created Date**	10/23/06
Task/Contract #		**Serial Number**	PPXJ0009	**Modified By**	James Goerdt
WBS Code #				**Modified Date**	11/14/06
Client				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Calibration Records

Date	Calibrator	Isobutylene (100 ppm)	Comments
10/23/06	Terry Rojahn	Pre: 100 Post: 100 Std: 004756 Exp: NA	Manufacture Date: 10-10-06
10/24/06	Terry Rojahn	Pre: 100 Post: 100 Std: 004756 Exp:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	LaMotte 2020	**Created By**	James Goerdt
TtNUS Project #	112GN1245	**Manufacturer**	Lamotte	**Created Date**	10/24/06
Task/Contract #		**Serial Number**	3596-3502	**Modified By**	James Goerdt
WBS Code #				**Modified Date**	11/14/06
Client				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Calibration Records

Date	Calibrator	Turbidity (0 NTU)	Turbidity (10 NTU)	Comments
10/24/06	James Goerdt	Pre: 0.0 Post: 0.0 Std: Exp:	Pre: 9.81 Post: 10.06 Std: Exp:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	Horiba U-22XD	**Created By**	James Goerdt
TtNUS Project #	112GN1245	**Manufacturer**	Horiba	**Created Date**	10/24/06
Task/Contract #		**Serial Number**	4143008	**Modified By**	James Goerdt
WBS Code #				**Modified Date**	11/14/06
Client				**Printed By**	James Goerdt
Status	Complete			**Printed Date**	12/11/06

Calibration Records

Date	Calibrator	pH (4 SU)	Conductivity (mS/cm)	Turbidity (0 NTU)	ORP (mV)	DO (mg/L)	Comments
10/24/06	James Goerdt	Pre: 3.80 Post: 4.00 Std: 5350 Exp: 7/14/.07	Pre: 0.001 Post: 0.001 Std: 5350 Exp: 7/14/07	Pre: 0.0 Post: 0.0 Std: 5350 Exp: 7/14/07	Pre: 278 Post: 273 Std: 5350 Exp: 7/14/07	Pre: 10.55 Post: 9.56 Std: 5350 Exp: 7/14/07	Conductivity initially coming up as ERR 6. Manually corrected with calibration solution.

C.7 MONITORING WELL DEVELOPMENT RECORDS

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MW101
Site: SWMU 8
Date Installed: 5/15/05
Date Developed: 6/1/05
Dev. Method: surge and purge
Pump Type: whale pump

Depth to Bottom (ft.): ~~55.00~~ 58.7
Static Water Level Before (ft.): 49.94
Static Water Level After (ft.): *
Screen Length (ft.): 20
One Well Volume (gal/L): 0.82
Casing ID (in.): 2"

Responsible Personnel: TR, CD
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: N 1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/)	Turbidity (NTU)	Remarks (odor, color, etc.)
0945	—	—	49.94	—	—	—	—	brown, start development
0950	4	NA**	*	14.77	6.74	.525	>1000	brown
1000	7	"	"	15.88	6.70	.540	120	slightly cloudy
1005	9	"	"	16.27	6.74	.550	60	very slightly cloudy
1010	10.5	"	"	16.41	6.76	.557	45	clear, end development

* water level below top of pump
** measured by bucket

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

WELL UNFINISHED

Well: OBMW TO2 (TH)
Site: SWMU 8
Date Installed: 5-11-05
Date Developed: 5-24-05
Dev. Method: SURGE & PURGE
Pump Type: WHALER

Depth to Bottom (ft.): 17.30
Static Water Level Before (ft.): 7.31
Static Water Level After (ft.): DRY
Screen Length (ft.): 10'
One Well Volume (gal/L): 1.6
Casing ID (in.): 2"Ø

Responsible Personnel: JG/TR
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

SURGE 5 min PRIOR to PUMPING

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
0930	0	–	7.31	–	–	–	–	START DEV.
0932	5	**NA	*	12.68	6.16	0.234	50	CLEAR
0938	8		*	13.06	6.20	0.201	39	CLEAR
0939			(DRY)	–	–	–	–	(DRY)
0944			15.83	–	–	–	–	RECHARGE
0949			15.42	–	–	–	–	
0954			15.24	–	–	–	–	
0959	8		15.10	–	–	–	–	(RESTART PUMP)
1000			–	12.63	6.16	0.194	45	CLEAR
1001	9		(DRY)	–	–	–	–	(DRY)
1006			*	–	–	–	–	RECHARGE
1011			*	–	–	–	–	
1016	9		16.10	–	–	–	–	(RESTART PUMP)
1017			–	13.41	6.00	0.189	65	V.SL. CLOUDY
1017	9.5		DRY	–	–	–	–	

* W.L. Below top of Pump
** MEAS. W/ BUCKET

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

WELL UNFINISHED

Well: 08MW~~T~~03 (TC)
Site: SWMU 8
Date Installed: 5-16-05
Date Developed: 5-24-05
Dev. Method: Surge & Purge
Pump Type: ~~Waterra~~ Waterra (TC)

Depth to Bottom (ft.): 62.75
Static Water Level Before (ft.): 53.20
Static Water Level After (ft.): 56.60
Screen Length (ft.): 10'
One Well Volume (gal/L): 1.6
Casing ID (in.): 2"

Responsible Personnel: J.G. / T.R.
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1307	0	* 0	53.20	–	–	–	–	Start Purge
1313	5	NA	55.26	16.61	7.21	0.451	+1000	BRN
1320	10	NA	56.90	15.13	6.82	0.368	+1000	Lt BRN
1327	16	NA	57.52	14.55	6.35	0.346	+1000	" "
1334	21	NA	57.15	14.61	6.09	0.348	+1000	" "
1338	26	NA	56.75	14.64	5.90	0.333	+1000	" "
1344	30	NA	56.60	15.05	5.86	0.341	+1000	" "

* MEKS. buckets

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT04
Site: SWMU 8
Date Installed: 5/12/05
Date Developed: 6/1/05
Dev. Method: Surge and purge
Pump Type: whale

Depth to Bottom (ft.): ~~12~~ (CD) 15.0
Static Water Level Before (ft.): 7.95
Static Water Level After (ft.): Dry
Screen Length (ft.): 5
One Well Volume (gal/L): 1.15
Casing ID (in.): 2"

Responsible Personnel: CD
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: N1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1030	—	—	7.95	—	—	—	—	brown, start development
1035	2.5	NA**	dry	14.96	6.77	0.337	>1000	brown, went dry at 1035
1040	—	—	8.58	—	—	—	—	water level readings during recharge
1045	—	—	8.14	—	—	—	—	"
1050	—	—	8.07	—	—	—	—	"
1055	3.5	**	dry	14.26	6.90	0.326	>1000	brown, went dry at 1057
1100	—	—	9.48	—	—	—	—	water level readings during recharge
1105	—	—	9.18	—	—	—	—	"
1110	5	**	dry	14.75	6.89	0.331	>1000	brown, went dry at 1112, end development

** measured by bucket

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MW105
Site: SWMU 8
Date Installed: 5/16/05
Date Developed: 6/1/05
Dev. Method: Surge and purge
Pump Type: whale

Depth to Bottom (ft.): 62.7
Static Water Level Before (ft.): 52.45
Static Water Level After (ft.): *
Screen Length (ft.): 10
One Well Volume (gal/L): 1.67
Casing ID (in.): 2"

Responsible Personnel: TR, CD
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: N1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1405	—	—	52.45	—	—	—	—	dk. red to dk. brown, start development
1410	4	NA **	59.29	16.35	5.87	0.568	>1000	dk. brown
1415	6	"	*	15.90	6.41	0.613	>1000	dk. brown
1420	7.5	"	*	16.00	6.32	0.549	>1000	brown
1425	8.5	"	"	16.12	6.32	0.538	290	cloudy
1430	9	"	"	16.47	6.15	0.534	120	slightly cloudy
1435	9.5	"	"	16.43	6.05	0.528	50	clear, end development

** measured by bucket
* water level is below pump

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

WELL UNFINISHED

Well: 08MWT06 (TH)
Site: SWMU8
Date Installed: 5-12-05
Date Developed: 5-24-05
Dev. Method: SURGE & PURGE
Pump Type: WHALER

Depth to Bottom (ft.): 20.75
Static Water Level Before (ft.): 16.32
Static Water Level After (ft.): 20.75 (DRY)
Screen Length (ft.): 10'
One Well Volume (gal/L): 0.75
Casing ID (in.): 2"Ø

Responsible Personnel: JG/TR
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole - ppm
PID Readings: Breathing Zone - ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1039	0	-	16.32	-	-	-	-	START DEV. (GREY)
1042	↓	** NA	18.50	14.01	7.29	0.786	+1000	Lt Grey
1043	4		DRY	-	-	-	-	(DRY)
1048			18.67	-	-	-	-	RECHARGE
1053			18.51	-	-	-	-	
1058	↓		18.40	-	-	-	-	
1103	4		18.32	-	-	-	-	
1104			-					RESTART
1105	↓		-	15.42	6.71	0.781	+1000	GREYISH BRN
1106	5		DRY	-	-	-	-	DRY
1111			18.91	-	-	-	-	RECHARGE
1116	↓		18.85	-	-	-	-	
1121	5		18.79	-	-	-	-	
1122	5.5		DRY	16.25	6.01	0.749	+1000	GREYISH BRN

** MEAS. W/ BUCKET

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

WELL UNFINISHED

Well: 08MWT007 (P)
Site: SWMU 8
Date Installed: 5/13/05
Date Developed: 5/24/05
Dev. Method: SURGE & PURGE
Pump Type: WHALER

Depth to Bottom (ft.): 34.50
Static Water Level Before (ft.): 14.15
Static Water Level After (ft.): 21.70
Screen Length (ft.): 15'
One Well Volume (gal/L): 3.3
Casing ID (in.): 2" ϕ

Responsible Personnel: JG/TL
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: ~~B-M~~ 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
14:27	0	NA	14.15	–	–	–	–	Start Dev.
14:30	5	NA	17.15	16.13	6.28	0.201	+1000	BRN
14:35	10	NA	18.66	14.92	5.56	0.150	+1000	Lt BRN
14:40	14	NA	19.22	14.62	5.75	0.146	+1000	Lt BRN
1445	17	NA	19.82	14.54	5.83	0.139	+1000	Lt BRN
1451	21	NA	20.01	13.90	5.79	0.135	+1000	Lt BRN
1453	23	NA	20.50	13.83	5.76	0.135	850	~~850~~ Lt BRN
1456	26	NA	20.70	13.77	5.81	0.138	800	Lt BRN *Stop Pumping
1500	26	NA	–	–	–	–	–	Restart
1505	30	NA	20.00	13.99	5.63	0.133	450	Cloudy
1510	33	NA	19.05	14.23	5.47	0.128	380	Cloudy
1515	34	NA	18.00	14.80	5.39	0.132	360	Cloudy
1525	38	NA	20.50	14.38	5.47	0.134	550	Cloudy switch batteries
1530	44	NA	21.95	14.25	5.48	0.141	700	Cloudy
1535	50	NA	21.70	15.30	5.73	0.152	+1000	Cloudy

* wait for JG to return w/ empty containers

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT08
Site: SWMU 8
Date Installed: 5-15-05
Date Developed: 6-1-05
Dev. Method: SURGE & PURGE
Pump Type: WHALER

Depth to Bottom (ft.): 32.60
Static Water Level Before (ft.): 10.85
Static Water Level After (ft.): DRY
Screen Length (ft.): 15'
One Well Volume (gal/L): 3.6
Casing ID (in.): 2" Φ

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1110	0	–	10.85	–	–	–	–	Start DEV. tan-Grey
1115	5.0	NA**	26.00	15.69	6.02	0.299	+1000	tan/cloudy
1120	6.5		29.04	14.99	6.03	0.335	+1000	BRN
1125	8.0		30.78	15.27	6.64	0.312	+1000	BRN
1130	10.0		*(DRY)	16.14	5.87	0.401	+1000	BRN (DRY)
1135	10.0		31.12	–	–	–	–	RECHARGE
1140			28.68	–	–	–	–	
1145			27.55	–	–	–	–	Restart Pump
1150	14.0		*	15.98	5.80	0.444	+1000	
1152	14.5		(DRY)	–	–	–	–	RECHARGE
1157			29.35	–	–	–	–	
1202			27.33	–	–	–	–	
1207	14.5		25.51	–	–	–	–	Restart Pump
1209	16.0		29.00	15.09	5.76	0.391	550	CLOUDY
1213	19.0	–	(DRY)	–	–	–	–	"

** MEASURE IN bucket
* W.L. below top of pump

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08 MWT 09
Site: SWMU 8
Date Installed: 5/17/05
Date Developed: 6-1-05
Dev. Method: Surge & Purge
Pump Type: WHALER

Depth to Bottom (ft.): 32.60
Static Water Level Before (ft.): 18.62
Static Water Level After (ft.): DRY
Screen Length (ft.): 15
One Well Volume (gal/L): 2.2
Casing ID (in.): 2"

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1500	0	** NA	18.62	–	–	–	–	BRN START DEV.
1505	4.0		28.10	15.85	5.72	0.502	650	CLOUDY
1510	6.0		*(DRY)	–	–	–	–	(DRY) BRN
1515			31.02	–	–	–	–	RECHARGE
1520			30.71	–	–	–	–	
1525			30.46	–	–	–	–	
1530	6.0		30.27	–	–	–	–	RESTART PUMP
1533	7.0		*	15.13	6.02	0.617	+1000	Cloudy - TANNISH
1535	7.5		*(DRY)	–	–	–	–	(DRY) BRN
1540			*	–	–	–	–	RECHARGE
1545			31.30	–	–	–	–	
1550	7.5		31.12	–	–	–	–	RESTART PUMP
1552	8.0		*	16.32	5.89	0.717	+1000	BRN
1553	8.25		DRY	–	–	–	–	DRY

* W.L. BELOW TOP OF PUMP
** MEASURED IN BUCKETS

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT10
Site: SWMU 6
Date Installed: 5/24/05
Date Developed: 6/1/05
Dev. Method: surge and purge
Pump Type: whale

Depth to Bottom (ft.): 33.0
Static Water Level Before (ft.): 15.41
Static Water Level After (ft.): dry
Screen Length (ft.): 15
One Well Volume (gal/L): 2.67
Casing ID (in.): 2"

Responsible Personnel: CO
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: N 1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1505	—	—	15.41	—			—	grey brown, start development
1510	4	**	*	16.28	10.23	0.488	>1000	"
1515	6	"	"	15.27	10.19	0.518	>1000	" , went dry at 1518
1520	—	—	30.78	—			—	recovery
1525	—	—	29.91	—			—	"
1530	—	—	28.48	—			—	"
1535	7	**	27.44	14.59	10.24	0.491	>1000	grey , went dry at 1538
1540	—	—	28.92	—			—	recovery
1545	—	—	27.90	—			—	"
1550	8	**	27.81	14.06	10.50	0.477	>1000	grey , went dry at 1553 end development

** water flow measured in bucket
* water level below pump

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT11
Site: SWMU 8
Date Installed: 5-23-05
Date Developed: 6-1-05
Dev. Method: Surge and purge
Pump Type: whale

Depth to Bottom (ft.): 32.78
Static Water Level Before (ft.): 8.85
Static Water Level After (ft.): DRY
Screen Length (ft.): 15
One Well Volume (gal/L): 3.90
Casing ID (in.): 2"

Responsible Personnel: CO
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: N245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1645	~~6~~	~~* *~~	8.85				~~>1000~~	v. dark brown, start development
1650	6	* *	*	15.31	10.04	0.254	>1000	v. dark brown
1655			30.47					recovery
1700			30.05					"
1705			29.71					"
1710	7	* *	29.49	14.48	10.25	0.256	>1000	dark brown, went dry at 1712
1715			31.64					recovery
1720			31.49					recovery
1725	7.5	* *	31.40	15.23	9.34	0.248	>1000	dark brown, went dry at 1726, end development

* * flow measured in bucket
* water level below pump

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

WELL NOT FINISHED

Well: 08MWT012
Site: SWMU 8
Date Installed: 10/8/05
Date Developed: 10/13/05
Dev. Method: Surge & Purge
Pump Type: WHALE

Depth to Bottom (ft.): 76.00
Static Water Level Before (ft.): 52.61
Static Water Level After (ft.): 70.60
Screen Length (ft.): 20
One Well Volume (gal.): 4.1
Casing ID (in.): 2

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1308	0	NA	52.61	—	—	—	—	GREY Start DEV.
1318	5	NA	55.56	16.09	5.21	0.920	+1000	GREY
1328	7	NA	54.18	14.97	4.85	0.896	+1000	GREY
1338	9	NA	55.12	15.74	4.93	0.918	600	Grey (Hose Bent)
1348	13	NA	58.30	15.22	4.95	0.894	+1000	Grey ↳ FIX ABOVE @ 1345 INCREASE FLOW!
1358	18	NA	59.49	14.05	4.95	0.875	+1000	Grey
1408	23	NA	59.96	13.75	4.97	0.879	+1000	GREY
1418	28	NA	61.82	13.83	4.93	0.891	+1000	GREY
1428	32	NA	62.33	13.83	4.76	0.894	900	GREY
1438	36	NA	63.21	13.78	4.79	0.890	+1000	GREY
1448	40	NA	63.69	13.89	4.80	0.894	+1000	GREY
1458	44	NA	65.00	13.93	4.82	0.884	+1000	GREY
1508	48	NA	65.40	13.79	4.85	0.892	850	GREY
1518	52	NA	66.10	13.85	4.94	0.887	+1000	GREY
1528	—	—	62.45	—	—	—	340	ALLOW WELL to RECOVER ~10 MINS
1538	58	NA	65.40	14.07	4.72	0.895	650	Lt Grey

1540 stop PURGE to dispose PURGE WATER.

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT012
Site: SWMU 8
Date Installed: 10-8-05
Date Developed: 10-13-05
Dev. Method: SURGE & PURGE
Pump Type: WHALE

Depth to Bottom (ft.): 76.00
Static Water Level Before (ft.): 52.61
Static Water Level After (ft.): 70.60
Screen Length (ft.): 20
One Well Volume (gal/L): 4.1
Casing ID (in.): 2

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1635	58	—	53.85	—	—	—	500	RESTART DEV.
1645	65	NA	60.50	13.48	4.62	0.889	550	Lt Grey - Cloudy
1655	70	NA	63.16	13.56	4.62	0.894	170	Sl. Cloudy
1705	75	NA	64.70	13.57	459	0.895	120	Sl. Cloudy
1715	79	NA	65.48	13.65	4.65	0.897	75	V. Sl. Cloudy
1725	83	NA	65.70	13.63	4.68	0.895	450	CLOUDY -- Stop Pump
1740	83	NA	56.50	—	—	—	—	RECHARGE
1750	88	NA	63.55	13.37	4.57	0.882	140	Sl. Cloudy
1800	92	NA	67.30	13.49	4.61	0.887	290	Cloudy
	10/14/05	— Additional Development to clean up well or remove 5 sat. Annulus volumes						
0955	92	NA	53.00	—	—	—	—	RESTART DEV. 10/14/03
1005	98	NA	60.60	13.69	4.69	0.862	160	Sl. Cloudy
1015	104	NA	63.86	13.39	4.75	0.868	140	Sl. Cloudy
1025	108	NA	65.12	13.41	4.80	0.867	510	Cloudy - Lt Grey
1035	112	NA	68.00	13.47	4.82	0.865	850	Cloudy - Lt Grey
1045	116	NA	69.05	13.57	4.80	0.865	+1000	GREY

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT012
Site: SWMU 8
Date Installed: 10-5-05
Date Developed: 10-13+14-05
Dev. Method: Surge & Pumped
Pump Type: WHALE

Depth to Bottom (ft.): 76.00
Static Water Level Before (ft.): 52.61
Static Water Level After (ft.): 70.60
Screen Length (ft.): 20
One Well Volume (gal/L): 4.1
Casing ID (in.): 2

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole - ppm
PID Readings: Breathing Zone - ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1055	120	NA	69.61	13.59	4.70	0.865	+1000	Grey
1105	123.5	NA	70.19	13.62	4.67	0.864	+1000	GREY
1115	127	NA	70.26	13.67	4.65	0.868	700	Lt. Grey
1125	130.5	NA	70.60	13.70	4.65	0.868	+1000	Grey

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT013
Site: SWMU 8
Date Installed: 10/11/05
Date Developed: 10/14/05
Dev. Method: SURGE & PURGE
Pump Type: SS Bailer

Depth to Bottom (ft.): 125.90
Static Water Level Before (ft.): 117.73
Static Water Level After (ft.): DRY
Screen Length (ft.): 15
One Well Volume (gal/L): 5.0
Casing ID (in.): 2

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (~~Gal.~~) L	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1335	0	NA	117.73	–	–	–	–	Grey
1343	5	NA	120.05	15.28	12.07	2.759	+1000	Grey
1353	10	NA	122.55	13.77	12.28	2.691	+1000	Grey
1405	15	NA	DRY	13.81	12.29	2.368	+1000	Grey
1410	↓	NA	124.85	–	–	–	–	RECHARGE
1415	↓	NA	124.78	–	–	–	–	"
1420	15	NA	124.73	–	–	–	–	"
1425	16	NA	DRY	–	–	–	–	DRY w/ <1L withdrawn-END

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT014
Site: SWMU 8
Date Installed: 10/10/05
Date Developed: 10-13-05
Dev. Method: Surge & Purge
Pump Type: WATTERRIA

Depth to Bottom (ft.): ~~119~~ 117.90
Static Water Level Before (ft.): 81.65
Static Water Level After (ft.): DRY
Screen Length (ft.): 15
One Well Volume (gal/L): 6.1
Casing ID (in.): 2

Responsible Personnel: T. ROLAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1000	0	—	81.65	—	—	—	—	Grey
1020	8	NA	111.70	15.87	7.71	0.875	+1000	Grey
1030	11	NA	DRY	—	—	—	—	RECHARGE
1035	↓	NA	116.4	—	—	—	—	"
1040	↓	NA	116.25	—	—	—	—	"
1045	11	NA	116.15	—	—	—	—	"
1045	11	NA	116.15	19.74	8.89	0.923	+1000	Grey
1050	12	NA	DRY	—	—	—	—	RECHARGE
1055	↓	NA	117.19	—	—	—	—	"
1100	↓	NA	117.10	—	—	—	—	"
1105	↓	NA	117.05	19.08	8.90	0.917	+1000	" Grey
1107	12.5	NA	DRY	—	—	—	—	DRY END DEV.
	2.5 gal	in tubing						
	15.0 gal	Total						

Tetra Tech NUS, Inc.

MONITORING WELL RE DEVELOPMENT RECORD

Well: 08MWT03
Site: SWMU 8
Date Installed:
Date Developed: 11/12/05
Dev. Method: Surge & Purge
Pump Type: WHALE

Depth to Bottom (ft.): 62.73
Static Water Level Before (ft.): 53.29
Static Water Level After (ft.):
Screen Length (ft.):
One Well Volume (gal/L): 1.5
Casing ID (in.): 2"

Responsible Personnel: T. ROJANA'
Drilling Company: BM
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole - ppm
PID Readings: Breathing Zone - ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1003	0	-	53.29	-	-	-	-	Start development
1010	6	NA	55.91	14.67	5.85	0.509	180	Cloudy
1017	12	NA	56.31	13.85	5.72	0.480	65	V. Slightly Cloudy
1030	20	NA	56.63	13.73	5.60	0.422	10	CLEAR
1041	28	NA	56.76	13.58	5.56	0.400	4.4	CLEAR
1049	33	NA	56.75	13.29	5.52	0.390	0.95	CLEAR
1056	38	NA	56.81	13.27	5.53	0.387	1.4	CLEAR
1102	43	NA	56.81	13.28	5.53	0.384	0.60	CLEAR
1109	48	NA	56.84	13.28	5.52	0.382	1.0	CLEAR
1116	53	NA	56.85	13.29	5.53	0.381	0.55	CLEAR END REDEV.

Tetra Tech NUS, Inc.

MONITORING WELL RE DEVELOPMENT RECORD

Well: 08MWT05
Site: SWMU 8
Date Installed:
Date Developed: 10/12/05
Dev. Method: PURGE & SURGE
Pump Type: WHALE

Depth to Bottom (ft.): 62.63
Static Water Level Before (ft.): 54.61
Static Water Level After (ft.):
Screen Length (ft.):
One Well Volume (gal/L): 1.3
Casing ID (in.): 2"

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1320	–	NA	54.61	–	–	–	–	START REDEVELOPMENT
1335	5	NA	*	16.31	5.24	0.524	7.2	CLEAR
1345	↓	NA	*	16.07	5.59	0.517	2.7	CLEAR
1355	↓	NA	*	15.80	5.57	0.503	2.3	CLEAR
1405	↓	NA	*	16.10	5.60	0.507	0.75	CLEAR
1415	↓	NA	*	16.22	5.59	0.507	0.70	CLEAR
1425	↓	NA	*	16.19	5.57	0.502	0.95	CLEAR
1435	10	NA	*	16.27	5.57	0.502	0.40	CLEAR END REDEV.

* WATER LEVEL PROBE ON TOP OF PUMP ~ 61.5' (TOP OF PUMP)

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

WELL NOT FINISHED

Well: 08MWT012
Site: SWMU 8
Date Installed:
Date Developed: 10/13/05
Dev. Method: Surge & Purge
Pump Type: WHALE

Depth to Bottom (ft.): 76.00
Static Water Level Before (ft.): 52.61
Static Water Level After (ft.): 70.60
Screen Length (ft.): 20
One Well Volume (gal/L): 4.1
Casing ID (in.): 2

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1308	0	NA	52.61	–	–	–	–	GREY Start Dev.
1318	5	NA	55.56	16.09	5.21	0.920	+1000	GREY
1328	7	NA	54.18	14.97	4.85	0.896	+1000	GREY
1338	9	NA	55.12	15.74	4.93	0.918	600	Grey (Hose Bent)
1348	13	NA	58.30	15.22	4.95	0.894	+1000	Grey ↳ Fix above @ 1345 increase flow
1358	18	NA	59.49	14.05	4.95	0.875	+1000	Grey
1408	23	NA	59.96	13.75	4.97	0.879	+1000	GREY
1418	28	NA	61.82	13.83	4.93	0.891	+1000	GREY
1428	32	NA	62.33	13.83	4.76	0.894	900	GREY
1438	36	NA	63.21	13.78	4.79	0.890	+1000	GREY
1448	40	NA	63.69	13.89	4.80	0.894	+1000	GREY
1458	44	NA	65.00	13.93	4.82	0.884	+1000	GREY
1508	48	NA	65.40	13.79	4.85	0.892	850	GREY
1518	52	NA	66.10	13.85	4.94	0.887	+1000	GREY
1528	–	–	62.45	–	–	–	340	Allow well to recover 10 mins
1538	58	NA	65.40	14.07	4.72	0.895	650	Lt Grey

1540 stop purge to dispose purge water.

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT012
Site: SWMU 8
Date Installed:
Date Developed: 10-13-05
Dev. Method: SURGE & PURGE
Pump Type: WHALE

Depth to Bottom (ft.): 76.00
Static Water Level Before (ft.): 52.61
Static Water Level After (ft.): 70.60
Screen Length (ft.): 20
One Well Volume (gal/L): 4.1
Casing ID (in.): 2

Responsible Personnel: T. ROJAHN
Drilling Company: B-M
Project Name: ___ NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole — ppm
PID Readings: Breathing Zone — ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1635	58	—	53.85	—	—	—	500	RESTART DEV.
1645	65	NA	60.50	13.48	4.62	0.889	550	Lt Grey - Cloudy
1655	70	NA	63.16	13.56	4.62	0.894	170	Sl. Cloudy
1705	75	NA	64.70	13.57	4.59	0.895	120	Sl. Cloudy
1715	79	NA	65.48	13.65	4.65	0.897	75	V. Sl. Cloudy
1725	83	NA	65.70	13.63	4.68	0.895	450	CLOUDY - Stop Pump
1740	83	NA	56.50	—	—	—	—	RECHARGE
1750	88	NA	63.55	13.37	4.57	0.882	140	Sl. Cloudy
1800	92	NA	67.30	13.49	4.61	0.887	290	Cloudy
	10/14/05	— Additional Development to clean up well or remove 5 sat. annulus volumes						
0955	92	NA	53.00	—	—	—	—	RESTART DEV. 10/14/03
1005	98	NA	60.60	13.69	4.69	0.862	160	Sl. Cloudy
1015	104	NA	63.86	13.39	4.75	0.868	140	Sl. Cloudy
1025	108	NA	65.12	13.41	4.80	0.867	510	Cloudy - Lt Grey
1035	112	NA	68.00	13.47	4.82	0.865	850	Cloudy - Lt Grey
1045	116	NA	69.05	13.57	4.80	0.865	+1000	GREY

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT012
Site: SWMU 8
Date Installed:
Date Developed: 10-13 & 14-05
Dev. Method: Surge & Purged
Pump Type: WHALE

Depth to Bottom (ft.): 76.00
Static Water Level Before (ft.): 52.61
Static Water Level After (ft.): 70.60
Screen Length (ft.): 20
One Well Volume (gal/L): 4.1
Casing ID (in.): 2

Responsible Personnel: T. Rojahn
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole - ppm
PID Readings: Breathing Zone - ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1055	120	NA	69.61	13.59	4.70	0.865	+1000	Grey
1105	123.5	NA	70.19	13.62	4.67	0.864	+1000	Grey
1115	127	NA	70.26	13.67	4.65	0.868	700	Lt. Grey
1125	130.5	NA	70.60	13.70	4.65	0.868	+1000	Grey

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT013
Site: SWMU 8
Date Installed:
Date Developed: 10/14/05
Dev. Method: Surge & Purge
Pump Type: SS Bailer

Depth to Bottom (ft.): 125.90
Static Water Level Before (ft.): 117.73
Static Water Level After (ft.): DRY
Screen Length (ft.): 15
One Well Volume (gal/L): 5.0
Casing ID (in.): 2

Responsible Personnel: T. Rojahn
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (~~Gal.~~) L	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1335	0	NA	117.73	–	–	–	–	Grey
1343	5	NA	120.05	15.28	12.07	2.759	+1000	Grey
1353	10	NA	122.55	13.77	12.28	2.691	+1000	Grey
1405	15	NA	DRY	13.81	12.29	2.368	+1000	Grey
1410	↓	NA	124.85	–	–	–	–	RECHARGE
1415	↓	NA	124.78	–	–	–	–	"
1420	15	NA	124.73	–	–	–	–	"
1425	16	NA	DRY	–	–	–	–	DRY w/ <1L with drawn-END

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: 08MWT014
Site: SWMU 8
Date Installed:
Date Developed: 10-13-05
Dev. Method: Surge & Purge
Pump Type: Waterra

Depth to Bottom (ft.): ~~119~~ 117.90
Static Water Level Before (ft.): 81.65
Static Water Level After (ft.): DRY
Screen Length (ft.): 15
One Well Volume (gal/L): 6.1
Casing ID (in.): 2

Responsible Personnel: T. Rolahn
Drilling Company: B-M
Project Name: NSWC-CRANE
Project Number: 1245
PID Readings: Bore Hole – ppm
PID Readings: Breathing Zone – ppm

Time	Cumulative Water Volume (Gal.)	Flow Rate (mL/min.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks (odor, color, etc.)
1000	0	–	81.65	–	–	–	–	Grey
1020	8	NA	111.70	15.87	7.71	0.875	+1000	Grey
1030	11	NA	DRY	–	–	–	–	RECHARGE
1035	↓	NA	116.4	–	–	–	–	"
1040	↓	NA	116.25	–	–	–	–	"
1045	11	NA	116.15	–	–	–	–	"
1045	11	NA	116.15	19.74	8.89	0.923	+1000	Grey
1050	12	NA	DRY	–	–	–	–	RECHARGE
1055	↓	NA	117.19	–	–	–	–	"
1100	↓	NA	117.10	–	–	–	–	"
1105	↓	NA	117.05	19.08	8.90	0.917	+1000	" Grey
1107	12.5	NA	DRY	–	–	–	–	DRY END DEV.
	2.5 gal	in tubing						
	15.0 gal	Total						

C.8 QUALITY CONTROL RECORDS

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**QC Sample ID #**	08RB10220601	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Corresponding Sample ID**		**Created Date**	10/22/06
Task/Contract #		**QA Sample Type**	Rinsate Blank	**Modified By**	James Goerdt
WBS Code #		**Sample Location**	QC	**Modified Date**	11/14/06
Status	Complete	**Sampled By**	Terry Rojahn	**Printed By**	James Goerdt
		Concentration	Low concentration	**Printed Date**	12/11/06

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative		Comments	Chain of Custody #
✓	10/22/06	18:40	SW-846 8260B	VOCs	3	Glass	40ml vials	AQ	4°C/HCL	Rinsate of DPT Sleeve and drilling shoe	112GN1245-10232006-1	

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**QC Sample ID #**	08TB10220601	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Corresponding Sample ID**		**Created Date**	10/22/06
Task/Contract #		**QA Sample Type**	Trip Blank	**Modified By**	James Goerdt
WBS Code #		**Sample Location**	QC	**Modified Date**	11/14/06
Status	Complete	**Sampled By**	Terry Rojahn	**Printed By**	James Goerdt
		Concentration	Low concentration	**Printed Date**	12/11/06

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative		Comments	Chain of Custody #
✓	10/22/06	18:30	SW-846 8260B	VOCs	2	Glass	40ml vials	AQ	4°C/HCL	Trip Blank	112GN1245-10232006-1	

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**QC Sample ID #**	08FD10240602	**Created By**	James Goerdt
TtNUS Project #	112GN1245	**Corresponding Sample ID**	08GWTW15	**Created Date**	10/24/06
Task/Contract #		**QA Sample Type**	Field Duplicate	**Modified By**	James Goerdt
WBS Code #		**Sample Location**	QC	**Modified Date**	12/11/06
Status	Complete	**Sampled By**	James Goerdt	**Printed By**	James Goerdt
		Concentration	Low concentration	**Printed Date**	12/11/06

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative		Comments	Chain of Custody #
✓	10/24/06	00:00	SW-846 8260B	VOCs	3	Glass	40ml vials	GW	4°C/HCL		112GN1245-10252006-3	
✓	10/24/06	00:00	SW-846 8270C	SVOCs	2	Glass	1L Amber	GW	4°C		112GN1245-10252006-3	

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**QC Sample ID #**	08FD10240601	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Corresponding Sample ID**	08SB510204	**Created Date**	10/24/06
Task/Contract #		**QA Sample Type**	Field Duplicate	**Modified By**	James Goerdt
WBS Code #		**Sample Location**	QC	**Modified Date**	12/11/06
Status	Complete	**Sampled By**	Terry Rojahn	**Printed By**	James Goerdt
		Concentration	Low concentration	**Printed Date**	12/11/06

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative		Comments	Chain of Custody #
✓	10/24/06	10:55	SW-846 8260B	VOCs	3	EnCore	EnCore Sampler - 5 gram	SO	4°C	Hydrocarbon odor	112GN1245-10242006-2	

Tetra Tech NUS, Inc.

QUALITY CONTROL SAMPLING LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**QC Sample ID #**	08TB10240601	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Corresponding Sample ID**		**Created Date**	10/24/06
Task/Contract #		**QA Sample Type**	Trip Blank	**Modified By**	James Goerdt
WBS Code #		**Sample Location**	QC	**Modified Date**	11/14/06
Status	Complete	**Sampled By**	Terry Rojahn	**Printed By**	James Goerdt
		Concentration	Low concentration	**Printed Date**	12/11/06

Log Entries

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Matrix	Preservative		Comments	Chain of Custody #
✓	10/24/06	08:00	SW-846 8260B	VOCs	2	Glass	40ml vials	AQ	4°C/HCL		112GN1245-10242006-2	

APPENDIX D

MISCELLANEOUS FIELD DOCUMENTATION

D.1 SITE LOGBOOK

D.2 SITE NOTEBOOK

D.3 SURVEY DATA

D.1 SITE LOGBOOK

1380

TABLE OF CONTENTS

	PAGE No.
SWMUS 8 & 15	1 - 41
SWMUS 18, 19, 20 & OGTSL	42-53
SWMUS 8 & 15	54-57

©SCIENTIFIC BINDERY PRODUCTIONS, 60 EAST 13TH STREET, CHICAGO, ILLINOIS 60605

TITLE

PROJECT NO. 1245

BOOK NO. 1380

MON. 12-06-04

Work continued from Page

TRAVEL DAY - D. WESTERHOFF & T. ROJAHN

PURCHASE SUPPLIES @ LOWES & SAM'S CLUB

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12-6-04

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

B 100 P ©

DIGGING PERMIT
NSWC CRANE 11000/3 (REV. 8/02)

4668

REQUESTED BY: Tetra Tech / Terry Rogers 812-421-3857	DATE: 11/17/04
WORK REQUEST ON E/S NO.: Hwy 555 B-3330 B-2693	
WORK WILL BE PERFORMED BY: Tetra Tech NUS Inc.	DATE (Start - on or about): 12/3/04

WORK DESCRIPTION: Soil borings to obtain surface + subsurface samples. Location are: South & east off Highway 555, south & west of Building 3330; north, east & west of Building 2693. Marked with stakes with pink ribbon or white paint. Locations are solid circles on attached drawing.

EQUIPMENT TYPE: ☐ HAND TOOLS ☐ CORE DRILL ☐ TRENCHER ☐ BACKHOE ☐ HEAVY EQUIPMENT

Faxed CROP1 & 2 11/17/04

UNDERGROUND UTILITIES LOCATED IN WORK SITE

UTILITY	PRESENT	MARKED	NOT LOCATED	REMARKS
COMPRESSED AIR CROP1	N/A			KG 12-2-04
HIGH VOLTAGE ELECTRICAL	yes	yes	see note *	S.Q. 11-23-04
FIRE ALARM CROP1	N/A	N/A		SEG 11-18-04
GROUNDING CROP1	N/A			KG 12-2-04
16 NATURAL GAS See Below	YES	YES		DFH 11-[illegible]
SECURITY ALARM CROP2	NA			MJ 11-20
SEWER	yes	yes		12-1-04 MW
STEAM 3330	N/A			11-18-04 9CE
TELEPHONE Faxed 11/17/04	N/A			LP 11-29-04
WATER	yes	yes		12-1-04 MW
SECOND ELECTRICAL CROP1	yes	yes		11-[illegible]-04 K.C
GENERAL DYNAMICS/NMCI Faxed 11/17/04	N/A			11-18-04 [illegible]

In addition to the general precautions for excavating where underground utilites are present, comply with the following:

0412071305, 0412071310, 0412071312
0411140569, 0411140572, 0411140582 Exp 12/9 12/27

* marked at 13 43-44

PERMIT HOLDER SIGNATURE: Terry Rogers	DATE: 12/07/04
DIGGING PERMIT APPROVED BY: [illegible]	DATE: 12/7/04

DISTRIBUTION:
ORIGINAL - Code 09Z5 File
YELLOW - Supv. At work site
PINK - Permit requestor

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

TUES 12-07-04

Work continued from Page

OVERCAST & PERIODS OF RAIN 40's

0700 HRS - ARRIVE @ B-3245
WORK ON CTO 160

1230 HRS - ARRIVE @ PUBLIC WORKS
• DONNA Z. EXTENDED GAS TICKETS @
1255 HRS - SWMU's 8 & 15; FINISH @ PUBLIC WORKS
SEE DIG PERMITS ON PAGES 2, 4 & 5.

WORK ON CTO 160 REMAINDER OF DAY

1630 HRS - H&S TRAINING
• ORGANIZE EQ.
• PUT PIDS ON CHARGE
• OPEN CONTAINER BOXES & COLORS
1720 HRS → NO 402 JARS
CALL LAB to CHECK ON CONTAINER SHIPMENT
1745 HRS - LEFT SITE FOR WAL MART

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12-07-04

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

DIGGING PERMIT
NSWC CRANE 11000/3 (REV. 8/02)

4669

REQUESTED BY: Tetra Tech / Tony Rosch 412-921-8857	DATE: 11/18/04
WORK REQUEST ON E/S NO.	Bldg 106 AREA
WORK WILL BE PERFORMED BY: Tetra Tech NUS, Inc.	DATE (Start - on or about): 12/3/04

WORK DESCRIPTION: Soil borings to obtain surface & subsurface samples. Locations are: North, East, & South of Building 106. Locations are marked with stakes with pink ribbon or white paint, & are solid circles on attached drawing.

EQUIPMENT TYPE: ☐ HAND TOOLS ☐ CORE DRILL ☐ TRENCHER ☐ BACKHOE ☐ HEAVY EQUIPMENT

Faxed CROP 2 11/19/04 **UNDERGROUND UTILITIES LOCATED IN WORK SITE**

UTILITY	PRESENT	MARKED	NOT LOCATED	REMARKS
COMPRESSED AIR CROP 2	N/A			RI 11-23-04
HIGH VOLTAGE ELECTRICAL	NA			S.P. 11-23-04
FIRE ALARM CROP 2	Yes	Yes		MA 11-22-04
GROUNDING CROP 2	N/A			11-22-04 BR
2 NATURAL GAS Exp 12/19 ~~0411190560~~	YES	YES		11-22-04 DEH
SECURITY ALARM CROP 2	NA			11-20 MA
SEWER	Yes	Yes		12-1-04 M. Wagonc
STEAM	Yes	Hot Pink Lines & Flags		11-19-04 GCD
TELEPHONE Faxed 11/18/04	N/A			11-29-04
WATER	Yes	Yes		12-1-04 M Wagonck
SECOND ELECTRICAL CROP 2	N/A			11-22-04 BR
GENERAL DYNAMICS/NMCI Faxed 11/19/04	N/A	NU	Not in AREA	11-29-04

In addition to the general precautions for excavating where underground utilites are present, comply with the following:

* Exp 12/27 0412071315

PERMIT HOLDER SIGNATURE: Tony Rosch	DATE: 12/07/04
DIGGING PERMIT APPROVED BY: [illegible]	DATE: 12/7/04

DISTRIBUTION:

ORIGINAL - Code 09Z5 File
YELLOW - Supv. At work site

DIGGING PERMIT
NSWC CRANE 11000/3 (REV. 8/02)

4667

REQUESTED BY: Tetra Tech, Terry Rogsho 412-921-5857	DATE: 11/17/04
WORK REQUEST ON E/S NO.	E side B-45, S of B-325 & N of B-135
WORK WILL BE PERFORMED BY: Tetra Tech NUS Inc.	DATE (Start - on or about): 12/3/04

WORK DESCRIPTION
Soil borings to obtain surface & subsurface soil samples. Locations are marked with weather stained with pink ribbon. Location are annotated by solid circles on attached drawing

EQUIPMENT TYPE
☐ HAND TOOLS ☐ CORE DRILL ☐ TRENCHER ☐ BACKHOE ☐ HEAVY EQUIPMENT

Faxed CROP2 11/17/04 **UNDERGROUND UTILITIES LOCATED IN WORK SITE**

UTILITY	PRESENT	MARKED	NOT LOCATED	REMARKS
COMPRESSED AIR CROP2	N/A			DN 11-18-04
HIGH VOLTAGE ELECTRICAL	NA			S.P. 11-23-04
FIRE ALARM CROP2	NA			MH 11-20
GROUNDING CROP2	N/A			11-18-04 BL
NATURAL GAS	N/A			11/17/04 dm
SECURITY ALARM CROP2	NA			MH 11-20
SEWER	N/A			12-1-04 M. Wagoner
STEAM	N/A			11-19-04 JCD
TELEPHONE Faxed 11/17/04	N/A			LP 12-6-04
WATER	N/A			12-1-04 M Wagoner
SECOND ELECTRICAL CROP2	N/A			11-18-04 BL
GENERAL DYNAMICS/NMCI Faxed 11/17/04	NA			11-18-04

In addition to the general precautions for excavating where underground utilites are present, comply with the following:

PERMIT HOLDER SIGNATURE: Terry Rogsho	DATE: 12/07/04
DIGGING PERMIT APPROVED BY: Donna L. Zylman	DATE: 12/7/04

DISTRIBUTION:
ORIGINAL - Code 09Z5 File
YELLOW - Supv. At work site

SAMPLE SUMMARY FOR 12-08-04:

Soil Borings Completed include
1558 002, 005→013.

SAMPLES SHIP VIA AB # 8447 8135 6336
ON COCs 0138 & 0141

FINISHED LAYOUT OF AOC-41

DPT - S. Cort. J. Goerdt & J. McFall
OTHER - T. Rujahn D. Westerhoff

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

WED 12-08-04

Work continued from Page WEATHER OVERCAST 40°s Periods of rain

0700 - Arrive @ B 3245
- Assist DPT Crew to PREP. FOR Soil SAMPLING
- Got H&S PAPERWORK FROM DPT CREW (SC & JG)
- ORGANIZE GARAGE - EQ & SAMPLE CONTAINERS
  MAKE Room For delivery 3 PALLETS

0900 Hrs - ARRIVE @ SWMU 15 AOC-W
- LAY out REMAINING 9 Soil Boring Locations

1118 Hrs - FINISH LAY out @ AOC-W

1125 Hrs - CHECK IN W/ DPT CREW

1145 Hrs - LUNCH & PURCHASE ICE

1220 Hrs - ARRIVE @ B-3245
- Pick up supplies FOR SWMU 7
- Drop OFF ICE - PURCHASED @ GAS Station

1300 Hrs - CHECK @ DEMO RANGE - Range ACTIVE NEED to check back @ 6154

1315 Hrs - Stopped & PICKED up Soil Sampling Log Sheets FROM DPT CREW

1328 Hrs - ARRIVE @ B-3245 - Start COCs FOR SWMU 15

1410 Hrs - RECEIVE ok to ACCESS OPR (SWMU 7) FROM DEMO RANGE

1545 Hrs - DEMO RANGE WORKS locking up Gates - HAVE to LEAVE OPR

1600 Hrs - ARRIVE @ B 3245
- PREP. SAMPLES FROM SWMU 15 FOR SHIPMENT
- Complete COCs 0138 & 0141

1705 Hrs - LEFT B-3245 FOR FED. EX

1740 Hrs - DROP OFF SAMPLES @ FED. EX
AB# 8447 8135 6336

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12-8-04

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

CREWS - DPT
S. Cort
J. Goerdt
Jay McFall (EFS)

VEG. CLEARENCE
D. Westerhoff
T. RuAHN

DPT SUMMARY 12/09/04:
Completed Soil Borings = 10
1558 001, 003, 004, 029, 031, 032, 035, 037
047 & 048

TEMP. WELLS Completed to date - 6

CLEAR VEG ACCESS @ SWMU 15 AOC-WFGR DPT Boring locations.

TITLE NSWC CRANE **PROJECT NO.** 1245 **9**

THURS 12-09-04 **BOOK NO.** 1380

Work continued from Page WEATHER - OVERCAST / RAIN @ times 40°s

0700 Hrs - ARRIVE @ B-3245
FAX SAMPLE COCs to OFFICE & LAB
0745 Hrs - PREP. to sample soils @ SWMU 7
0815 Hrs - CHECK IN @ DEMO RANGE to ACCESS OPR
Range active today - cannot work on OPR
0825 Hrs - RETURN to B-3245, to work on N1245
• Check in w / T. Brent - suggest rental companies in Bloomington to rent chain saw to clear access for DPT @ SWMU 15 (AOC W)
0845 Hrs - LEAVE B-3245 FOR Master Rental in Bloomington
0930 Hrs - Rent chainsaw, chaps & brush cutter @ Master Rental
0955 Hrs - ARRIVE @ Lowes - D.H. purchased rain gear & flagging to mark access trail @ AOC W for DPT Rig.
1115 Hrs - ARRIVE @ B-3245; drop off all EQ @ OFFICE & Prep to clear veg @ AOC-W
1140 Hrs - LUNCH
1210 Hrs - Check in w/ DPT Crew - Rig stuck in Valley @ SWMU 15
1230 Hrs - ARRIVE @ AOC-W start veg clearing
1445 Hrs - Finish Clearing @ SWMU 15 AOC-W
1609 Hrs - Check Back w/ DPT crew; got sample log sheets - Rig being toed out
1625 Hrs - ARRIVE @ B-3245
• COC PREP., Airbill Prep. etc FOR SHIPMENT to Laucks
1635 Hrs - S.C. & J.G. ARRIVE @ B-3245
• PREP SAMPLES FOR shipment on COCs 0143 & 0144 VIA FED.EX. AB# 8447 8135 6325
1800 Hrs - Drop off samples @ FED.EX. (JG & TK.)
(D.H. RETURNED Chain saw & brush cutter to Master Rental EARLIER)

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Tony Rogel DATE 12-9-04

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

CREWS - SEE PAGE 8

SOIL BORINGS COMPLETED ON 12/10/04: 12
15SB019, 020, 021, 022, 023, 039, 040
042 + 046

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

FRI 12-10-04

Work continued from Page

WEATHER - Overcast w/ Periods of Rain 40°s

0700 Hrs - Arrive @ B 3245

FAX COCs to OFFICE & LAB; discuss DPT Sampling w/ S.C

0755 Hrs - Start working on SWMU 7

1540 Hrs - PAPERWORK & SHIPMENT PREP

Prepare COCs 0145 - 0147

SHIPMENT PREPARED ON FED EX AB# 8447 8135 643

1700 Hrs - LEFT B 3245 FOR FED EX

1735 Hrs - Drop off SAMPLES @ FEDEX

1803 Hrs - FAX LAUCKS COPY OF COCs @ Hotel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12-10-04

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

CREWS · SEE PAGE 8

Soil Borings Completed 12/11/04:

15SB014 - 018 & 024 - 028

↓

08SB001 - 005

TITLE NSWC CRANE

SAT 12-11-04

PROJECT NO. 1245

BOOK NO. 1380

Work continued from Page

WEATHER - Overcast w/ Periods of Lt. Rain 40°s

0725 Hrs - Show S. Cont. SWMU 8 & boring locations

0805 Hrs - Return to B-3245

Work @ SWMU 7 Remainder of Day

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE 12-11-04

DATE

CREWS - SEE PAGE 8

SOIL BORINGS COMPLETED
0858006-014

· Collect (3) Rinsate blanks & (2) SOURCE WATER blanks -

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1330

SUN 12/12/04

Work continued from Page

WEATHER - Partly Cloudy TEMP 40's WINDY

0700 HRS - ARRIVE @ B-3245

PAPERWORK - ~~PREPARE~~ Collect SAMPLES ON COC #3645

3 Rinsate Blanks

PREPARE CofC & Labels FOR SOUCE WATER blanks

1200 HRS - LUNCH

1230 HRS - 1600 HRS - WORK ON SUMMIT

1600 HRS - Label & PROCESS SB12120401

Collect SB12120402 @

1700 HRS - LEFT B3245 FOR Hotel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12-12-04

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

CREWS SAME AS ON PAGE 8

Soil Borings Completed:

15SB050 - 061 ALL CLEAN / No samples collected or TUB installed for sampling

SHIPPED SAMPLES ON COCs 3645 - 3650 VIA FED EX AOT 8447 9135 6450

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

MON 12/13/04

Work continued from Page

WEATHER - Mostly Cloudy Snow Dusting 30°s

0700 Hrs - Arrive @ B 3245

- FAX OFFICE COCs 0145 - 0147
- PREPARE COCs 3646 - 3650 for this dates shipment
- CHECK IN w/ R. Basinki - discuss project status, bring up problem of Routine Samples for Extract & Hold that were selected as DUPs & MS/MSDs Also, discussed problem w/ E. Sedlmyer
- CHECK IN w/ R. Clark regarding SWMU 7 & start COCs for Tues. shipment
- FAX COCs to OFFICE 3646-3650 for T Johnston ED. Sedlmyer to address Extract & Hold problem

1200 Hrs - Lunch

1230 Hrs - Return to B 3245

- Pick up ICE @ BASE Gas Station
- PACKAGE SAMPLES ON COCs - 3645 - 3650 FOR SHIPMENT this date
- CHECK ON drilling crew @ AOC W SWMU 15 AFTER talking to R. Basinski - Follow QAPP Regarding - NO SAMPLES IF CORES are CLEAN, likewise NO TEMP. WELLS will be installed if AREA / BORINGS ARE CLEAN.
- Cont Log in of SWMU 7 Soil SAMPLES

1700 Hrs - LEAVE B 3245 FOR FED. EX.

1730 Hrs - Drop off SAMPLES ON FED. EX. AB# 8497 8135 6950 Also COCs 3645 - 3650.

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Troy Royal

DATE 12-13-04

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

CREWS - SAME AS ON PAGE 8
JAY McFALL to DEMOB

SOIL Borings Completed - 8 HAND AUGERED
155B030, 033, 034, 038, 039, 041, 049
& 062

SHIP SAMPLES ON COC 3651 VIA FED. EX.
AB # 8447 8135 5682

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

TUES 12/14/04

Work continued from Page

0715 Hrs - Arrive @ B-3245
FAX COCs 3645-3650 to OFFICE & LAB
0800 Hrs - Survey crew arrived
Furnish maps of SWMUS 8 & 15 and show
Boring locations on the ground
0930 Hrs - Return to B-3245
Work on SWMU 7
1530 Hrs - Prep samples ~~on~~ & COC # 3651 for shipping
via Fed.Ex. AB # 8447 8135 5682
1630 Hrs - FAX COC # 3651 to LAB & OFFICE
1645 Hrs - Leave Bldg 3245 for Fed Ex
1715 Hrs - Drop off samples @ Fed Ex.

END

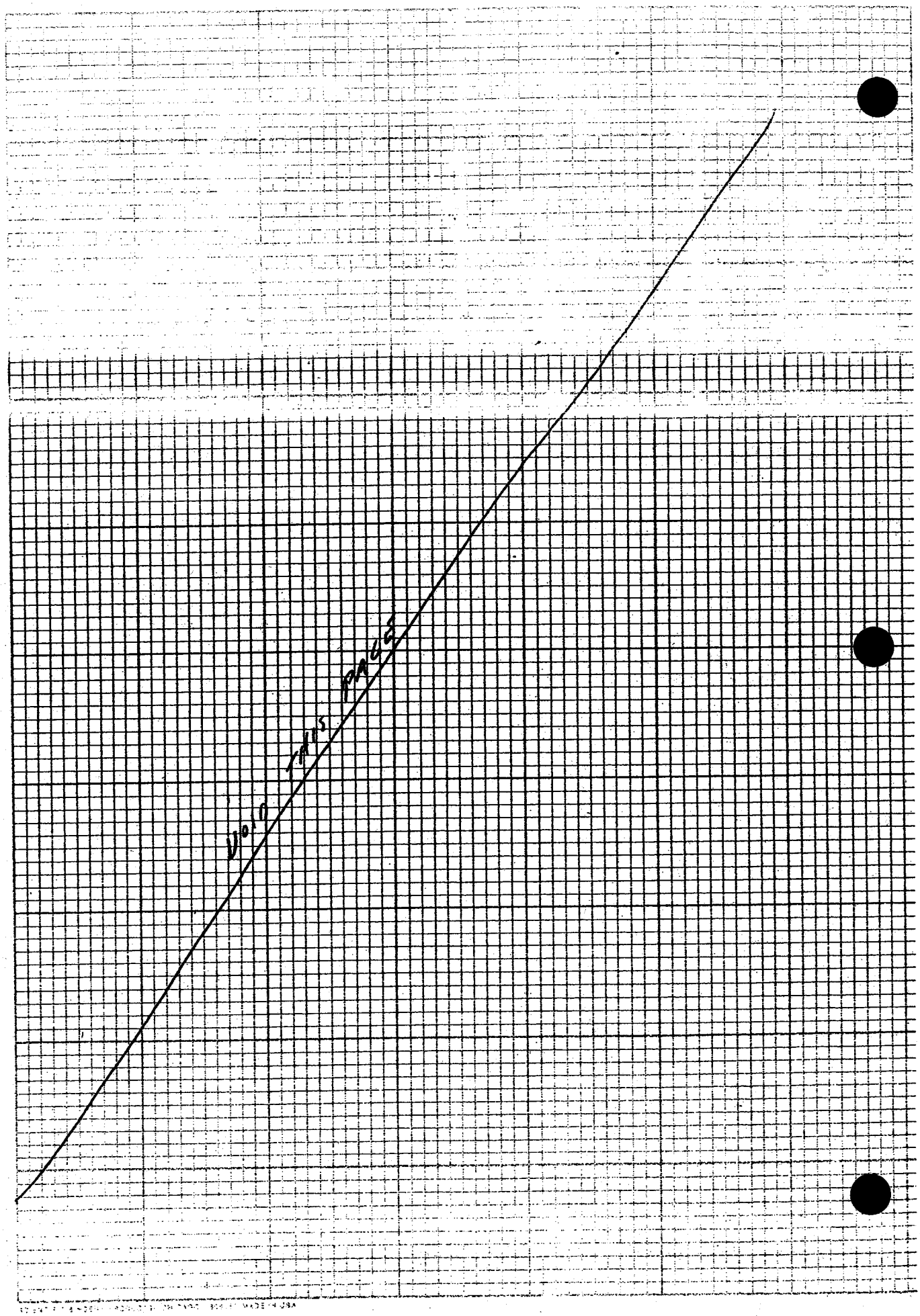
SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers

DATE 12/14/04

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE


Do not this page

TITLE NSWC CLANE

PROJECT NO. 1245

BOOK NO. 1380

WED 12/15/04

Work continued from Page

0700 Hrs - Arrive @ B-3245

Meas staff gauges & surface water flow @

SWMUs 16 & 12.

See Notebooks 1374 & 1376

1100 Hrs - travel to Airport (T. Rojahn & D. Westerhoff)

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12/15/04

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

TRAVEL DAY 01/04/05

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

TUES 01/04/05

Work continued from Page

0630 Hrs - Arrive @ Pitt Airport

1330 Hrs - Arrive @ B-3245

- CHECK IN W. T. Brent
- CALL ED SEDLMYER REGARDING FECAL Coliform LAB
  - LAB: EC LABS, FARMERSBURG, IN
    Contact: JAC PADGETT
- Contact LAB - set up bottle drop off for WED.
- Inventory supplies

1500 Hrs - LEAVE B 3245 FOR Sam's Club

1610 Hrs - CHECK out @ Sam's w/ supplies for sampling.

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 1/04/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

CREW : S. Conti - slug tests
C. Doolan
J. Goerdt
T. Rosahn
} SAMPLERS

SAMPLE SUMMARY 01/05/05 :
TEMP WELL - 15GWTW005 Sampled

Soil Boring No.	AOC	Temporary Well No.	Sample No.	Priority of Sample Aliquot Collection					
SWMU 15				High Priority ←					
15SB002	A	15TW001	15GWTW001	VOCs	SVOCs	PAHs	PCBs	metals	diss.
15SB006	A	15TW002	15GWTW002	VOCs	SVOCs	PAHs	PCBs	metals	diss.
15SB009	B	15TW003	15GWTW003	VOCs	SVOCs	PAHs	metals	diss. metals	P
15SB031	G	15TW004	15GWTW004	metals	diss. metals	SVOCs	PAHs	VOCs	P
15SB035	G	15TW005	15GWTW005	metals	diss. metals	SVOCs	PAHs	VOCs	P
15SB046	U	15TW006	15GWTW006	metals	diss. metals	SVOCs	PAHs	VOCs	P
15SB048	U	15TW007	15GWTW007	metals	diss. metals	SVOCs	PAHs	VOCs	P
15SB061	W	do not collect sample							
15SB062	U	15TW008	15GWTW008	metals	diss. metals	SVOCs	PAHs	VOCs	P
SWMU 08									
08SB006	✓	08TW001	08GWTW001	Explosives	Perchlorate	metals	diss. metals	VOCs	SV
08SB007	✓	08TW002	08GWTW002	Explosives	Perchlorate	metals	diss. metals	VOCs	SV
08SB010	✓	08TW003	08GWTW003	Explosives	Perchlorate	metals	diss. metals	VOCs	SV
08SB013	✓	08TW004	08GWTW004	Explosives	Perchlorate	metals	diss. metals	VOCs	SV

VOCs = volatile organic compounds (method 8260B) - need full vials (i.e., no headspace)
SVOCs = semivolatile organic compounds (except PAHs) -- need full bottle
PAHs = polycyclic aromatic hydrocarbons -- need full bottle
metals = TAL metals plus tin -- need minimum of 250 mL; fill bottle if possible
diss. metals = dissolved TAL metals plus tin (i.e., filtered) - need minimum of 250 mL; fill bottle if possible
PCBs = polychlorinated byphenyls - need minimum of 500 mL; fill bottle if possible
pest. = pesticides - need minimum of 500 mL; fill bottle if possible
herb. = herbicides - need minimum of 500 mL; fill bottle if possible
fecal colif = fecal coliform - need full bottle

Expl - (2) amb
Perch - (1) clear
metals - (1) pl
VOCs - (3) 40
SVOCs - (2) am
PAHs -
Fecal -
PCBs - (2) A
pest/Herb - (2)

Note: Sample aliquots for VOCs method 8015B are **not** to be collected
Field parameters (pH, ORP, DO, SC, and temperature) should be measured for every temporary well
Follow SOP CTO331-05 for sampling procedures

CREW : S. Conti - slug tests
C. Doolan
J. Goerdt
T. Rosahn
} SAMPLERS

SAMPLE SUMMARY 01/05/05 :
TEMP WELL - 15GWTW005 Sampled @ 1320 Hrs

ary o.	Sample No.	Priority of Sample Aliquot Collection							
		High Priority ←							→ Low Priority
01	15GWTW001	VOCs	SVOCs	PAHs	PCBs	metals	diss. metals		
02	15GWTW002	VOCs	SVOCs	PAHs	PCBs	metals	diss. metals		
03	15GWTW003	VOCs	SVOCs	PAHs	metals	diss. metals	PCBs		
0	15GWTW004	metals	diss. metals	SVOCs	PAHs	VOCs	PCBs	pest.	herb.
05	15GWTW005	metals	diss. metals	SVOCs	PAHs	VOCs	PCBs	pest.	herb.
06	15GWTW006	metals	diss. metals	SVOCs	PAHs	VOCs	PCBs	pest.	herb.
07	15GWTW007	metals	diss. metals	SVOCs	PAHs	VOCs	PCBs	pest.	herb.
ot collect sample									
08	15GWTW008	metals	diss. metals	SVOCs	PAHs	VOCs	PCBs	pest.	herb.
01	08GWTW001	Explosives	Perchlorate	metals	diss. metals	VOCs	SVOCs	PAHs	fecal colif.
02	08GWTW002	Explosives	Perchlorate	metals	diss. metals	VOCs	SVOCs	PAHs	fecal colif.
03	08GWTW003	Explosives	Perchlorate	metals	diss. metals	VOCs	SVOCs	PAHs	fecal colif.
04	08GWTW004	Explosives	Perchlorate	metals	diss. metals	VOCs	SVOCs	PAHs	fecal colif.

(method 8260B) - need full vials (i.e., no headspace)
ounds (except PAHs) -- need full bottle
bons -- need full bottle
minimum of 250 mL; fill bottle if possible
plus tin (i.e., filtered) - need minimum of 250 mL; fill bottle if possible
need minimum of 500 mL; fill bottle if possible
500 mL; fill bottle if possible
f 500 mL; fill bottle if possible
bottle

hod 8015B are not to be collected
, and temperature) should be measured for every temporary well
g procedures

Expl - (2) amber 1000 ml
Perch - (1) clean plastic 500 ml
metals - (1) plastic w/ HNO_3 1000 ml
VOCs - (3) 40 ml
SVOCs - (2) amber 1000 ml
PAHs -
Fecal -
PCBs - (2) Amber 1000 ml
pest/herb - (2) Amber 1000 ml

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

WED 01/05/05

Work continued from Page WEATHER - 30°s & rainy

0705 Hrs - Arrive @ site
- Assist & Train C. Dolan w/ Prep for sampling temporary wells @ SWMU 15
- Select wells for sampling, Collect Trip Blank
- Discuss need for boat for SWMU 8 Pond w/ T. Brent etc.
- Begin Paperwork; Received Container from EC Labs

1015 Hrs - Arrive @ SWMU 15
J.G. - set up @ sample location 15TW003
C.D. & T.R. - set up @ 15TW005 - set up tent to block rain from well and samplers

1100 Hrs - Check on J.G. - Geotech Pump not working
Break for lunch

1120 Hrs - Lunch

1150 Hrs - Returned to B-3245 to work on ~~get~~ geotech pump - J.G. went with C.D. to help train CD & sample 15TW005
- Check pump w/ AC plug - started to smoke
- Called U.S. Env. for pump replacement for tomorrow's sampling; order more Cal. Sol. for YSI
- Checked in w/ office - Discussed problem due to weather & malfunctioning Geotech Pump
- Conference call w/ J. Schubert & R. Basinski Need to check out wells W of Mine Fill A
- Order 4 Nitrogen Cylinders

1400 Hrs - Check in on JG & C.D. @ 15TW005
Need to over purge wells due to recent Rain Fall

1420 Hrs - Check wells West of SWMU 12 for J. Schubert - Wells (5) - 7/3, 7/4 & 7/5 are marked assume 7/1 & 2 are unmarked wells only well next to road has a protecting case & 7/4 is damaged

1500 Hrs - Return to B-3245
Paperwork & Prep. Geotech Pump for shipment

1615 Hrs - Leave B-3245 for FED EX

1645 Hrs - Drop off shipment @ FED EX.
AB # 8747 8135 6347

Work continued to Page

SCIENTIC BOOKS PRODUCTIONS CHICAGO 10085 MADE IN USA

SIGNATURE

DATE 1/05/05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

CREW SAME AS ON P. 24

SLUGE TESTS @ 12MWT01, 03, 06 & 08

SAMPLING SUMMARY 01/06/05 !

SAMPLED TEMP. WELLS @ SWMU 8 -

08TW001 → 004

THURS. 1/06/05

Work continued from Page

WEATHER - OVERCAST & 30's

0710Hrs - ARRIVE @ BLDG # 3245
- Assign WELLS FOR SAMPLING
- Assist in PREP FOR TEMP. WELL SAMPLING
- Obtain VEHICLE PASSES
- Organize PAPERWORK
- H&S FOR C. Doolan

0850Hrs - T. Brent & T.R. PICKED UP JON BOAT @ PW

0920Hrs - Return to B 3245 & SECURE Boat to Fence Post
- Set up Pickup FOR Coli. SAMPLES @ BLDG 118 @0900 Hrs on FRI.
- RECEIVE FED. EX. SHIPMENT - SWMU 16 EQ. & Peristaltic Pump REPLACEMENT

1020 Hrs - ARRIVE @ SWMU 8

1047 Hrs - Start Purge 08TW002

1204 Hrs - END Purge

1210 Hrs - LUNCH BREAK / Collected T80106D501 @ 1230 Hrs

1305 Hrs - Return to SWMU 08
- Assist & Train C. Doolan w/ the sampling of 08TW002 & Purging of 08TW004

1530 Hrs - LEFT SWMU 8 to locate BLDG #118 - location to MEET ECLABS Pick up PERSON ~~for~~ the SCH. for tomorrow

1635 Hrs - RETURN to B-3245
- CALL ECLABS - JAC Padgett to confirm meeting place (BLDG seemed unlikely) - JAC checked w/ Pickup PERSON - MEETING place should be @ B 3260
- PREP. PAPERWORK and PACKAGE SAMPLES on COC # 3652

1745 Hrs - LEFT B-3245 FOR FED. EX

1815 Hrs - DROP OFF SAMPLES ON FED. EX. AB # 8447 8135 5627

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers DATE 1/06/05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

CREW - SAME AS ON P. 24

SAMPLE SUMMARY 01/07/05 :

- ALL WELLS @ SWMU 08 SAMPLED this date for FECAL COLIFORM - EC LAB PICKED UP @ BLDG 3260 @ 0922 Hr. Pick up person was Mr Copland Jac Padgett was POC @ EC LABS FARMERSBURG, IN

Environmental Certification Labs, Inc.
P.O. Box 569 • Farmersburg, IN 47850-0569
(812) 696-5076 • 1-800-458-3489
Fax: (812) 696-2596

- Additional TEMP WELLS SAMPLED includes 15TW006, 007 & 008

SLUGS TEST SUMMARY :

TESTED Monitoring WELLS 16MWT03, 05, 18 & 19
No tests conducted @ 16MWT16 - Due to small water column.

FRI. 1/07/05

Work continued from Page

WEATHER - COLD 30°s & Mostly Cloudy

0630 Hrs - ARRIVE @ B-3245

PREP. to Collect Fecal Coliform samples @ SWMU 8

SAMPLE ID #	SAMPLE TIME
08GWTW004	0705
08GWTW003	0715
08GWTW002	0735
08GWTW001	0745
08FD01070501	0000 FROM 08TW002

0810 Hrs - RETURN to B-3245

PREP. Coliform samples FOR EC LAB PICK UP

0922 Hrs - EC LABS (Mr Copland) PICK CO UP SAMPLES @ B-3260

0930 Hrs - RETURNED to B 3245

- FAX COCs 3653 & 3652 to OFFICE &
  COC 3652 to LAUCKS TESTING LAB
- PAPERWORK & CONST. STORM SEWER SAMPLER
- PREP to BACKFILL TEMP WELLS
- ORGANIZE OFFICE / CLEAN

1210 Hrs - LUNCH

1245 Hrs - ARRIVE @ SWMU 8 to BACKFILL TEMP. WELLS - will meas. stick ups prior to WELL ABANDONMENT

TW001 - 2.60' 10' WELL TW003 — 20' WELL

TW002 - 2.98' 20' WELL TW004 0.12' 20' WELL

1330 Hrs - Finish WELL ABANDONMENT @ SWMU 8

1338 Hrs - ARRIVE @ SWMU 15

ABANDONED TEMP WELL @ 15SB061 &
15TW1005 - 4.18' stick up. 10' WELL

CHECK IN ON Jim & Colin

1457 Hrs - ARRIVE @ B-3245

- PAPERWORK & PACKAGE SAMPLES FOR SHIPMENT ON COC # 3655

1650 Hrs - LEAVE B-3245 FOR FED. EX.

1735 Hrs - Drop OFF SAMPLES @ FED. EX. (AB # 8447 8135 5638)

1806 Hrs - FAX COC # 3655 to LAUCKS

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Tony Boyd DATE 1/07/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

CREW SAME AS P. 29

SLUGE Testing @ 16 MWT 20 & 12 MWT 10, 13, & 21
Also FINISHED TEST @ 16 MWT 18

SAMPLING SUMMARY 01/08/05:

- Collected SAMPLES @ 15TW 001 → 004
- ABANDONED the Following TEMP WELLS
  15TW 001 - 004 & 006 → 007 (005 Abandoned)
  ALL WELLS (TEMP.) HAVE been ABANDONED

SAT. 1-08-05

Work continued from Page

WEATHER : Cold 30's & overcast

0705 Hrs - Arrive @ B-3245
- Prep vehicle for GW sampling
- Collect TB01080501 @ 0730 Hrs

0820 Hrs - Arrive @ 15TW002
Start Purge = 0840 VOL. PURGED = 7.4L
END PURGE = 0850 SAMPLE TIME = 0850 Hrs

1145 Hrs - Arrive @ 15TW001
Start Purge - 1200 VOL. PURGED = 4.3L
END PURGE - 1300 SAMPLE TIME = 1300 Hrs

1455 Hrs - Finish Clean up @ 15TW001

1515 Hrs - Arrive @ B 3245
- Pick up Back Fill material (Bentonite Chips)
- Drop off samples

1527 Hrs - Return to SWMU 15 to ABANDON TEMP. WELLS

WELL ID	Stick up	
15TW001	1.44'	
002	1.52	
003	1.00'	10' WELL
004	1.48'	~~20'~~ 15' WELL (TK)
005	4.19'	10' WELL (ABANDONED 1/07)
006	1.35'	~21.5' WELL
007	0.10'	~~20'~~ 15' WELL (TK)
008	2.60'	~~ABANDONED BY C.D. (TK)~~

1615 Hrs - Return to B-3245

1630 Hrs - Collect Rinsate Blank of tubing RB01080501
NERL Lot # 1009064 EX. DATE 10/05

1710 Hrs - Left B 3245 for Hotel

1745 Hrs - Drop off J. Goerdt @ Hotel
- Drive to K-mart to purchase life preservers for SWMU 8 Pond - No luck - J.G. check checked 2 stores last night with no luck (seasonal item)

1830 Hrs - Return to Hotel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Tony Rogel DATE 1/08/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

CREW SAME AS P. 24

SLUGE TESTING PERFORMED THIS DATA ON
12MWT 15, 17, 3C, 25 & 28

SAMPLE SUMMARY 1/9/05 :

Completed the following sediment & surface water locations :

08SW 001, 003, 006 → 009
15SW 018 & 019
08SD 001 → 003, 006 → 009, 15SD 018 & 019

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

SUN 1-09-05

Work continued from Page

WEATHER - Mild 40°s, Partly Cloudy

0710 HRS - ARRIVE @ B-3245

- PREP. FOR SURFACE WATER & SEDI. SAMPLING

0830 HRS - ARRIVE @ SWMU 8 CONFIRM CONFLUENCE OF SITE NO NAME STREAM w/ RTE 45

SW SAMPLE ID		TIME	SD SAMPLE ID	TIME
08SW00901		0855	08SD0090006	0905
08SW00701	(DUPE MS/MSD)	0955	08SD0070006	1008
08SW00801		1138	08SD0080006	1145
08SW00601		1340	08SD0060006	1350
08SW00301		1415	08SD0030006	1420
08SW00201	(DRY)	NA	08SD0020006	1450
08SW00101		1450	08SD0010006	1510
15SW01901		1540	15SD0190006	1540
15SW01801		1600	15SD0180006	1605

1630 Hrs - RETURN to B3245

- SECURE Sample in FRIG or ICED in Coolers
- PROCESS 15SW1/SD019 & 018 (LABEL & BAG)

1700 Hrs - LEFT B-3245 FOR ~~PM~~ EQ. NEED to SAMPLE POND @ SWMU 08

1805 Hrs - CHECK out @ MENARDS

1826 Hrs - " " @ LOWE'S

END

Work continued to Page

SIGNATURE Terry Royal

DATE 1-09-05

DISCLOSED TO AND UNDERSTOOD BY **DATE** **WITNESS** **DATE**

CREW SAME AS P 24

SAMPLE SUMMARY 1/10/05:

SAMPLE 08SW/SD 004 & 005 @ 106 POND
SEE P. 35 & sample log sheets for details

SLUDGE TEST MONITORING WELLS 12MW 38, 45, 46 & 4.

TASK MUD - BASED ON FIELD OBSERVATION & CONVERSATION W/ R. BASHUSKI INSTEAD OF 3 SAMPLE DEPTHS (0-6", 6"-12" & 12-24") 2 SAMPLE DEPTHS (0-12" & 12-24") WERE SAMPLED.

MON 1-10-05

Work continued from Page WEATHER - Mostly Cloudy TEMP ~40°s

0705 HRS - ARRIVE @ B3245
PREP to SAMPLE POND @ SITE 8

0905 HRS - ARRIVE @ POND SWMU 8
• UNLOAD EQ & JON BOAT (delivered by T. BRANT

1000 HRS - START SAMPLING SURFACE WATER AFTER RIGGING JON BOAT W/ STABILIZATION ROPES FROM FRONT & BACK OF JON BOAT to SHORE - ALSO MARK sampling locations w/ 1" screened PVC - USED AS location marker & to SAMPLE SW NEAR the bottom of pond ~4.5'

SAMPLE ID	TIME	Comments
08SW00502	1000	Deep Sample
08SW00501	1020	Shallow "
08SW00402	1045	Deep Sample
08SW00401	1115	SHALLOW "
08SD004 0012	1145	0-12"
08SD004 1224	1200	12"-24"
08SD005 0012	1220	0-12"
08SD005 1224	1235	12"-24"

1250 HRS - LUNCH

1330 HRS - Return to SWMU 8 - DECON BOAT & CLEAN UP

1420 HRS - TR Return to B-3245
JG STAYED @ SWMU 8 to ASSIST T. Brant w/ Returning Jon Boat
CD - ASSISTING S. Conti this AFTERNOON w/ SLUGGE TESTING

1420 HRS - ~~START~~ TR SAMPLE PROCESSING (PACKAGE SAMPLES & PAPERWORK FOR SHIPMENT OF SAMPLES ON COCs # 3656, 3657, 3658 & 3662 via FEDEX AB# 8447 8135 6358

1722 HRS - LEAVE B-3245 FOR FED.EX.

1808 HRS - Drop off SAMPLES @ FED.EX.
• unload / SHIP 11 COOLERS

END

SIGNATURE Tr Brant DATE 1/10/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

CREW SAME AS ON P. 24

SLUGE TEST SUMMARY 01-11-05:
Tested 12MWT23 33 & 29

SAMPLE SUMMARY 01-11-05:
Collected SURFACE WATER SAMPLES @ and SED SAMPL
@ 15SW/SD001, 002, 005, 006, and 013-017

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

TUES 1-11-05

Work continued from Page

WEATHER - Mostly Cloudy Rain High in 50's

0655 Hrs - Arrive @ B-3245 Collect TB01110501 @ 0700 Hrs

- Prep. to sample surface water & sediment @ 15
- Fax COCs to office (from 1/07 & 1/10) &
- Lab (1/10 only, 1/07 was faxed on 1/07).
- Purchase ice @ Base Gas Station
- ~~Pick up ice @~~

0930 Hrs - Arrive @ SWMU 15

SW SAMPLE ID	TIME	SD SAMPLE ID	TIME	
15SW00201	0945	15SD0020006	1000	
15SW00101	1035	15SD0010006	1040	
15SW01601	1110	15SD0160006	1115	
15SW01701	1220	15SD0170006	1225	
15SW01501	1315	15SD0150006	1320	
15SW01301	1410	15SD0130006	1415	
15SW01401	1420	15SD0140006	1425	
15SW00501	1520	15SD0050006	1525	DUP & MS/MSD
DUP & MS/MSD 15SW00601	1550	15SD0060006	1555	

1610 Hrs - Arrive @ B 3245

- Process samples from 15SW/SD 006
- Collect Rinsate Blank on Wilco sieve used to collect SED. samples @ SWMU 7 Pond 08RB01110508 @ 1700 Hrs
- CLEAN UP

1800 Hrs - Leave site for Motel

C.D. to purchase bubble wrap @ Office Depot

T.R. paperwork in evening

END

Work continued to Page

SIGNATURE

DATE 1/11/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

CREWS SAME AS ON P. 24

SAMPLE SUMMARY 01-12-05:
Collect 4 SW SAMPLES 15SW009 & 15ST010, 011 &
Collect 1 SED. SAMPLE 15SD009
REMAINDER OF DAY PACKAGE SAMPLE & VENDOR
EQ. FOR SHIPMENT TO LAB & U.S. ENV.
RESPECTIVELY.
S. Cont. demob slug test EQ AS WELL

Returned on 1-12-05
U.S. ENVIRONMENTAL EQUIPMENT

2	mini troll	
1	PDA	
2	water levels	26043 (~~51670830~~) 26104
1	PID	ED JF 315
2	power pacs	90 122
2	peristaltics	401 419
1	Hammerer	US 02
1	Wildco	105
1	tire meter	0918-4298
1	LAP TOP	

WED 1/12/05

Work continued from Page

WEATHER Mostly Cloudy TEMP in 50°s & 60°s

0650 HRS - ARRIVE @ SITE
- PAPERWORK
- PREP. to Collect Sediment & SURFACE Water @ SWMU 15

0905 HRS - Collect SURFACE WATER @ 15SW00901
0910 HRS - " SEDIMENT @ 15S0009
0930 HRS - Catch basin @ location SW/SD007 couldn't be located

0955 HRS - SAMPLED a newly constructed Catch basin/storm SEWER @ SW/SD010 - 15ST01001

0915 HRS - THE ONLY MANHOLE in the AREA OF SW/SD012 WAS A SANITARY SEWER

1035 HRS - SAMPLED 15ST01101 Also a newly constructed Catch basin/storm sewer

1120 HRS - SAMPLED 15ST004

Locations NOT SAMPLED	COMMENTS
15SW/SD007	missing
15SW/SD012	impact by NEW const. (IN THE AREA IS A SANITARY SEWER)
15SW/SD008	impacted by NEW const.
15SW/SD003	missing (AREA SOMEWHAT FLOODED)

1215 HRS - 1245 HRS - LUNCH

1250 HRS - RETURN to B 3245
- PAPERWORK & PACKAGING SAMPLES on CoCs 3660, 3664, 3665 & 3666
- Check in w/ OFFICE Ed. SEDLMYER & R. BASINSKI
- FAX COCs to OFFICE & LAB (H. PRENTICE)
- UNLOAD VEHICEL
- ORGANIZE & begin OFFICE CLEAN UP
- PACKAGE EQ to RETURN to US. ENU ON AB# 8447 8135 5649

SEE P. 38 →

1620 HRS - LEAVE B-3245 FOR FED. EX

1655 HRS - DROP OFF EQ & SAMPLES (ON AB# 8447 8135 6369)

1720 HRS - WASH RENTAL SUV

1730 HRS - FINISH WASHING RENTAL

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

SIGNATURE

DATE 1-12-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60609 MADE IN U.S.A.

THUR. 1/13/05

Work continued from Page

0700 Hrs - Arrive @ B-3285
- Organize Paperwork
- Prep to return to Pittsburgh
- Sweep & mop floors

1000 Hrs - Leave for Airport
- Remainder of day - travel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 1/13/05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

Logbook pages 42 - 53 are associated with SWMUs 18, 19, 20 and OGTSL.

SAMPLE SUMMARY 2-14-05:

Sampled soil @ 15350470002,
15350480002 & 15350480206.

TRAVEL DAY!

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

MON. 2/14/05

Work continued from Page

TRAVEL DAY

1330 Hrs - Arrive @ B-3245

- Prep. to collect soil samples @ SWMU 15

1420 Hrs - Collect 15550470002 for Pest./PCBs @ SWMU 15

1430 Hrs - Collect 15550480002 " " " " " "

1448 Hrs - Collect 15580480206 " " " " " "

Samples on COC # 3694

1500 Hrs - Return to B-3245

- Process samples @ RM and place in Frig.
- Decon Auger bucket bits

1595 Hrs - Leave B-3245 for Bedford.

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 2-14-05

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS . CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

WED 2-16-05

Work continued from Page

SHIPPER SAMPLES Collected on 2-14-05 (see p 55.)
VIA FED.EX. AB# 8997 8135 7890

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE 2-16-05

DATE

1380

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©SCIENTIFIC BINDERY PRODUCTIONS 60 EAST 13TH STREET CHICAGO ILLINOIS 60605

START ROUND 2

5-24-05:

WELL ID	START DEV	END DEV.	VOL. PURGED
08MW702	0930	1017	9.5 gal
08MW706	1039	1122	5.5 gal
08MW703	1307	1349	30.0 gal
08MW707	1427	1535	50.0 gal

TITLE NSWC CRANE

PROJECT NO. 1245

BOOK NO. 1380

TUES 5-24-05

Work continued from Page

WEATHER - Mostly Sunny & 70's

0830 Hrs - Returned to B-3245 (Work @ SWMU 9)

- Prep. to Dev. Monitoring Wells @ SWMU 8

SEE P 58

0910 Hrs - Arrive @ SWMU-8

Dev. Monitoring Wells 08MW102, 03, 06 & 07

Install two temporary wells w/ J. Schubert

1730 Hrs - Return to B 3245

- Prep. samples for shipment from SWMU 09
- Unload Rental
- Start Cleaning offices

1800 Hrs - Leave B-3245 for Bloomington

END

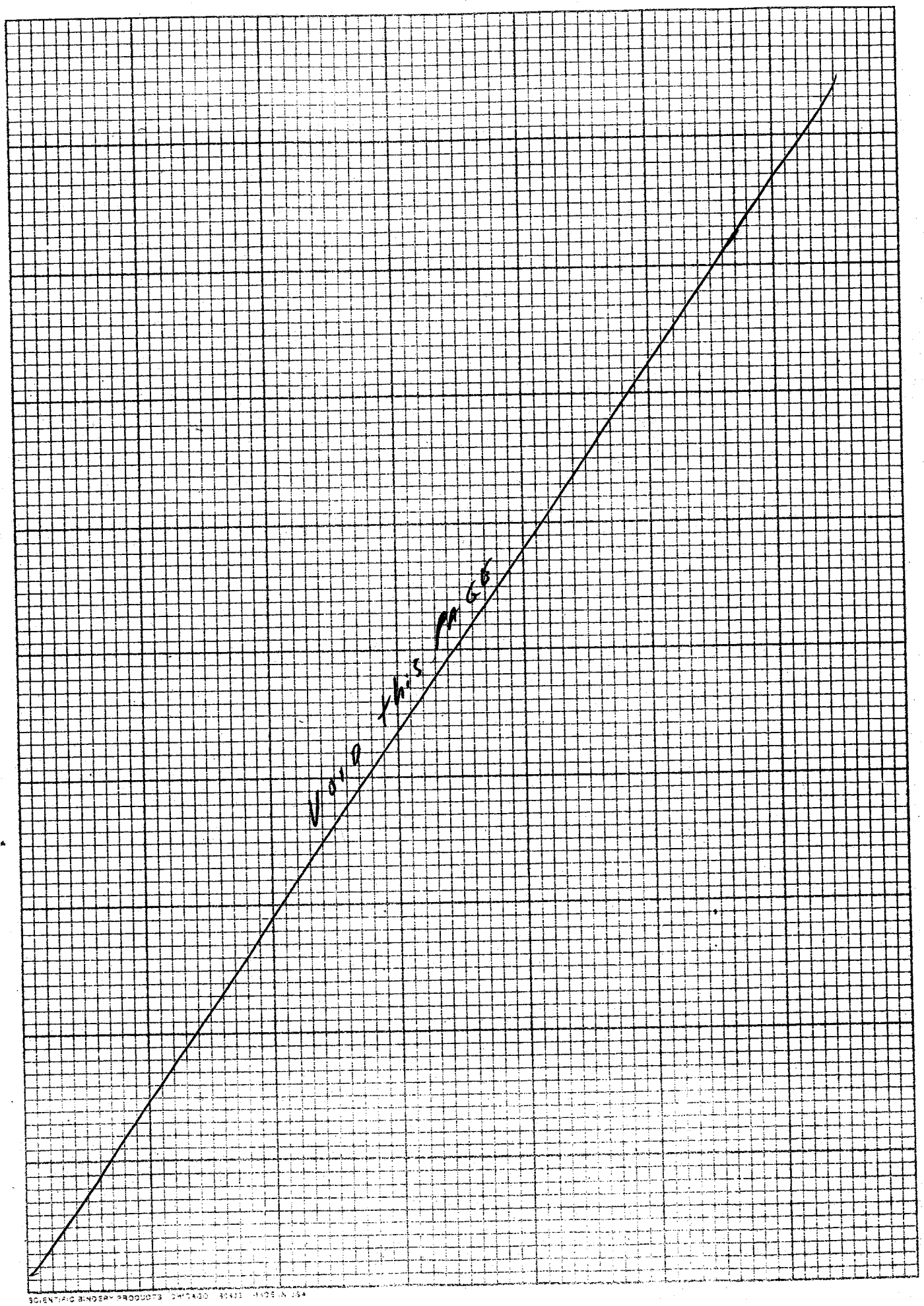
SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5-24-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE



SCIENTIFIC BINDERY PRODUCTS CHICAGO 60621 MADE IN USA

TUES 05-31-05

Work continued from Page

TRAVEL DAY

1140 Hrs - ARRIVE @ B-3245 - BRIF H&S MEETING

- Contact EC LABS Mr. JAC PADGETT (PRES.) FOR Coliform container drop off & Pick up SCH.
- Talk to J. SCHUBERT Regarding well screen lengths NEEDED FOR monitoring WELLS - Also some changes in SW sampling locations.
- TRIED SEVERAL times to talk to R. BASINSKI - NO ANSWER
- TALKED to ED SEDLMYER about changes to Table 2 sample ID #s; if it is ok to pull TWS @ SWMU 9
- Work on labels & VOC bottle sets
- MAKE list of supplies

1430 Hrs - LEFT SITE FOR SAMS Club - PURCHASE Zip lock bags & drinking water

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5-31-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY 06-01-05

WELL ID	START DEV	END DEV	VOL. DEV	COMMENTS
08MWT01	0945	1010	10.5gal	(TC & CD) Good RECHARGE
08MWT04	1030	1110	5.0gal	(CD) Dry out 3 times
08MWT08	1110	1213	19.0gal	(TC) Dry out 3 Xs
08MWT05	1405	1435	9.5gal	(TC & CD) Cleared up
08MWT09	1500	1553	8.25gal	(TC) Dry out 3 Xs
08MWT10	1505	1550	8gal	(CD) Dry out 3 Xs
08MWT11	1645	1725	7.5gal	(CD) Dry out 3 Xs

WED 6-1-05

Work continued from Page

WEATHER: Mostly Cloudy & 70°s

0700 Hrs - ARRIVE @ B-3245
- PAPERWORK
- TALK to J. SCHUBERT - WILL FAX WELL INFO to T. Brent
- TALK W/ SURVEYORS - C. ALLAN dropped by will start SURVEYING ON FRI.
- RECEIVED Coliform Containers from EC LABS
- PREP. to DEV. WELLS @ SWMU 8
- LOAD SUVS W/ DEV. EQ

0920 Hrs - ARRIVE @ SWMU 08
AFTER W/ DEVELOPMENT, WHALER PUMP DECON & DUMPING PURGE WATER IN WATER treatment system
SEE PAGE 62 for details

1245 Hrs - LUNCH

1315 Hrs - RETURN to B-3245
- CHECK MESSAGES
- DECON WHALER PUMP
- PAPERWORK
- CALL RALPH - NO ANSWER

1340 Hrs - RETURN to SWMU 8 - ALTERNATE between DEVELOPMENT DECON OF WHALER PUMPS & dumping PURGE WATER IN WATER treatment system
SEE PAGE 62 for details

1610 Hrs - RETURN to B-3245
- CD to DEV. last WELL AFTER DECON OF (1) WHALER PUMP
- DECON (3) WHALER PUMPS (total)
- PAPERWORK
- CHECK IN W/ R. BASINSKI
- RESTOCK Containers IN OFFICE

1800 Hrs - LEFT B-3245 FOR BLOOMINGTON

END

SAMPLE SUMMARY 06-02-05:

TB060205 01 @ 0800 HRS

WELL ID	START PURGE	END PURGE	VOL. PURGED	SAMPLE TIME	COMMENTS
08MWT06	1000	1039	4.9 L	—	(CD) Slow Recharge well
08MWT07	1025	1045	30.2 L	1450	(TR) MS/MSD
08MWT02	1110	1510	20.1 L	1515	(CD) 08FD060205 01
08MWT01	1725	1915	14.8 L	1920	(CD)
08MWT03	1735	1945	20.8 L	1950	(TR)

THURS 6-2-05

Work continued from Page

WEATHER - OVERCAST, PERIODS OF LT. RAIN & TEMP 60's

0700 HRS - ARRIVE @ B-3245

- XEROX DEV. RECORDS FOR GROUNDWATER SAMPLING
- PREP. FOR GW SAMPLING - LOAD SUV
- SELECT WELLS FOR SAMPLING this date
- TALKED to A. Bernhardt regarding Possible Toxicity testing @ SWMU-15 - REQUEST MAP & SAMPLE CONTAINERS
- CHECK IN W/ R. BASINSKI - LEFT MESSAGE
- Stop & CAF. Pick up LUNCH

1015 HRS - ARRIVE @ SWMU 08

SEE PAGE 64 FOR Groundwater SAMPLING INFO.

2045 HRS - ARRIVE @ B-3245

- Drop off EQ & GAS Cyl.
- REFRIGERATE SAMPLES

2100 HRS - LEAVE B 3245 FOR Bloomington

E-MAIL R. BASINSKI @ Hotel Sample Summary

END

SAMPLE SUMMARY 6/3/05

08RB060305 01 @ 0850 HRS } NERL
08SB060305 01 @ 0900 HRS } LOT # 1003064
EXP Date = 10/05

WELL ID	Start Purge	End Purge	Vol Purged	Sample Time	Comments
08MWT06	612	→	→	0900	Start SAMPLING Slow Re.
08MWT05	1042	1232	8.7 L	1235	(TL)
08MWT09	1000	1400	20.1	1405	(CP)
08MWT04	1415	1540	10.2	1542	(TR)
08MWT10	1530	1700	11.7	1705	(CP)

TB060305 01 @ 1700 HRS

FRI- 06-03-05

Work continued from Page

WEATHER: Mostly Cloudy - OVERCAST & 70°S

0630 Hrs - ARRIVE @ B-3245
- SELECT WELLS FOR sampling this date
- PREP. PAPERWORK & MAPS FOR SURVEYORS
- PREP to SAMPLE Ground water

0745 Hrs - Cory ALLEN & Gary Wood Arrive
- give them MAPS to SWMUS 9 & 13
- SHOWED SWMU 9 to surveyors

0830 Hrs - RETURN FROM SWMU 9
- DECON Bladder pumps
- TAKE Rinsate & Source water blanks
- PREP. SUV to SAMPLE Groundwater @ SWMU 8
- TALK to A. Bernhardt regarding SWMU 15 toxicity sampling
- LEFT MESSAGE W/ R Clark on SWMU 9 - resample of TW @ S831

1010 Hrs - ARRIVE @ SWMU 8
SEE PAGE 66 FOR Groundwater sampling INFO.

1630 Hrs - Return to B-3245
- PREP. samples on COC #3248 FOR SHIPMENT VIA AB # 8447 8135 4804

1730 Hrs - LEAVE B-3245 FOR FED. EX

1800 Hrs - Drop off samples @ FED. EX
E-mail R. Basiaski sample summary from Mate 1

END

SIGNATURE

DATE 6/3/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

SAMPLE SUMMARY 06/04/05

SAMPLE ID/LOC	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
08MW11T06	0840	1240	26.9L	1205	(CO)
08MW11T08	0850	1130	14.8L	1135	(TC)
08TW06	NA	NA	NA	1345	(TC)
08SP02	NA	NA	NA	1855	(TC/CO)
08MW11T06	06/02	→	→	1610	(CO) metals collected slow recharge WLO

SAT 06-04-05

Work continued from Page

WEATHER - mostly Cloudy Hot & Humid - 80's

0700 Hrs - Arrive on site - B-3245
- PREP. to SAMPLE Groundwater
- PAPERWORK

0815 Hrs - Arrive @ SWMU 8
SEE Page 69 for Ground water details of sampling

1230 Lunch @ B-3245

1310 Hrs - Return to SWMU 8 to SAMPLE TEMPORARY WELLS
1330 Hrs - 08TW05 (DRY)
1345 Hrs - 08TW06 SAMPLED
1415 Hrs - 08TW07 (DRY)

1430 Hrs - CHECK / SAMPLE SEEPS staked out by J. SCHUBERT
08SP01 - DRY @ 1430
08SP02 - SAMPLED @ 1455 Hrs
08SP03 - DRY @ 1530 Hrs
08SP04 - DRY @ 1445 Hrs

1545 Hrs - Located & MARKED SURVEY pt OF REFERENCE ON CULVERTS (EXCEPT FOR 08SG07) FOR STAFF GAUGES ~~08SG06~~ 08SG01 → 07.

1645 Hrs - Returned to B-3245
dropped of EQ
SECURED samples in Frig.

1715 Hrs - LEFT B3245 For Motel
- SENT R. Bisinski E-mail of sample summary FROM Motel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE 6/4/05 | DATE

SAMPLE SUMMARY 06-05-05 :

SURFACE WATER ID	TIME	SEDIMENT ID	TIME
08SW01401	0930	08SD01401	0935
08SW00902	1015	08SD00902	1020
08SW00702	1035	08SD00702	1040
08SW00802	1105	08SD00802	1110
08SW011	DRY	08SD01101	1135
08SW01501	1200	08SD01501	1205
08SW01001	1400	08SD01001	1405
08SW006	DRY	08SD00602	1430
08SW01201	1510	08SD01201	1515
08SW00302	1610	08SD00302	1615
08SW002	DRY	08SD00202	1640
08SW001	DRY	08SD00102	1645
08SW013	DRY	08SD01301	1635

SUN 06/05/05

Work continued from Page

Weather - Partly Cloudy - Mostly Sunny Hot & Humid 90's

0640 Hrs - Arrive @ B-3245
- PAPERWORK
- PREP to SAMPLE ~~@~~ SURFACE WATER & SEDIMENT @ SWMU 8

0900 Hrs - Arrive @ SWMU 8 to SAMPLE SURFACE WATER & SEDIMENT SEE PAGE 70

1720 Hrs - RETURN to B-3245
- REFRIGERATE SAMPLES
- Unload SUVs

1785 Hrs - LEFT B-3245 FOR BLOOMINGTON
SEND R. BASINSKI E-MAIL OF SAMPLE SUMMARY FROM Motel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 6-5-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

SLUG TESTING SUMMARY:

FINISHED 08MW101, 03, 04 & 05 (Rising head)

MON 6/06/05

Work continued from Page WEATHER - Mostly Sunny High 80's

0645 Hrs - Arrive on Site (B-3245

- FAX OFFICE (EO) COC # 3248
- Pull maps for surveyors C. Allen & G. Wood for Monitoring wells, Temporary wells, SW/SD, SEEPS & Staff gauges.
- Went over maps w/ surveyors

0830 Hrs - Jacobs Personnel Arriving @ Crane Gate

- Escort Personnel onto base - Start & transmission line West of Mine Fill A
- Personnel - Robert Highfill (Foreman) Brad Whalin, Jason Maples & Kelly Kamp
- Show R. Highfill area to be restored
- Stop & B-156 and check in w/ David Baker to Access Road & West Gate along Mine Fill A

0930 Hrs - Return to Transmission line - will escort crew to MFA West Gate (Need to open both South & West Gate to access restoration area.

- Paperwork
- Meet crew @ S. MFA Gate after lunch

1120 Hrs - Break for Lunch

1145 Hrs - Arrive @ S. MFA Gate to Escort crew into MFA & out W. Gate

1155 Hrs - Let Ground working crew in MFA

1225 Hrs - Let seeding crew in MFA

1330 Hrs - Finish @ SWMU 12 MFA - Secure West & South Gates

1340 Hrs - Arrive @ B-3245

- Prep. samples on COCs 3250-3252 for shipment
- FAX COCs to LAB & OFFICE
- CHECK IN W A. Bernhardt on Toxicity sampling regarding questions on nomenclature & QC.
- CHECK IN W/ R. Clark - do all TWSOT-10 for ~~Dis~~ PCBs. Filtered.
- CHECK OUT Sodding Service SEE PAGE 75 (R. Highfill,

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 6/6/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

1710 Hrs - Arrive @ SWMU 16

1715 Hrs - RESTAKE 165607 (WASHED OUT)

1730 Hrs - LEAVE Bloomington Gate

1805 Hrs - Drop off samples @ FED-EX on AB # 8447 8135 4815

END

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Floyds Knobs, IN 47119-9205
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FAX 812.923.75[illegible]
www.jacobisod.com

Date 6-6-05 JSS Job # 5151

CONTRACTOR: Tetra Tech NUS Owner / Over & Above

CONTRACTOR JOB/ PO # _____ CONTRACT # _____

LOCATION CRANE IN.

QUANTITY	UNIT OF MEASURE	Description
	lft / m	Erosion Control Perimeter Protection
	lft / m	Erosion Control Straw Bale Ditch
	each	Erosion Control Drop Inlet
	each	Erosion Control Curb Inlet
	each	Erosion Control Culvert Pipe
	sys / m^2	ECB (S-75 SC-150 S-150)
	lft / m	Silt Fence (IN / KY)
	sys / m^2	Netting ( )
	sys / m^2	Sodding
	sys / m^2	Sodding (Nursery)
	ton / Mg	Agricultural Limestone
	ton / Mg	Fertilizer (- -)
	ton / Mg	Mulching Material
	lbs / kg	Hydro-Mulch
4730 sys	sys	Mulched Seeding (R-Mix)
	sys	Mulched Seeding ( )
	lbs / kg	Seed Mix ( )
	lbs / kg	Seed Mix ( )
	lbs / kg	Seed Mix ( )
	lbs / kg	Seed Mix (CV)
	each	Signs
	each	Shrubs
	each	Seedlings
	each	Trees
1	each	Mobilization For Seeding
	hours	
4730 sys		Prep all ground

Signature [signature] Title FOL

Date 6/6/05

TB 0607 05 01 @ 0630 Hrs

SAMPLE SUMMARY:

SWMU 08

08SP002 01 @ 0650 (Coliform only)
08SW001 01 @ 1710

SWMU 09

09TW08 @ 1005 Hrs
09TW09 Dry @ 1015 Hrs
09TW07 @ 1030 Hrs
09TW10 @ 1045 Hrs

SWMU 15 — SCHEDULED IN line w/ former locations

15SD020 0006 @ 1215 – 15SW/SD 002
15SD021 0006 @ 1305 – NONE ≈100-150' upstream of 002
15SD022 0006 @ 1340 – 15SW/SD 001
15SD023 0006 @ 1430 – 15SW/SD 016
15SD026 0006 @ 1435 – 15SW/SD 014
15SD025 0006 @ 1500 – 15SW/SD 015
15SD024 0006 @ 1510 – Directly Below 15SD033

C.D. slug TESTED Monitoring Wells
08MW07, 09 & 11

TUES 6/7/05

Work continued from Page

WEATHER: Mostly Sunny Hot Humid & 80's

0630 Hrs - ARRIVE @ B 3245
- PREP. to sample SEEP & SWMU

0650 Hrs - Collect 08SP00201 (Coliform Bacteria only)

0710 Hrs - Collect 08SW00101

0740 Hrs - Check w/ C.D. @ 08MWT11 - Slug Testing

0810 Hrs - Arrive @ B-3260 to wait for EC LABS Pick up
- waste labels for SWMU 15 SED. sampling

0912 Hrs - J. Jones Picked up Coliform Bacteria samples for EC LABS

0915 Hrs - Return to B-3245
- Prep to sample GW @ SWMU 9
- Checked in w/ R. Basinski

1000 - ~~1200~~ 1100 Hrs - Collecting PCB samples @ SWMU 9

~~1200~~ 1100 Hrs - LUNCH

1630 Hrs - Return to B-3245
- Prep to collect sediment @ SWMU 15 for toxicity testing

1200 Hrs - 1530 Hrs - Collected sediment samples for Toxicity Testing @ SWMU 15 - SEE PAGE 76 FOR DETAILS

1535 Hrs - Returned to B-3245
REFRIGERATED SAMPLES

1555 Hrs - Returned to SWMU 15
took PHOTOS OF Locations 15SW1SD020 - 022

1635 Hrs - Finish @ SWMU 15

1650 Hrs - Arrive @ SWMU 9
TW HAVE not RECHARGED; put in sand pack & bentonite @ TEMP. WELL - will leave installed

1730 Hrs - Return to B-3245
- PAPER WORK / ORGANIZE FOR DEMOB
- Clean out SUV
- Start general cleaning inside OFFICE & organize
- ORGANIZE GARAGE SPACE coolers / containers
- DECON S.S. Bowls & Bladder Pump
- PREP. U.S. ENVIRONMENT EQ. FOR REMOVAL

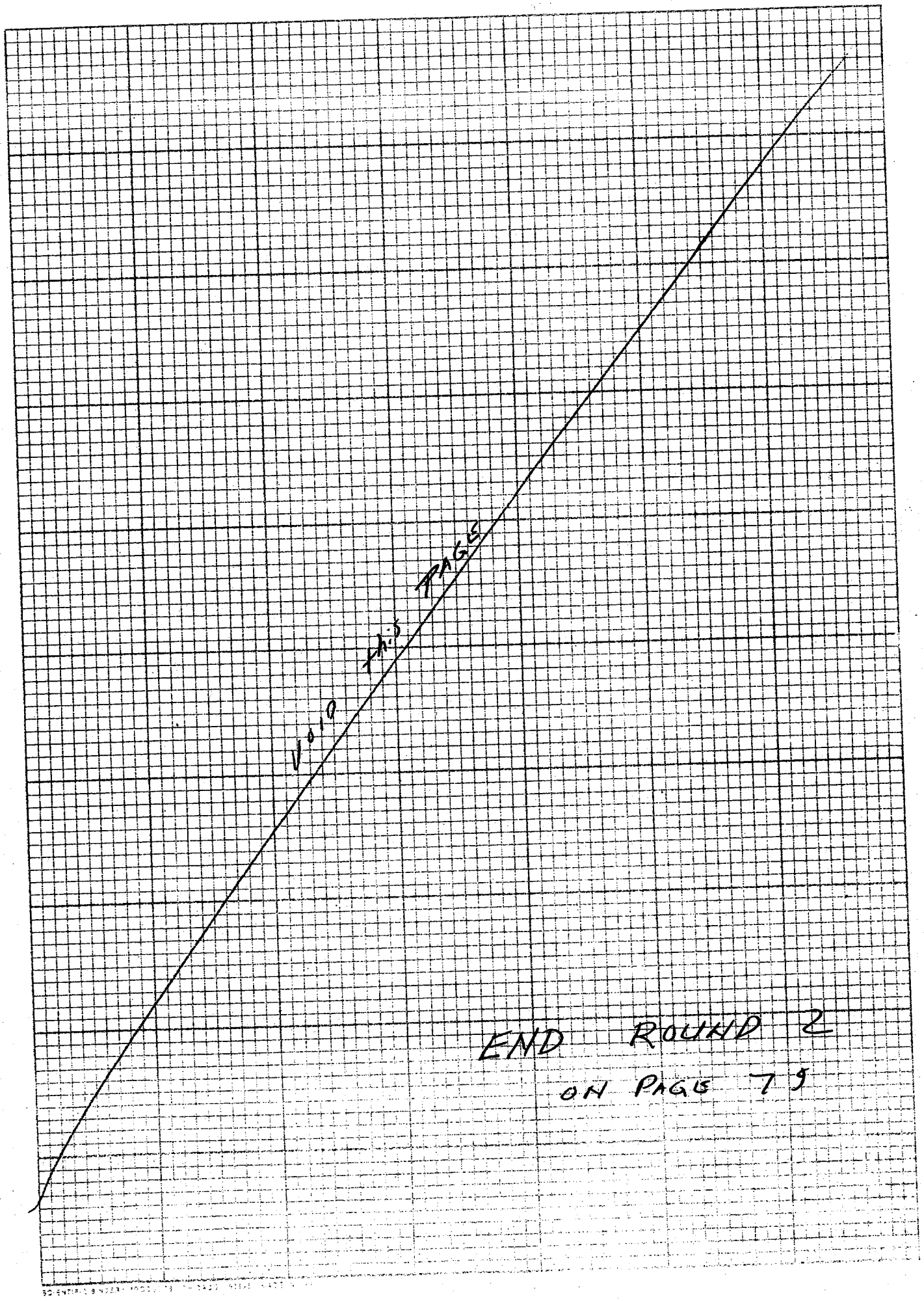
2030 Hrs - LEAVE B3245 FOR Bloomington

SCIENTIFIC BOOKS PRODUCTIONS CHICAGO MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 6-7-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE



END ROUND 2

ON PAGE 79

WED 6-08-05

Work continued from Page

0615 Hrs - Arrive @ B-3245
- Start doing AB# for FED. EX SHIPMENTS

0650 Hrs - Prep. to load Boring cores / T. Brents truck

0700 Hrs - Arrive @ Magazine - unload cores

0728 Hrs - Return to B-3245
- PREP SAMPLES FOR SHIPMENT
- PREP. PAPERWORK FOR SHIPMENT
- PREP. U.S. ENU. EQ FOR SHIPMENT
- PREP. - THUS EQ FOR SHIPMENT
- Sweep & mop Bathroom, hallways, lab & office

0945 Hrs - Leave B-3245 for FED. EX

1020 Hrs - Arrive @ FED. EX.

SHIP:

Laucks samples on AB# 8447 8135 4826
COCs 3257 & 3259 (1 Cooler)

EnviroSystems on AB# 8447 8135 4848
COC 3258 (3 Coolers

Paperwork - AB# 8447 8135 4837 (1 Box)

US ENU - AB# 8447 8135 4859 (13 Boxes) #35,000 Ins

THUS Warehouse - AB# 8447 8135 4860 (1 Box)

1130 Hrs - Arrived @ AVIS

1210 Hrs - Airport INDY

Travel Remainder of the Day

END

SIGNATURE

DATE 6/8/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	09/27/2005	**Weather/Temp**	Sunny - am 60/pm75	**Created By**	John Wright
Facility Name	CRANE NSWC	**TtNUS Personnel**	John Wright (JW);Don Westerhoff (DW);Terry Rojahn (TR);David Hickey (DH)	**Created Date**	9/27/05
TtNUS Project #	112GN1245			**Modified By**	
Task/Contract #				**Modified Date**	
WBS Code #	Open	**Subcontractor Personnel**	EFS:	**Printed By**	James Goerdt
Client	SOUTHDIV	**Visitors**		**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/17/2005	07:00	John Wright	Team arrive at office. JW get pass at main gate.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	09/27/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	Clear / 70's
TtNUS Personnel	D. Hickey;T. Rojahn
Subcontractor Personnel	Jay McFall
Visitors	

Created By	James Goerdt
Created Date	9/27/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
09/27/2005	13:44	James Goerdt	Arrive at swmu 8
09/27/2005	14:34	James Goerdt	BEGIN DRILLING 08SB039.
09/27/2005	14:44	James Goerdt	Arrive at swmu 8 set DPT Rig up on 08SB36 . Prepare to Begin drilling.
09/27/2005	14:44	James Goerdt	Arrive at swmu 8 set DPT Rig up on 08SB36 . Prepare to Begin drilling.
09/27/2005	15:01	James Goerdt	begin drilling 08SB36.
09/27/2005	15:08	James Goerdt	COLLECTED SAMPLE 08SS0360002
09/27/2005	15:10	James Goerdt	BEGIN DRILLING 08SB037.
09/27/2005	15:15	James Goerdt	COLLECT SAMPLE 08SS0370002. HIT REFUSAL AT 2.5 FT BGS.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/27/2005	15:18	James Goerdt	SETTING UP ON 08SB038.
09/27/2005	15:24	James Goerdt	BEGIN DRILLING 08SB038.
09/27/2005	15:28	James Goerdt	SETTING UP ON 08SB039.
09/27/2005	15:36	James Goerdt	COLLECT SAMPLE 08SS0390002.
09/27/2005	15:47	James Goerdt	Location 08sb040 can't be reached with the DPT due to steep slope. Driller will attempting to reach 032. 040 will be advanced via hand auger (HA).
09/27/2005	15:52	James Goerdt	Driller unable to get the DPT rig up to 033
09/27/2005	15:55	James Goerdt	Begin packing up and preparing to head back to the field office to prep samples for shipment to the lab.
09/27/2005	16:12	James Goerdt	Heading back to the field trailer.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/27/2005	16:25	James Goerdt	Arrive at field office
09/27/2005	18:30	James Goerdt	Leave office for the day. T.R. is taking samples by Fedex.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	09/27/2005	**Weather/Temp**	Sunny and 70s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;D. Westerhoff;J. Wright;T. Rojahn	**Created Date**	9/27/05
TtNUS Project #	112GN1245			**Modified By**	Terry Rojahn
Task/Contract #	Open	**Subcontractor Personnel**	EFS:;Jay McFall;Derek Loverich	**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV	**Visitors**		**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
09/27/2005	08:00	Terry Rojahn	Arrive at B-3245: Assist DW in prep for site specific H&S training - the above personnel were present.
09/27/2005	09:30	Terry Rojahn	Personnel at B-106 & 107 Coring and drilling kick off meeting:
09/27/2005	10:00	Terry Rojahn	Finish H&S training
09/27/2005	10:10	Terry Rojahn	Left B-3245 for SWMU 8 kick off meeting for coring and dpt work inside Bldgs 106 & 107.
09/27/2005	11:45	Terry Rojahn	Leave Bldgs 106 & 107 for Public Works
09/27/2005	12:00	Terry Rojahn	Pick up Dig Permits (#4874 & 4885) @ Public Works
09/27/2005	12:20	Terry Rojahn	TR/DH/JW-Return to B-3245 - prep to sample soils
09/27/2005	12:20	Terry Rojahn	TR/DH/JW-Return to B-3245 - prep to sample soils

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/27/2005	12:20	Terry Rojahn	Pick up JW @ B-3245 for lunch.
09/27/2005	13:00	Terry Rojahn	Lunch
09/27/2005	13:20	Terry Rojahn	DW & JM - return to SWMU 8 to inspect DPT rig and to check access to B-107 via B106 corridor
09/27/2005	13:20	Terry Rojahn	TR/DH/JW-Return to B-3245 - prep to sample soils
09/27/2005	15:00	Terry Rojahn	Start sampling soil at SWMU 8 - see COC 112GN1245-9272005-1
09/27/2005	16:20	Terry Rojahn	Return to B3245 -collect rinsate from drilling shoe -RB09270501-NERL DI water Lot # 0807035 & Exp. Date 8/06
09/27/2005	17:00	Terry Rojahn	Pick up Dig Permit 4886 for SWMU 9 at Public Works
09/27/2005	17:25	Terry Rojahn	Return to B-3245- prep samples on above COC for shipping to Laucks Testing Lab this date

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/27/2005	17:30	Terry Rojahn	Leave B3245 for Fed EX
09/27/2005	18:00	Terry Rojahn	Drop off samples at Fed Ex of AB# 8447 8135 7891. Notes: collected soil samples @ borings 08SB36 through 39. Received all dig permits except B-106 permit - Public Work's electric cable locator went down - will not be able to get a replacement until this Friday.
09/27/2005	18:00	Terry Rojahn	

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	09/29/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	clear / 60's
TtNUS Personnel	Dave Hickey
Subcontractor Personnel	Jay McFall;Dave Cribbs
Visitors	

Created By	James Goerdt
Created Date	9/29/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
09/29/2005	08:01	James Goerdt	Arrive at field Office - prep for day.
09/29/2005	09:30	James Goerdt	Leave office for SWMU8.
09/29/2005	09:45	James Goerdt	Arrive at SWMU8 bldg 106 - obtaining permits to begin activities inside bldg 106 and 107.
09/29/2005	10:10	James Goerdt	Concrete coring started in bldg 106.
09/29/2005	10:34	James Goerdt	Driller setting up on 08SB025 - prep for drilling.
09/29/2005	10:40	James Goerdt	Begin drilling 08SB025 - see boring log for details.
09/29/2005	11:10	James Goerdt	Boring 08SB025 is complete - hit refusal at 7.5 ft bgs. Moving to 08SB027.
09/29/2005	11:27	James Goerdt	Begin drilling 08SB027 - see boring log for details.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/29/2005	11:35	James Goerdt	Boring 08SB027 is complete - hit refusal at 6.0 ft bgs. Moving to 08SB022.
09/29/2005	11:51	James Goerdt	Begin drilling 08SB022 - see boring log for details.
09/29/2005	12:03	James Goerdt	boring 08SB022 is complete - hit refusal at 7.5 ft bgs. Set temporary well 08TW008 at this location with 5 ft screen and 0.75 inch ID pvc. Moving to 08SB026.
09/29/2005	12:30	James Goerdt	Breaking for lunch.
09/29/2005	13:34	James Goerdt	Begin drilling 08SB030 - see boring log for details.
09/29/2005	13:38	James Goerdt	Return from lunch - Begin drilling 08SB026 - see boring log for details.
09/29/2005	13:39	James Goerdt	Hit refusal immediately in 08SB030 - appears to be a second layer of concrete or a large rock below the floor - will have to have it cored deeper in order to sample here - in the meantime we are moving to 08SB031.
09/29/2005	13:49	James Goerdt	Both PIDs are malfunctioning - no working PID at this time.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/29/2005	13:52	James Goerdt	Boring 031 is complete - hit refusal at 6.0 ft bgs. Set temp well 08TW009 with 5 ft screen and 0.75 inch ID pvc.
09/29/2005	13:58	James Goerdt	Boring 08SB026 is complete - hit refusal at 6.5 ft bgs. Moving to 08SB028.
09/29/2005	14:01	James Goerdt	Appear to have one PID working for the moment - will look in to getting replacements.
09/29/2005	14:02	James Goerdt	Begin drilling 08SB028 - see boring log for details.
09/29/2005	14:10	James Goerdt	Boring 08SB028 is complete - hit refusal at 6.0 ft bgs. Moving to 08SB029.
09/29/2005	14:13	James Goerdt	Will move location slightly and core a new hole for 08SB030.
09/29/2005	14:18	James Goerdt	Begin drilling 08SB029 - see boring log for details.
09/29/2005	14:30	James Goerdt	Boring 08SB029 is complete - hit refusal at 6.5 ft bgs. Moving to 08SB030.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/29/2005	14:46	James Goerdt	Begin drilling 08SB031 - see boring log for details.
09/29/2005	15:17	James Goerdt	Due to large void beneath 030 we are putting this one on hold for now.
09/29/2005	16:01	James Goerdt	Begin drilling 08SB030 - see boring log for details.
09/29/2005	16:30	James Goerdt	Leave SWMU8 for the field office.
09/29/2005	16:45	James Goerdt	Arrive at field office begin preping samples for shipment.
09/29/2005	18:51	James Goerdt	Leaving site for the day.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	09/29/2005	**Weather/Temp**	Mostly susnny and 60	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Westerhoff;D. Hickey;J. Wright;T. Rojahn	**Created Date**	9/29/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	EFS;J. McFall;Capitol Drilling and Sawing;D. Cribbs	**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
09/29/2005	07:00	Terry Rojahn	Arrive at B-3245 - Check in with Tom Brent
09/29/2005	08:00	Terry Rojahn	Check in with Tom Hess (Building Supervisor)- open building B-106 and turn on overhead exhaust fans.
09/29/2005	08:10	Terry Rojahn	DW & TR Leave B3245 for SWMU 8.
09/29/2005	08:30	Terry Rojahn	DW & TR arrive at SWMU 8. Receive Safety and Building Availability Permit from Tom Butler & Pam Houk (Army H & S).
09/29/2005	09:45	Terry Rojahn	Call dispatch to check on Fire Inspector ETA - 20 mins.
09/29/2005	10:10	Terry Rojahn	Fire Inspector David Neal arrived at SWMU 8. DW & TR received Flame Tool/Hot Work Permit.
09/29/2005	10:15	Terry Rojahn	David Cribbs started coring inside B106.
09/29/2005	10:45	Terry Rojahn	Start drilling inside B-106.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/29/2005	10:55	Terry Rojahn	Begin sampling soil at boring location 08SB22.
09/29/2005	12:45	Terry Rojahn	Finish clean up for lunch - all coring and soil borings 08SB22
09/29/2005	13:00	Terry Rojahn	Lunch
09/29/2005	13:30	Terry Rojahn	Return to SWMU 8: DW over seeing drilling @ B-106 and TR over seeing coring @ B-107. Workers still in B107 - check with T. Hess to see what boring locations could be cored while workers were still in B107 (all but 08SB45).
09/29/2005	14:30	Terry Rojahn	Finish coring all boring locations in B107 except SB45. Move back top B106 because soil boring location 08SB30 had refusal ~ 2inches under the concrete floor.
09/29/2005	15:45	Terry Rojahn	Locate another coring location for 08SB30 ~5' off east internal wall.
09/29/2005	16:00	Terry Rojahn	Cored 2nd location - encountered a 4' void - sump confirmed -attempted to drill @ 2nd location- macrocore would advance only 2 inches - T. Brent to return to B3245 and pick up floor plans in order to select a 3rd location for 08SB30.
09/29/2005	16:15	Terry Rojahn	D.Cribbs returned to B107 to core 08SB 45 inside and 08SB34 via outside back. JW & DH prep to leave SWMU8 for B-3245.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
09/29/2005	17:10	Terry Rojahn	T. Brent returned to B-106 - located the 3rd location for soil boring 08SB30 at B106 - D. Cribbs finished coring all proposed sampling locations at B-107 and moved back to B106 to core 08SB30 (3rd location) - DW & TR finish with clean up at both buildings.
09/29/2005	17:30	Terry Rojahn	T.Brent and TR left SWMU 8 for B3245. DW stayed with D. Cribbs while he cored the 3rd location at 08SB30.
09/29/2005	17:45	Terry Rojahn	TR arrived at B3245. DH and JW working on creating COC 112GN1245-9292005-2. TR packed samples for shipment to Laucks Testing Labs via Federal Express AB#8447 8135 7870 - Check in with R. Basinski - Fax COC to lab.
09/29/2005	18:30	Terry Rojahn	DW arrived at B-3245 with coring Ticket No. 1738178 prepared by David Cribbs for 9.5 hrs of coring (16 locations).
09/29/2005	18:50	Terry Rojahn	Left B-3245 for Fed Ex
09/29/2005	19:20	Terry Rojahn	Drop off samples on COC #112GN1245-9292005-2 at Fed Ex.
09/29/2005	19:30	Terry Rojahn	9/29/05 Sample Summary - Coring completed at the following sampling locations 08SB22
09/29/2005	19:30	Terry Rojahn	

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	09/30/2005	**Weather/Temp**	Sunny and 70s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D.Hickey;D. Westerhoff;J. Wright;T. Rojahn	**Created Date**	9/30/05
TtNUS Project #	112GN1245			**Modified By**	Terry Rojahn
Task/Contract #	Open	**Subcontractor Personnel**	EFS;J. McFall;D. Loverich	**Modified Date**	3/9/06
WBS Code #	Open	**Visitors**		**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
09/30/2005	08:00	Terry Rojahn	For details this date - see entries made in SWMU 9 daily log.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/02/2005	**Weather/Temp**	Mostly cloudy, 80's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	Dave Hickey	**Created Date**	10/2/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	Derek Loverich	**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/02/2005	07:44	James Goerdt	Arrive at field office
10/02/2005	08:07	James Goerdt	Head to SWMU8.
10/02/2005	08:20	James Goerdt	Arrive at SWMU8
10/02/2005	08:27	James Goerdt	Driller navigating DPT rig through tunnel from bldg 106 to bldg 107.
10/02/2005	08:37	James Goerdt	Set up on 08SB041.
10/02/2005	08:44	James Goerdt	Begin drilling 08SB041
10/02/2005	08:55	James Goerdt	Boring 08SB041 is complete
10/02/2005	09:07	James Goerdt	Begin drilling 042

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/02/2005	09:16	James Goerdt	Boring 042 is complete
10/02/2005	09:30	James Goerdt	Begin drilling 043
10/02/2005	09:32	James Goerdt	boring 045 is complete
10/02/2005	09:41	James Goerdt	Boring 043 is complete
10/02/2005	09:49	James Goerdt	Begin drilling 044
10/02/2005	09:55	James Goerdt	Boring 044 is complete
10/02/2005	09:59	James Goerdt	Boring 030 is complete
10/02/2005	10:18	James Goerdt	Begin drilling 045

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/02/2005	10:37	James Goerdt	Moving DPT back to bldg 106
10/02/2005	10:42	James Goerdt	Temp wells 008 and 009
10/02/2005	10:50	James Goerdt	Begin drilling 08SB030
10/02/2005	12:06	James Goerdt	Begin drilling 08SB034
10/02/2005	12:16	James Goerdt	Boring 034 is complete
10/02/2005	12:23	James Goerdt	Begin drilling 035
10/02/2005	12:36	James Goerdt	Boring 035 is complete
10/02/2005	12:47	James Goerdt	Leave SWMU8 for office.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/02/2005	13:00	James Goerdt	Break for lunch.
10/02/2005	13:30	James Goerdt	Begin preping equipment and supplies for tomorrow. DPT rig has been mobed to SWMU9.
10/02/2005	16:30	James Goerdt	Leave site for the day.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/02/2005	**Weather/Temp**	Overcast & 70s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Westerhoff;D. Hickey;J. Wright;T. Rojahn	**Created Date**	10/2/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	EFS;D. Loverich	**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**	Army	**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/02/2005	07:35	Terry Rojahn	Checked water levels in both temporary wells (08TW08 & 09) inside B-106 - both were dry.
10/02/2005	07:45	Terry Rojahn	Start DPT drilling inside B-107.
10/02/2005	07:55	Terry Rojahn	Arrive at B -3245: Did most of soil sampling prep last night - just picked up PIDs on charge
10/02/2005	08:15	Terry Rojahn	Arrive at B-107: Mr Fitzjerald already had both B106 (for rig access to B-107 through bldg corridor) and B-107 opened & lights on.
10/02/2005	09:15	Terry Rojahn	Abandoned and backfilled temporary wells inside B106.
10/02/2005	11:14	Terry Rojahn	Finish walking around buildings 106 & 107 with Mr Fitzjerald - bldgs cleaned of DPT litter and secured. Prior to walk through with Mr. Fitzjerald - TR back filled & sweep up around all boring locations. DL patched all holes ~6" (same size as the removed core)with neat cement.
10/02/2005	13:00	Terry Rojahn	Finish up DPT work inside buildings 106 and 107
10/02/2005	13:10	Terry Rojahn	Lunch break

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/02/2005	14:17	Terry Rojahn	Finish generating COCs: 112G00042-1022005-3 (samples collected on Saturday 10/01) and 112GN1245-1022005-5 (samples collected on Sunday 10/02).
10/02/2005	16:09	Terry Rojahn	Finish clean up in garage - coolers(open coolers pull out bubble wrap
10/02/2005	16:30	Terry Rojahn	Left B-3245 for Bloomington - NOTE: See log book #1380 (pages 85-87) for today's H&S readings associated with DPT work inside Bldgs 106 & 107.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/03/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	Sunny and 80s
TtNUS Personnel	D. Westerhoff;D. Hichey;J. Wright;T. Rojahn
Subcontractor Personnel	EFS;J. McFall
Visitors	

Created By	Terry Rojahn
Created Date	10/3/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
10/03/2005	23:00	Terry Rojahn	06:55:00 - Arrive at B-3245: Prep to lay out soil sample study area at the SWMU 12 Battery Site Area. Tom Brent plotted 11"X17" site map to facilitate field lay out.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/04/2005	**Weather/Temp**	Mostly Sunny and 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Westerhoff;D. Hickey;J. Wright;J. Schubert;T. Rojahn	**Created Date**	10/4/05
TtNUS Project #	112GN1245			**Modified By**	Terry Rojahn
Task/Contract #	Open	**Subcontractor Personnel**	Bowser Morner;Jim Walsh;Josh Dean;Chad Mahaffey	**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV	**Visitors**		**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/04/2005	08:00	Terry Rojahn	Arrive at B-3245: prep for sampling temporary wells and soil borings @ SWMU 8
10/04/2005	09:00	Terry Rojahn	Collect TB10040501 @ 0800 Hrs and 08RB10040501 @ 0810 Hrs.
10/04/2005	09:45	Terry Rojahn	Arrive at B-106: Chisel out asphalt at 08SB23
10/04/2005	11:00	Terry Rojahn	Finish patching 08SB41 & 34 w/ neat cement. Abandoned the following dry temporary wells 08TW010
10/04/2005	11:15	Terry Rojahn	TR return to 08SB23 to chisel a wider and deeper bore hole for hand auger.
10/04/2005	12:00	Terry Rojahn	Break for lunch.
10/04/2005	12:30	Terry Rojahn	Return to B-3245: Prep to sample 17TW01 and SWMU 17 sediments. Hand auger crew returned to SWMU 8 to finish sampling soil borings.
10/04/2005	12:45	Terry Rojahn	Chisel and dig soil boring hole 08SB23 to ~1.5' bgs.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/04/2005	13:00	Terry Rojahn	Arrive at SWMU 17 - continue to collect ground water @ 17TW01 (started collecting sample 17GWTW01 on 10/3).
10/04/2005	15:05	Terry Rojahn	Collected 17SD070006
10/04/2005	15:10	Terry Rojahn	Collect 17SD020006 & MS/MSD
10/04/2005	15:20	Terry Rojahn	Collect 17SD010006 and 17FD10040501.
10/04/2005	15:30	Terry Rojahn	DH & DW arrive at SWMU 17 - Abandoned all temporary wells - 17TW01 (17SB46) sampled for PCBs
10/04/2005	16:00	Terry Rojahn	Return to B-3245: Process samples
10/04/2005	18:00	Terry Rojahn	Drop off samples for shipment to Laucks Lab on COC#s 112GN1245-1042005-7 and 112G00042-1042005-5 via Fed Ex AB# 8447 8135 7847. Sample Summary for 10/4/05 - Completed soil sampling at SWMU 8 with the hand auger collection of soil samples from borings 08SB16
10/04/2005	18:30	Terry Rojahn	LeaveB-3245 for Fed Ex

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/04/2005	**Weather/Temp**		**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	10/4/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Michael Quaill
Task/Contract #	Open	**Visitors**		**Modified Date**	2/11/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/04/2005	08:00	James Goerdt	Arrive at field office and begin prep for sampling at SWMU8.
10/04/2005	09:15	James Goerdt	Heading to SWMU8 to handauger and sample 016
10/04/2005	16:00	James Goerdt	back at the field office
10/04/2005	18:15	James Goerdt	Leave site for the day.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/05/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	NA
TtNUS Personnel	J. Schubert;T. Rojahn
Subcontractor Personnel	J. Schubert;T. Rojahn;J. Goerdt
Visitors	

Created By	Terry Rojahn
Created Date	10/10/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
10/05/2005	07:55	Terry Rojahn	Arrive at B-3245:
10/05/2005	11:15	Terry Rojahn	Leave B-3245 for Federal Express.
10/05/2005	11:50	Terry Rojahn	Drop off above shipments at Fed. Ex.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/10/2005	**Weather/Temp**	Cloudy and 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Schubert;T. Rojahn;J. Goerdt	**Created Date**	10/10/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	Bowser Morner;Jim Walsh;Josh Dean;Chad Mahaffey	**Modified By**	Terry Rojahn
Task/Contract #	Open			**Modified Date**	3/9/06
WBS Code #	Open	**Visitors**		**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
	13:30	Terry Rojahn	Check and mark the amount of psi in 7 large and 5 small nitrogen cylinders - should be enough nitrogen for SWMU 8 groundwater sampling. Unpack and check out equipment : two YSIs, one turbidity meter, one M-scope, one peristaltic pump and one micropurge bladder pump w/ control box. Sweep and mop office, lab, hallways and bathroom. Check in w/R. Clark and J. Wright - couldn't reach R. Basinski. Make travel arrangements for next shift - air and car.
	16:50	Terry Rojahn	Check in w/ J. Schubert at SWMU 8.
	17:15	Terry Rojahn	Leave base for hardware store.
	17:59	Terry Rojahn	Check out at Menards - purchase field supplies.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/11/2005	**Weather/Temp**	Cloudy & 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Schubert;T. Rojahn;J. Goerdt	**Created Date**	10/11/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	Bowser Morner;Jim Walsh;Josh Dean;Chad Mahaffey	**Modified By**	Terry Rojahn
Task/Contract #	Open			**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV	**Visitors**		**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
	07:10	Terry Rojahn	Arrive at B-3245:
10/11/2005	10:37	Terry Rojahn	Left phone message w/ Donna Zollman to renew gas ticket at SWMU 9 dig permit # 4886.
10/11/2005	11:00	Terry Rojahn	Arrive at SWMU 12: Mike Roach's office closed - got his cell phone # off the door (295-8272).
10/11/2005	11:25	Terry Rojahn	Returned to B3245 - called Mr Roach - OK to access SWMU 12.
10/11/2005	11:38	Terry Rojahn	Return to SWMU 12 - Begin Eco Study for Eco Checklist.
10/11/2005	13:10	Terry Rojahn	Lunch break
10/11/2005	13:35	Terry Rojahn	Return to SWMU 12 - Continue Eco Study for Eco Checklist.
10/11/2005	17:40	Terry Rojahn	Complete Eco Study at SWMU 12.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/11/2005	17:50	Terry Rojahn	Arrive at SWMU 8 - check on JG & JS:
10/11/2005	18:20	Terry Rojahn	Return to B-3245:
10/11/2005	19:00	Terry Rojahn	Left B-3245 for Bloomington

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/12/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	Mostly cloudy & 60s
TtNUS Personnel	J. Goerdt;T. Rojahn
Subcontractor Personnel	B-M : shift ended 10/11/05
Visitors	

Created By	Terry Rojahn
Created Date	10/12/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
10/12/2005	06:50	Terry Rojahn	Arrive at B-3245:
10/12/2005	09:05	Terry Rojahn	Check in w/ Public Works - talked to Mr. Ryan Roberts regarding reticketing dig permits 4886 (SWMU 9) and 4876 (SWMU 8) for gas
10/12/2005	10:35	Terry Rojahn	Arrive at SWMU 8 to redevelop monitoring wells 08MWT03 & 05.
10/12/2005	11:03	Terry Rojahn	Start redeveloping 08MWT03.
10/12/2005	11:16	Terry Rojahn	Finish redeveloping 08MWT03.
10/12/2005	13:03	Terry Rojahn	Finish disposal of well 08MWT03 development water.
10/12/2005	13:10	Terry Rojahn	lunch
10/12/2005	13:31	Terry Rojahn	Arrive at B-3245 to decon whale pump.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/12/2005	14:05	Terry Rojahn	Arrive @ SWMU 8.
10/12/2005	14:20	Terry Rojahn	Start redevelopment of 08MWT05.
10/12/2005	15:10	Terry Rojahn	Arrived at B-3245 - Checked on JG at 08MW11 on the way in:
10/12/2005	15:35	Terry Rojahn	End redevelopment of 08MWT05.
10/12/2005	15:44	Terry Rojahn	Finish clean up at SWMU 8.
10/12/2005	18:15	Terry Rojahn	Leave B-3245 for Fed. Ex.
10/12/2005	18:27	Terry Rojahn	SAMPLE SUMMARY:
10/12/2005	18:45	Terry Rojahn	Drop off samples to Laucks and PID to U.S Environmental at Federal Express.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/12/2005	19:00	Terry Rojahn	Purchase gas for SUV
10/12/2005	19:24	Terry Rojahn	Purchase hardware for well dev at Menards.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/13/2005	**Weather/Temp**	Partly sunny & 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;T. Rojahn	**Created Date**	10/13/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/13/2005	07:10	Terry Rojahn	Arrive at B-3245:
10/13/2005	10:35	Terry Rojahn	JG & TR arrive at SWMU 8 to develop 08MWT014.
10/13/2005	11:00	Terry Rojahn	Begin developing 08MWT014.
10/13/2005	11:40	Terry Rojahn	Arrive at B-3245:
10/13/2005	12:07	Terry Rojahn	Finish developing 08MWT014 - dried out well three times.
10/13/2005	12:30	Terry Rojahn	Finish clean up at 08MWT014 and leave SWMU 8 for B-3245.
10/13/2005	13:00	Terry Rojahn	Lunch
10/13/2005	13:35	Terry Rojahn	Arrive at SWMU 8

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/13/2005	14:08	Terry Rojahn	Start development at 08MWT012
10/13/2005	18:30	Terry Rojahn	Leave B-3245 for Bloomington.
10/13/2005	19:00	Terry Rojahn	End development of 08MWT012 for this date - will continue tomorrow. JG assisted in disposal of 08MWT012 development water - after purging and sampling 08MWT001 and the continued sampling of 08MWT006.
10/13/2005	19:15	Terry Rojahn	Arrived at B-3245:

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/14/2005	**Weather/Temp**	Mostly sunny & 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;T. Rojahn	**Created Date**	10/14/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/14/2005	07:00	Terry Rojahn	Arrive at B-3245:
10/14/2005	10:15	Terry Rojahn	Check on dig permit status at Public Works - stopped work on dig permit #4876 (since the additional well was canceled). Donna will be in today - will check back with her regarding permit #4886 (for SWMU 9).
10/14/2005	10:35	Terry Rojahn	Arrive at SWMU 8
10/14/2005	10:55	Terry Rojahn	Continue to develop 08MWT012.
10/14/2005	12:25	Terry Rojahn	End development at 08MWT12.
10/14/2005	12:40	Terry Rojahn	Arrive at B-3245:
10/14/2005	13:00	Terry Rojahn	Lunch
10/14/2005	13:25	Terry Rojahn	Talked to Donna Zollman at Public Works - she already called gas co. regarding the reticketing of SWMU 9 - Donna said the gas co. should remark it either today or on Monday.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/14/2005	13:35	Terry Rojahn	Start development on 08MWT013.
10/14/2005	14:10	Terry Rojahn	Arrive at SWMU 8
10/14/2005	14:25	Terry Rojahn	End development on 08MWT013.
10/14/2005	15:25	Terry Rojahn	Arrive at B-3245:
10/14/2005	16:00	Terry Rojahn	Finish transfer of dev water from a 32gal poly tub to 5 and 8 gal poly containers for handling.
10/14/2005	16:10	Terry Rojahn	Dump development water in industrial sewer MH 327.
10/14/2005	17:40	Terry Rojahn	Drop off samples on the above COC at Federal Express.
10/14/2005	18:09	Terry Rojahn	Prep to leave B-3245 for Federal Express.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/15/2005	**Weather/Temp**	Sunny and 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;T. Rojahn	**Created Date**	10/15/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/15/2005	07:00	Terry Rojahn	Arrive at B-3245:
10/15/2005	10:00	Terry Rojahn	Arrive at SWMU 8:
10/15/2005	10:30	Terry Rojahn	Arrive at 08MWT009.
10/15/2005	10:55	Terry Rojahn	
10/15/2005	10:55	Terry Rojahn	Start purging 08MWT009.
10/15/2005	14:55	Terry Rojahn	End purging 08MWT009.
10/15/2005	14:57	Terry Rojahn	Start sampling 08MWT009.
10/15/2005	15:40	Terry Rojahn	Finish clean up at 08MWT009.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/15/2005	15:50	Terry Rojahn	Lunch
10/15/2005	16:20	Terry Rojahn	Pick up teflon bailers at B-3245 - to sample monitoring wells 08MWT13 & 14.
10/15/2005	16:35	Terry Rojahn	Return to SWMU 8: check on JG at 08MWT007.
10/15/2005	16:45	Terry Rojahn	Arrive at 08MWT014.
10/15/2005	17:00	Terry Rojahn	Start purging 08MWT014 with a Teflon bailer.
10/15/2005	17:05	Terry Rojahn	Finish purging 08MWT013 - dry after 1 volume.
10/15/2005	17:24	Terry Rojahn	Complete purging 08MWY014 - dry after 3 volumes.
10/15/2005	17:50	Terry Rojahn	Begin purging 08MWT013.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/15/2005	18:20	Terry Rojahn	Return to B-3245:
10/15/2005	18:45	Terry Rojahn	Leave B-3245 for Bloomington

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/16/2005	**Weather/Temp**	Mostly sunny & 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	10/16/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/16/2005	08:00	Terry Rojahn	Arrive at B-3245:
10/16/2005	08:10	Terry Rojahn	Arrive at SWMU 15 - Conduct Eco Survey in order to fill out the eco. Checklist - took 19 photos to assist the reader in site familiarization.
10/16/2005	13:00	Terry Rojahn	Lunch @ B-3245
10/16/2005	14:15	Terry Rojahn	Start sampling monitoring well 08MWT014.
10/16/2005	14:30	Terry Rojahn	Prep to sample ground water at SWMU 8.
10/16/2005	14:40	Terry Rojahn	End sampling at monitoring well 08MWT014 - dried out well - collected min volume - will collect additional volume tomorrow.
10/16/2005	15:10	Terry Rojahn	Arrive at SWMU 8
10/16/2005	15:20	Terry Rojahn	End sampling at monitoring well 08MWT013 - dried out well - collected min volume - will collect additional volume tomorrow.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/16/2005	15:50	Terry Rojahn	Start sampling monitoring well 08MWT013.
10/16/2005	16:30	Terry Rojahn	Conduct Eco Survey at SWMU 8 in order to fill out the Ecological Checklist - took 6 photos to assist the reader in site familiarization
10/16/2005	17:45	Terry Rojahn	Leave SWMU 16 for Bloomington
10/16/2005	18:00	Terry Rojahn	Return to B-3245:
10/16/2005	18:30	Terry Rojahn	Arrive at SWMU 16 - installed well tag on monitoring well 16MWT021.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/17/2005	**Weather/Temp**	mostly cloudy & 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn;J. Wright;D. Hickey	**Created Date**	10/17/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	Bowser Morner;Jim Walsh;Josh Dean;Chad Mahaffey	**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
10/17/2005	08:00	Terry Rojahn	Arrive at B-3245:
10/17/2005	10:30	Terry Rojahn	Arrive at SWMU 8
10/17/2005	11:10	Terry Rojahn	Start purging monitoring well 08MWT012.
10/17/2005	13:20	Terry Rojahn	End purge
10/17/2005	13:23	Terry Rojahn	Start collecting ground water sample 08GWT01201.
10/17/2005	13:28	Terry Rojahn	Finish at SWMU 8 - got additional ground water volume from 08MWT013.
10/17/2005	14:05	Terry Rojahn	Arrive at 08MWT014 to acquire additional sample volume.
10/17/2005	14:45	Terry Rojahn	Talk to Donna Zollman at Public Works - Gas remarked at SWMUI 9 - may continue to drill.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/17/2005	15:05	Terry Rojahn	Return to B-3245:
10/17/2005	18:30	Terry Rojahn	Leave B-3245 for Federal Express.
10/17/2005	19:10	Terry Rojahn	Drop off sample shipment at Federal Express.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/25/2005	**Weather/Temp**	Mostly cloudy & 50s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;C. Doolan;T.Rojahn	**Created Date**	10/25/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	Bowser Morner;Jim Walsh;Josh Dean;Chad Mahaffey	**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
	08:00	Terry Rojahn	Arrive at B3245: Cali. Meters - YSI & Turbidity. Collect Trip Blank TB10250501. Prep to sample surface water.
	10:15	Terry Rojahn	Arrive at SWMU 8 to collect surface water samples.
	12:55	Terry Rojahn	Lunch
	13:25	Terry Rojahn	Arrive at B-3245: Contact J. Wright regarding changes to Surface Water Log and pick up supplies.
	13:50	Terry Rojahn	Return to SWMU 8 to collect surface water and seep samples.
10/25/2005	17:30	Terry Rojahn	Checked on drilling progress at SWMU 9 - drilling rig was repaired and monitoring well 09T10 was installed.
10/25/2005	17:35	Terry Rojahn	Finish sampling surface water at SWMU 8.
10/25/2005	17:40	Terry Rojahn	Check temporary well water levels at wells 08TW05, 06 & 07 - all wells were dry.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Log Entries

Date	Time	Author	Notes
10/25/2005	17:55	Terry Rojahn	Check staff gage 08SG02 = 4.59'
10/25/2005	18:10	Terry Rojahn	Return to B-3245:
10/25/2005	19:00	Terry Rojahn	Left NSWC Crane for Bloomington.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/26/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	Mostly cloudy & 50s
TtNUS Personnel	C. Doolan;T. Rojahn
Subcontractor Personnel	Bowser Morner;Jim Walsh;Josh Dean;Chad Mahaffey
Visitors	

Created By	Terry Rojahn
Created Date	10/27/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
	08:39	Terry Rojahn	06:55:00 Terry Rojahn Arrive at B3245:,Prep to develop newly installed monitoring wells at SWMU 9.,Drillers prep to leave Crane - end of their shift. 08:50:00 Terry Rojahn Arrive at SWMU 9 to develop wells. 09:10:00 Terry Rojahn Start development at 09T14. 09:56:00 Terry Rojahn Finish development at 09T14 - removed 5.75 gal. 10:20:00 Terry Rojahn Start development @ 09T15 11:05:00 Terry Rojahn Finish development at 09T15 - removed 7.5 gal. 11:22:00 Terry Rojahn Start development @ 09T13 12:00:00 Terry Rojahn Lunch - stop development 12:40:00 Terry Rojahn Restart development @ 09T13 13:35:00 Terry Rojahn Finish development at 09T13 - removed 25.5 gal. 13:50:00 Terry Rojahn Start development @ 09T09 14:33:00 Terry Rojahn Finish development at 09T09 - removed 8.0 gal 14:48:00 Terry Rojahn Finish clean up at SWMU 9. 15:00:00 Terry Rojahn Stop at Public Works - talk with Donna Zollman - get dig permit #4886 extended to 11/26/05. 15:15:00 Terry Rojahn Return to B-3245:,Decon whaler pump & clean equipment.,Prep 200' water level indicator to return to US Environmental (via Federal Express AB# 8447 8135 7744) in exchange for a 300' water level indicator for well inventory use.,Generated COC 112GN1245-10262005-11 for SWMU 8 surface water samples.,Had a computer glitch - hand corrected COC number -12 to -11 - Mr Quail will fix electronically.,Packaged SWMU 8 samples on the above COC for shipment to Laucks Labs via Federal Express AB# 8447 8135 7733. 18:00:00 Terry Rojahn Leave B-3245 for Federal Express 18:45:00 Terry Rojahn Drop off SWMU 8 surface water samples and water level indicator at Federal Express.
10/26/2005	07:43	Terry Rojahn	10/27/05 - copied 10/26/05 SWMU 9's log - see above entry.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date		**Weather/Temp**		**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	10/27/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	
Task/Contract #		**Visitors**		**Modified Date**	
WBS Code #				**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
	19:43	Terry Rojahn	Time Author Notes 06:50:00 Terry Rojahn Arrive at B-3245:,Generate 10/26/05 daily log form for SWMU 8 by coping SWMU 9 daily log.,Checked in with J.Wright regarding yesterday's COC glitch - M. Quail working on the electronic correction.,Prep J. Goerdt's toughbook for C. Doolan's use - sync,so that all calibration forms show upon for SWMU 9 and prep YSI forms for Colin's input.,Give Colin a quick over view of the "Gound Water Form" and analysis entry.,Prep for well development at SWMU 9 and assist Colin in prep for ground water sampling at SWMU 9.,Sync this toughbook. 10:00:00 Terry Rojahn Discussed well inventory with T. Brent - showed Mr. Brent the well inventory form and some of the photos. 11:30:00 Terry Rojahn Lunch 12:00:00 Terry Rojahn Check on Colin at SWMU 9, monitoring well 09T14 - give him my fully charged battery. 12:42:00 Terry Rojahn Return to B-3245: Called Emily of U S - Environmental regarding her message about sending a hand held PC to run the mini trolls instead of a laptop - OK to send PC - but also send cable and software for use with TTNUS laptop - so we have some options and back up while running slug tests at the newly installed wells at SWMU 8 & 9. Pick up Toughbook car charge for Colin. 13:05:00 Terry Rojahn Left B-3245 for SWMU 8 13:20:00 Terry Rojahn Initiate resample of monitoring well 08MWT 014 -remove 1L of ground water - well dry. 13:40:00 Terry Rojahn Arrive at SWMU 9 to develop newly installed monitoring wells. 13:51:00 Terry Rojahn Start development at 09T12. 15:02:00 Terry Rojahn Finish development at 09T12 -purged 16.5 gal. 15:17:00 Terry Rojahn Dump dev. water in MH327. 15:35:00 Terry Rojahn Start development at 09T11 17:22:00 Terry Rojahn Finish development at 09T11 - purged 102 gal. 17:23:00 Terry Rojahn Finish clean up at SWMU 9. 17:32:00 Terry Rojahn Arrive @ B-3245: Decon whaler pumps and clean equipment and meters. 18:05:00 Terry Rojahn Return to SWMU 9 to check on Colin - assist him in cleaning up at 09T15 after purge was completed. 18:25:00 Terry Rojahn Return to B-3245: Colin dropped off his meters and equipment. 18:40:00 Terry Rojahn Leave B-3245 for Bloomington.,SAMPLE SUMMARY THIS DATE:,CD purged monitoring wells 09T14 & 15 - will sample same tomorrow.,TR developed monitoring wells 09T11 & 12 and initiated the resampling of monitoring well 08MWT14.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/27/2005	**Weather/Temp**	Partly sunny, High mid 50s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn;C. Doolan	**Created Date**	10/30/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
	21:22	Terry Rojahn	13:05:00 Terry Rojahn Left B-3245 for SWMU 8 13:20:00 Terry Rojahn Initiate resample of monitoring well 08MWT 014 - remove 1L of ground water - well dry. 13:40:00 Terry Rojahn Arrive at SWMU 9 to develop newly installed monitoring wells.
10/27/2005	20:38	Terry Rojahn	Above was transferred from the Daily Log generated for SWMU 9 on 10/27/05.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/30/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	Mostly sunny & 50s
TtNUS Personnel	T. Rojahn;C. Doolan
Subcontractor Personnel	
Visitors	

Created By	Terry Rojahn
Created Date	10/30/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
10/30/2005	20:07	Terry Rojahn	06:25:00 Terry Rojahn Down load photo card w/SWMU 8 12 & 15 photos to laptop to make space for monitoring well inventory photos.
10/30/2005	21:09	Terry Rojahn	Above was transferred from the Daily Log generated for the Basewide Monitoring Well Inventory Project

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/28/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	Partly sunny & 50s
TtNUS Personnel	T. Rojahn;C. Doolan
Subcontractor Personnel	
Visitors	

Created By	Terry Rojahn
Created Date	10/30/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
	21:25	Terry Rojahn	09:15:00 Terry Rojahn Begin resampling monitoring well 08MWT14 (Sample ID 08GWT01401) - collected ~400 ml. 09:43:00 Terry Rojahn Finish at SWMU 8 09:50:00 Terry Rojahn Arrive at SWMU 9 - Check in on CD.
10/28/2005	21:40	Terry Rojahn	Above was transferred from the Daily Log generated for SWMU 9 on 10/28/05.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/29/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	
WBS Code #	
Client	SOUTHDIV

Weather/Temp	Mostly sunny & 50s
TtNUS Personnel	T. Rojahn;C. Doolan
Subcontractor Personnel	
Visitors	

Created By	Terry Rojahn
Created Date	10/30/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
	21:28	Terry Rojahn	08:50:00 Terry Rojahn Arrive at SWMU 8 - collected ~500ml of ground water from monitoring well 08MWT014. 09:10:00 Terry Rojahn Arrive at SWMU 9.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	10/31/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	Open
WBS Code #	Open
Client	SOUTHDIV

Weather/Temp	Mostly sunny and 50s
TtNUS Personnel	T. Rojahn;C.Doolan
Subcontractor Personnel	
Visitors	

Created By	Terry Rojahn
Created Date	10/31/05
Modified By	Terry Rojahn
Modified Date	3/9/06
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
	08:00	Terry Rojahn	Arrive at B-3245: Prep to continue sampling monitoring well 08MWT014.
	09:15	Terry Rojahn	Arrive at SWMU 8 - Collected only ~300ml before 08MWT014 dried out.
	09:40	Terry Rojahn	Return to B-3245: Prep to sample surface water at SWMU 9 and surface soil at SWMU 12 Battery Disposal Area.
	14:35	Terry Rojahn	Arrive at B-3245: Generate COC 112GN1245-10312005-12 Prep and package samples for shipment on Federal Express AB# 8447 8135 7700. Also processed and shipped samples from SWMU 9 and 12.
	18:30	Terry Rojahn	Left B-3245 for Federal Express.
	19:00	Terry Rojahn	Drop off samples on the above COC at Federal Express.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	12/13/2005	**Weather/Temp**	Overcast and 30s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	12/13/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**	BTR:;Matt Knoy;Eli Cook	**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
12/13/2005	19:56	Terry Rojahn	12:35:00 Terry Rojahn Arrive at NSWC Crane - pick up pass at Bloomington gate - THE MORNING WAS SPENT IN TRAVEL FROM PIT AIRPORT TO NSWC CRANE.
12/13/2005	19:57	Terry Rojahn	Copied from SWMU 12 Daily Log for 12/13/2005.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	12/17/2005	**Weather/Temp**	Mostly sunny & 30s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	12/17/05
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	Open	**Visitors**		**Modified Date**	3/9/06
WBS Code #	Open			**Printed By**	James Goerdt
Client	SOUTHDIV			**Printed Date**	3/30/06

Log Entries

Date	Time	Author	Notes
12/17/2005	07:15	Terry Rojahn	Arrive at B-3245:
12/17/2005	08:35	Terry Rojahn	Begin well inventory at SWMU 8.
12/17/2005	10:50	Terry Rojahn	Complete well inventory and synoptic water level measurements at SWMU 8 and begin measuring staff gauges.
12/17/2005	12:10	Terry Rojahn	Finish measuring staff gauges at SWMU 8, also took photos of each location.
12/17/2005	12:15	Terry Rojahn	Return to B-3245 - Demob (see SWMU 12 "Daily Log" for this date).
12/17/2005	23:26	Terry Rojahn	Also

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Activity Date	12/18/2005
Facility Name	CRANE NSWC
TtNUS Project #	112GN1245
Task/Contract #	
WBS Code #	
Client	SOUTHDIV

Weather/Temp	NA - travel day - paper work
TtNUS Personnel	T. Rojahn
Subcontractor Personnel	
Visitors	

Created By	Terry Rojahn
Created Date	12/18/05
Modified By	
Modified Date	
Printed By	James Goerdt
Printed Date	3/30/06

Log Entries

Date	Time	Author	Notes
12/18/2005	09:00	Terry Rojahn	Begin to transfer hand written data (water level and total well depth measurements taken on 12/17/05) to a "Groundwater Level Measurement Log".
12/18/2005	09:41	Terry Rojahn	Finished and checked the above task - performed in Indy airport.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Activity Date	10/8/06	**Weather/Temp**	PM: Sunny 74 degrees	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	Dave Hickey (DH)James Goerdt (JG);Terry Rojahn (TR)	**Created Date**	10/8/06
TtNUS Project #	112GN1245			**Modified By**	James Goerdt
Task/Contract #		**Subcontractor Personnel**		**Modified Date**	11/14/06
WBS Code #				**Printed By**	James Goerdt
Client		**Visitors**		**Printed Date**	12/11/06
		Status	Complete		

Daily Activity

Date	Time	Author	Notes
10/8/06	12:30	James Goerdt	JG installing several well ID plates at permanent monitoring well locations.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Activity Date	10/10/06	**Weather/Temp**	AM: PC 67 degrees	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	James Goerdt (JG)	**Created Date**	10/10/06
TtNUS Project #	112GN1245	**Subcontractor Personnel**	NA	**Modified By**	James Goerdt
Task/Contract #		**Visitors**	NA	**Modified Date**	11/14/06
WBS Code #		**Status**	Complete	**Printed By**	James Goerdt
Client				**Printed Date**	12/11/06

Daily Activity

Date	Time	Author	Notes
10/10/06	08:15	James Goerdt	Arrived on site to finish installing remaining permanent well ID tags.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Activity Date	10/22/06	**Weather/Temp**	NA	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	10/22/06
TtNUS Project #	112GN1245	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #		**Visitors**		**Modified Date**	11/3/06
WBS Code #		**Status**	Complete	**Printed By**	James Goerdt
Client				**Printed Date**	12/11/06

Daily Activity

Date	Time	Author	Notes
10/22/06	18:45	Terry Rojahn	COPIED FROM SWMU 9 DAILY LOG:

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Activity Date	10/23/06	**Weather/Temp**	Mostly Cloudy and cold low 40s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC			**Created Date**	10/23/06
TtNUS Project #	112GN1245	**TtNUS Personnel**	David Hickey;Terry Rojahn	**Modified By**	Terry Rojahn
Task/Contract #		**Subcontractor Personnel**	Stephen Gaiser	**Modified Date**	11/3/06
WBS Code #		**Visitors**		**Printed By**	James Goerdt
Client		**Status**	Complete	**Printed Date**	12/11/06

Daily Activity

Date	Time	Author	Notes
10/23/06	10:05	Terry Rojahn	Arrive at SWMU 8 - collected soil samples at borings 08SB59, 60 & 62 and installed Temp. wells 08TW014, 15 and 17 respectively.
10/23/06	11:50	Terry Rojahn	Lunch - update Daily Logs for SWMUs 8 & 9.
			DH and SG return from lunch - collect samples from soil borings 08SB53

10/23/06	12:55	Terry Rojahn	through 57 & 61, and installed temp wells 08TW009, 010 (not installed refusal at 4 ft), 011, 012, 013 and 016 respectively.
10/23/06	15:50	Terry Rojahn	Returned to B-3245:
10/23/06	17:38	Terry Rojahn	Leave B-3245 for Fed Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Activity Date	10/24/06	**Weather/Temp**	PM: Partly Cloudy 50 degrees	**Created By**	James Goerdt
Facility Name	CRANE NSWC			**Created Date**	10/24/06
TtNUS Project #	112GN1245	**TtNUS Personnel**		**Modified By**	James Goerdt
Task/Contract #		**Subcontractor Personnel**		**Modified Date**	10/24/06
WBS Code #		**Visitors**		**Printed By**	James Goerdt
Client		**Status**	Complete	**Printed Date**	12/11/06

Daily Activity

Date	Time	Author	Notes
10/24/06	13:25	James Goerdt	Arrived at SWMU 08 after completing sampling activities at SWMU 17. Began purge/sample activities at temp wells 08TW08 through 08TW18 (excluding 08TW10 due to shallow refusal).
10/24/06	17:15	James Goerdt	Completed temp well sampling activities for the day at

			SWMU 08. Returned to Bldg 3245.
10/24/06	17:25	James Goerdt	Arrived at Bldg 3245. Unloaded vehicle of samples and equipment. Departed Crane at 17:50
10/24/06	21:00	James Goerdt	Completing paperwork from days sampling activities until 23:00.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 8 - Soil Sampling - October 2006 - CRANE NSWC

Project Information

Activity Date	10/25/06	**Weather/Temp**	AM: Cloudy 35 degrees	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	James Goerdt	**Created Date**	10/25/06
TtNUS Project #	112GN1245	**Subcontractor Personnel**	NA	**Modified By**	James Goerdt
Task/Contract #		**Visitors**	NA	**Modified Date**	11/14/06
WBS Code #		**Status**	Complete	**Printed By**	James Goerdt
Client				**Printed Date**	12/11/06

Daily Activity

Date	Time	Author	Notes
10/25/06	07:05	James Goerdt	Arrived at Building 3245. Preparing to sample temporary wells at SWMU 08 and 17.
10/25/06	07:35	James Goerdt	Arrived at SWMU 08 to finish sampling of temporary wells.
10/25/06	08:05	James Goerdt	Sampling well 08TW12. Collected (3) 40 ml vials and another 100 ml before well dried out. Sampling other wells at SWMU

			08 until sample complete or well dries out.
10/25/06	10:30	James Goerdt	Letting temp wells 08TW12 and 13 recharge as I move to SWMU 17 to sample.
10/25/06	13:25	James Goerdt	Arrived back at SWMU 08 to sample wells.
10/25/06	14:00	James Goerdt	Completed sampling at SWMU 08 and headed back to Bldg 3245. Began prepping samples for shipment to lab. Battery on lap top drained before I could complete both COCs and all labels. Ended up hand printing three sample labels as well as the COC for SWMU 17.
10/25/06	17:10	James Goerdt	Departed Crane for Fed Ex. Arrived at Fed Ex at 16:40 (EST).

- End of Report -

D.2 SITE NOTEBOOK

NSWC
CRANE

8 & 15

2586

LOGBOOK

START : 12-7-04

TABLE OF CONTENTS

Subject	Page

TITLE NSWC CRANE
TUES DEC 7 2004

PROJECT NO. N1245
BOOK 2586

Work continued from Page AT SITE SJC

AM: CLOUDY W/ RAIN
PM: " " "

AM: READ OVER QAP, ETC

PM: TRAVEL DAY TO NSWC SITE
MOB DAY FOR EFS.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conte DATE 12/7/04

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245
WED DEC 8 2004 BOOK 2586

Work continued from Page AT SITE: SJC/JG

JM- EFS

AM: SUNNY COLD
PM: " COLD HI 40°F

0630 AT SITE - LOAD VAN CALIB PID
H&S BRIEFING, SIGN SHEETS FILL
OUT MED DATA FORM

0800 DISCUSS WORK SCEDULE FOR TODAY

0850 DPT RIG STARTS TO MOB TO SITE 15.
CANNOT USE TRAILER, DUE TO BROKEN
WHEEL ON TRAILER

0930 ARRIVES (DPT) AT SITE 15

1020 AOC B SB013 6'
SB012 6'
SB011 6'

AOC C SB008 9'
SB009 TEMP WELL 9.5
SB010 9.5

1315 DONE AT AOC C.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE SJConti DATE 12/8/04
WITNESS DATE

TITLE NSWC CRANE PROJECT N1245
WED (CONT) BOOK 2586

Work continued from Page

1330 MOVE TO AOC A
SB007 6'
SB002 6' TEMP WELL - 6'
DUP MS/MSD ON 0206 SB006 6' TEMP WELL - 6'
SB005 6'

1530 AT SB005 FINISHING UP SAMPLE
COLLECTION.

1600 LEAVE FOR FIELD OFFICE.

1610 ARR FIELD OFF - BEGIN TO PREP
SAMPLES TAKEN TODAY.

1700 LOAD BOTTLES INTO COOLERS ADD
ICE AND STRAP.

1800 LV SITE.

QUANT TODAY EFS

1 DAILY RENTAL DPT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE SJConti DATE 12/8/04
WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** N1245

THUR DEC 9 2004 **BOOK** 2586

Work continued from Page

AT SITE: SJC / JG JM

AM: CLOUDY, COLD – LT RAIN @ 1115

PM: CLOUDY, COLD – RAIN STOPS @ 1400

0630 AT SITE – NOTES, CALIBRATE PID. GO OVER DARS

0730 MAKE UP ENCORE SETS

0800 EFS ARRIVES – WAITS FOR MECHANIC TO FIX TRAILER (WHEEL BROKE OFF)

0900 MOVE TO

AOCA	15SB001	–	6'	
	15SB003	–	6'	
	15SB004	–	6'	
AOCG	15SB029	–	5'	
	15SB031	–	14'	TEMP WELL
	15SB032	–	3'	
	15SB035	–	6'	TEMP WELL
	15SB037	–	4'	
	15SB048	–	15'	TEMP WELL
	15SB047	–	2'	

1215 DPT RIG STUCK – WENT TO LUNCH AFTER LUNCH TALKED TO TOM B HE WAS ABLE TO CALL ROAD MAINT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conte DATE 12/9/04

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** N1245

THURS (CONT) 2004 **BOOK** 2586

Work continued from Page

AND THEY WERE ABLE TO WINCH OUT THE DPT.

1500 DPT RIG WAS WINCHED OUT AND MOVED TO 15SB048.

1630 DONE AT 15SB047 GO TO FIELD OFFICE.

1700 BEGIN TO PREPARE SAMPLES FOR SHIPMENT

1800 LV SITE. [1 DAY FOR DPT]

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conte DATE 12/9/04

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

FRI DEC 10 2004 BOOK 2586

Work continued from Page AT SITE: SJC / JG.

AM: CLOUDY, COOL - RAIN BECOMES PARTLY CLOUDY

PM: PARTLY TO CLOUDY - COOL LT RAIN.

0630 AT SITE CALIB PID - FINISH NOTES

0730 PREPARE ENCORE SETS

0830 GO TO SITE 15 - SET UP ON 046

AOC U	15SB046	20.5'	SET TEMP WELL 10-20
	15SB045	14'	
AOC O	15SB043	5'	
	15SB042	6'	
	15SB044	4.5'	
AOC E	15SB019	6'	
	15SB023	6'	DUP AT 0206 + MS/MSD
	15SB020	6'	
	15SB022	6'	
	15SB021	6'	
AOC H	15SB040	6'	
	15SB039	3'	

1630 AT FIELD OFFICE - PREPARE SAMPLES

1800 LV SITE. (DAY DPT)

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conta DATE 12/10/04

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

SAT DEC 11 2004 BOOK 2586

Work continued from Page AT SITE: SJC/JG. JM

AM: CLOUDY COLD RAIN - RAIN STOPS ~ 0900

PM: " "

0630 AT SITE CALIB PID - FINISH NOTES

GET ENCORES READY

0730 SJC/TR GO TO SITE 8 TO CHECK OUT SITE.

0800 BACK AT OFFICE. JAY HOOKS UP TO TRAILER. GO TO SITE 15.

0835 MOVES DPT RIG TO 15SB0

	15SB017	6'
	15SB016	6'
	15SB015	6'
	15SB018	6'
0945	15SB014	6''
	15SB025	5'
	15SB024	5'
	15SB026	3.5'
1050	15SB028	4'
	15SB027	

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conta DATE 12/11/04

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

SAT (CONT) - 2004 BOOK 2586

Work continued from Page

1200 CLEAN UP AT SITE 15 - PATCH BORING WITH COLD PATCH. LOAD DPT ON TRAILER

1230 AT SITE 08 SET UP AT 08SB001

1305 08SB001 2.5'
08SB002 3'
08SB003 3'
08SB005 4'
1500 08SB004 6'

1545 AT SITE OFFICE - PLACE SAMPLES IN FRIDGE - WRITE UP NOTES, PAPERWORK - CHECK OVER QA SHEET BEGIN COC'S - FILL OUT DARS.

1810 LV SITE - WORK ON LOGS IN ROOM
47 BORINGS DONE SO FAR
9 LEFT AT SITE 8 (12/12)
12 " AT " 15 12/13 | 12/14 | 12/15
7 CANT DO W/ DPT
75 TOTAL

[1 DAY DPT]

4 DAY + 1 MOB

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 12/11/04

WITNESS

DATE

TITLE NSWC CRANE

SUN DEC 12 2004 BOOK 2586

Work continued from Page

AT SITE: SJC/JG JM - EFS

AM: CLOUDY, COLD, WINDY
PM: PTLY CLDY, COLD, WINDY

0630 AT SITE: CALIB PID - PREPARE ENCORE SAMPLES - LOAD VANS - JARS, COOLERS ICE

0730 FINISH LOADING VANS - PREPARE TO GO TO SITE 8.

0830 AT SITE 8

08SB006 8' TEMP WELL (3'-8')
0910 MS/MSD + DUP → 08SB009 8.5
08SB008 10'
08SB007 17' TEMP WELL (7'-17')
1130 08SB010 17.5 TEMP WELL (7'-17')

1230 TOOK SAMPLE OF EFS'S SOURCE WATER USED FOR DECON - TOOK SAMPLES AND PAPER WORK TO FIELD OFFICE.

1300 ARRIVE FIELD OFFICE - DROP OFF SAMPLES - GET MORE SUPPLIES

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 12/12/04

WITNESS

DATE

TITLE NSWC CRANE
SUN (CONT) 2004

PROJECT NO. N1245
BOOK 2586

Work continued from Page

1330	0858011	6'	
	0858012	19'	MS/MSD 0006 DUP 02
1515	0858013	19	SET TEMP WELL 9-19
	0858014	2-4	

1545 CLEAN UP LOAD UP DPT - GO TO SITE 15 LOOK OVER LOCATIONS

1630 RETURN TO FIELD OFFICE. PUT SAMPLES IN FRIDGE.

1800 LU SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conti DATE 12-12-04

WITNESS DATE

TITLE NSWC CRANE
MON DEC 13 2004

PROJECT NO. N1245
BOOK 2586

Work continued from Page

AT SITE: SJC/JG (THNUS) JM + EFS

AM: CLOUDY, COLD WINDY.
PM: " " "

0630 AT SITE: CALIB PID, PAPERWORK, DAPS GET ENCORES READY, JARS, COOLERS, ICE LOAD VAN - PREPARE TO GO TO SITE 15 WOODED AREA

0730 LOOK OVER QUP FOR AOC W.

0800 EFS ARRIVES + PREPARE TO GO TO AOC W.

0900	15SB053	6'	
	15SB057	9.5'	
	15SB061	6'	SET TEMP WELL 1-6
1020	15SB060	6'	
	15SB059	6'	
1320	15SB058	6'	
	15SB54	6'	
	15SB50	6'	
	15SB51	6'	
1430	15SB52	6'	

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conti DATE 12/13/04

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

MON (CONT) 2004 BOOK 2586

Work continued from Page

	15SB056	6'
1630	15SB055	6'

1635 JAY HOOKS UP TRAILER AND LOADS DPT ON TRAILER - TAKES IT TO FIELD OFFICE.

1730 AT FIELD OFFICE - PREP SAMPLES AND SHIP.

1810 LV SITE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conti DATE 12/14/04

WITNESS DATE

TITLE NSWC CRANE PROJECT NO.

TUE DEC 14 2004 BOOK 2586

Work continued from Page AT SITE: SJC/JG THUS

AM: CLEAR V. COLD.
PM: PARTLY CLDY COLD

0630 AT SITE - WRITE UP NOTES AND COMPLETE DARS

0730 PREPARE FOR HAND AUGER AT SITE 15

0800 GO OVER DARS W/ JAY McFACE

0830 LOAD HAND AUGER EQUIP

0915	TAKE HAND AUGER	15SB030	(3')
	" " "	15SB033	(2')
	" " "	15SB036	(2')
	" " "	15SB039	(2')
1050	" " "	15SB041	(2')
	" " "	15SB038	(2')
1330 ±	" " (TEMP WELL)	15SB062	(3.5)
1430	" "	15SB049	(2')

1510 DONE AT SITE 15 GO TO FIELD OFF.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SJ Conti DATE 12/14/04

WITNESS DATE

NSWC
CRANE

8 & 15

2586

LOGBOOK

START: 12-7-04

END

TITLE NSWC CRANE PROJECT NO. N1245

WED DEC 15 2004 BOOK 2586

Work continued from Page

AT SITE: SJC/JG TENUS

AM:

PM:

0630 AT SITE:

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE DATE

WITNESS DATE

TITLE NSWC CRANE 2005 PROJECT NO. N1245

May 10 BOOK 2586

Work continued from Page

7:10 am arrived at office

7:30 went over H&S forms, safety issues, and hospital routes with Terry Rozahn

8:00 drilling crew from Bowser-Morner filled out their personal health forms and signed the form sheet showing H&S training records.

Health and Safety training records and medical approval sheets are in the process of being faxed to Tom Brent.

8:30 am calibrated PID picked up hard hat and water level meter from office

Roger Clark checked with Donna Zollman, digging permit still not issued for SWMU 8

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-10-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

May 10, 2005 BOOK 2586

Work continued from Page

9:00 – 9:45 am took drilling crew and drilling rig to SWMU 8 to observe drilling locations and to determine access problems for drilling on (JPS) east side of 106 Pond (i.e. trees, steep slopes). Decided to place wells southeast of pond right at treeline.

10:00 am returned to check on digging permit at D. Zollman's office. Still not issued yet. I gave her my cell phone number and told her to call as soon as it was issued. Stopped by SWMU 9 to see how geoprobe work was progressing.

10:30 am went back to SWMU 8 to drillers. Informed them that digging permit still not issued. Jim Walsh informed me that their supply truck with sand, bentonite, etc had not arrived yet. Drilling crew was unloading supplies and setting up temporary decon station.

11:30 am broke for lunch

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-10-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

May 10, 2005 JPS BOOK 2586

Work continued from Page

11:45 am Jim Walsh called from Crane gate. Supply truck has arrived but guard will not let them enter. Took 15-20 minutes to find Tom Brent and get his authorization for entrance.

12:30 pm After lunch called Donna Zollman. Digging permit still needs electricians signature. Copied extra boring logs and well completion forms at Tom Brent's office.

1:00 pm went out to Bldg 106, met with drillers and decided on where to drill 09MW01 and 09MW02. Can not find stake so we will put wells on southeast side of pond as far as reasonable northward into the trees/brush as we can go. Slope eastward toward creek gets steep further north.

1:45 pm called Donna Zollman again about digging permit. Still no signature by electrician.

2:10 pm went over to SWMU 9 to log geoprobe cores. Logged 09SB28 through 09SB36 and 09SB18 through 09SB20.

6:30 pm left Crane

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-10-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

May 11, 2005 BOOK 2586

Work continued from Page

0700 arrive at office

0710 – 07:35 loaded supplies and equipment into truck

0800 called Donna Zollman, still no digging permit yet

0810 – 0900 helped Terry R. packed and label boxes for shipped calibrated PID and loaded into car.

10:00 am called Tom J., S. Anderson, back at NUS

10:30 am went over to D. Zollman's office to see if I could speed up digging permit. She called and arranged for another electrician to clear sites and sign permit. Gerald is electrician.

10:45 went to Bldg. 106 but Gerald didn not show up.

11:00 called D. Zollman and left message that Gerald was not here. Could she please contact him.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-11-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

May 11 2005 BOOK 2586

Work continued from Page

12:00 noon electrician showed up at 12 noon, OK'ed the drilling sites on the east and south sides of Bldg 106 and went to check 08MWT08 location on west side of Bldg. 106.

– Drillers returned from lunch and started drilling

– hot (~85°), sunny, little breeze

2:15 finished drilling 08MWT01 overburden, placed protective casing (20 feet) into hole, and grouted in place

2:25 started drilling 08MWT02 no split spoon coring, straight augering.

3:00 pm finished drilling hole, placed screen and riser into hole,

3:15 pm finished sandpack and bentonite seal

3:46 pm – tried to measure water level – dry –

3:45 driller took augers and other

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-11-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

BOOK 2586

May 11, 2005

Work continued from Page

equipment over to decon pad to steam clean

- decon pad is located on gravel apron south of Bldg 106

- drill rig set up over 08MWT04 ready to start drilling tomorrow morn.

4:15 - returned to office, made phone calls, put PID on charger, did some paperwork.

5:15pm left Crane

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-11-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

BOOK 2586

May 12, 2005

Work continued from Page

very cool (~ 60°), cloudy, foggy

7:05 am arrived at office

7:25 am calibrated PID

loaded supplies into truck

7:50 am arrived at SWMU 8

8:05 depth to water in 08MWT02 is 15.13 feet btoc

8:08 started drilling 08MWT04 on south side of pond as close to trees as we can get

8:35 finished drilling 08MWT04

8:45 set sand pack and bentonite chips in hole, no grout

8:50 moved south ~ 7' and set up rig to drill 08MWT03

8:55 started augering 08MWT03 no split spoons, augering with 10-inch OD auger

9:30 finished augering to 19' depth bgs

9:45 inserted steel casing (6" dia) into hole (20 ft of casing)

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-12-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

May 12 2005 ~~2004~~ BOOK 2586

Work continued from Page

10 am finished grouting steel casing in hole
- pulled drill rig off of hole

10 am - 10:30 am steam cleaning augers

10:25 am depth to water in 08MWT02 = 13.95 ft btor

10:28 am depth to water in 08MWT04 = 8.30 ft btor

10:45 set drill rig up over 08MWT06
drillers went to lunch

10:45 - 11:30 I walked along south and southeast sides of hill and found 4 springs/seepage areas (two on the east side of the right of way and two on the west side). I will stake these and mark with flagging so they can be found for sampling at later date.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-12-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

May 12, 2005 ~~2004~~ BOOK 2586

Work continued from Page

11:50 am drillers returned from lunch

12:05 pm started augering 08MWT06

12:50 pm reached depth of 18 feet bgs

1:05 pm installed screen, riser, sandpack and bentonite

1:15 started augering ~~[illegible]~~ 08MWT05
no split spoons; used 10" dia augers

1:50 pm finished drilling hole to 20' deep and put in 20 feet of permanent steel casing

~~2:00~~ - 2:15 pm - mixed grout and grouted in steel casing

50 gallons water 6 bags Portland #1 cement
1/3 bag bentonite
(CETCO drilling products Puregold Gel (sodium bentonite

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-12-05

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245
May 12, 2005 ~~2004~~ BOOK 2586

Work continued from Page

CETCO = Colloid Environmental Technologies
50 lb bags

2:15 pm measured water level in 08MWT06 dry
total depth = 26.87 feet btoc

2:30-3:15 steam cleaning augers pipes split spoons other equipment

3:15-3:30 moved drill rig to 08MWT07 location; drillers left for day

3:30 went to Bloomington gate and picked up new pass. lost mike in woods at lunch looking for scraps

4:15 pm called T. Johnson at TtNUS and left progress report on his voice mail

4:50 pm -- put PID on charge and left Crane

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-12-05
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245
May 13, 2005 ~~2004~~ BOOK 2586

Work continued from Page

7:00 am arrived at office
warm (~70°F) partly cloudy
a bit humid

7:05 am drillers arrived
7:30 am calibrated PID
7:40 called Sharon Currie at TtNUS and gave her my time

7:55 am at SWMU 8 and started augering / split spooning 08MWT0

9:00 am
hit bedrock at 9' bgs
set temporary casing and started coring bedrock

10:15 finish coring to a depth of 35 ft bgs; went through sandstone; went 3 to 5 feet down into dk gray shale.

10:25 started reaming hole with 10 inch roller bit

11:00 am finish reaming hole to depth of 35 feet

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-13-05
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. N1245

May 13, 2005 ~~2004~~ BOOK 2586

Work continued from Page

— placed one foot of sand in bottom of hole, then 15 feet of screen and 20' of riser

— bottom of screen placed at 32 feet bgs

11:30 finished sandpack and bentonite seal; no cement grout placed yet

12:00 – 1:00 pm lunch for drillers
I dropped core boxes off in office

1:00 pm water level in 08MW06 dry no water
total depth 20.87 feet btoc

1:05 drillers returned from lunch
1:30 pm steam cleaned augers, pipe, and other equipment

1:30 pm storm started, thunder lightning

2:45 still thunder, lightning, called it off drilling

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-13-05

WITNESS DATE

3 pm called T. Johnson w update

TITLE NSWC CRANE PROJECT NO. N1245

May 14, 2005 ~~2004~~ BOOK 2586

Work continued from Page

7:00 am arrived at office
cloudy, overcast, cool, light drizzle

7:10 drillers arrived at office
7:20 calibrated PID
8:00 raining heavier
drillers do not want to start drilling because of weather

8-10 rainstop and starts
sometimes very light drizzle
sometimes steady

10 am drillers left for early lunch; will call me from Bedford if it looks like end of storm
— Chad went back to Ohio with one truck to pick up more sand more well screen and more bumper posts.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-14-05

WITNESS DATE

TITLE NSWC Crane SWMU 8 May 14, 2005

PROJECT NO.

BOOK 2586

Work continued from Page

11:00 ~~11:45~~ 12:00 noon raining heavy at times

measured water level in 08MWT07 at 11:25 am wl = 15.30 ft btoc

12:15 pm wl in 08MWT06 = 11.85 feet btoc
this may surface runoff from rain that entered from todays rain

12:20 took picture of unnamed trib flowing past SWMU 13 where it crosses road; very high flow, could not cross

12:25 pm took picture of unnamed trib past SWMU 13 where it enters Boggs Creek
took 2 pictures of Boggs Creek, where trib enters
very high flow

12:00 – 1:00 raining off and on

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-14-05

WITNESS DATE

TITLE SWMU 8 May 14 2005

PROJECT NO.

BOOK 2586

Work continued from Page

12:30 pm taking picture of pipe laid down along NW side of SWMU 13 in valley.
Looks like it will be laid right next to our monitoring wells. This will not be good.

1:00 pm went to SWMU 9 finished logging the DPT cores. Made sketch of all the DPT locations.

2:30 pm returned to office
– plugged in PID to recharge
– cleaned out truck

3:00 pm returned to Bloomington to finish SWMU logs and DPT map.

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-14-05

WITNESS DATE

NSWC Crane

TITLE SWMU 8 May 15, 2005

PROJECT NO. 10125

BOOK 2586

Work continued from Page

7:00 am arrived at office
7:15 am calibrated PID

7:45 am arrived at Bldg 106
depth to water in 08MWT06 = 12.83 ft btoc
08:00 am set rig over 08MWT08
started coring overburden
08:30 am started rock coring at 10 feet bgs
09:30 finished rock coring at 30 feet bgs; started reaming

10:25 finished reaming to 30 feet bgs; hole produced a lot of water during coring and reaming
10:30 pulled rod and roller bit out of hole
put in 15 feet of screen and 20 feet of riser
5 bags of sand for sandpack 13-30 ft bgs; 3 bags bentonite chips for seal 3-13 feet bgs

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert **DATE** 5-15-05

WITNESS **DATE**

TITLE SWMU 8 May 15, 2005

PROJECT NO. 10125

BOOK 2586

Work continued from Page

10:45 am pulled rig off hole
went to decon pad to clean all equipment and tools

11:30 finished deconning all equipment, tools, and rig
11:40 set rig up over 08MWT01
11:45-1:00 pm lunch for drillers
1:10 started rock coring at 20' bgs in 08MWT01
3:45 finished rock coring at 55 feet bgs
3:48 pm started reaming hole with roller bit
4:20 pm finished reaming hole; pulled rod and roller bit out of hole
4:40 placed 20 feet of screen and 40 feet of riser into hole
- sandpack 55-33 feet bgs using 6½ bags of sand
- bentonite seal 23-33 feet bgs using 2 bags bent chips
- filled rest of hole to 4 feet bgs with cement bentonite grout

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert **DATE** 5-15-05

WITNESS **DATE**

TITLE SWMU 8 May 15, 2005 PROJECT NO. BOOK 2586

Work continued from Page

5:00 finished grouting well
cleaned up site
— moved rig and equipment over to decon pad to decon
— Jim Walsh, driller, informed me that a bearing burned out in the rig and would need to be replaced. They have extra bearings but need to go to Lowell to get right tools to change the bearing.
— will fix rig in the morning

5:30 — finished deconning rig and equipment

6:00 pm drillers left site
I cleaned up garbage ~~and~~

6:30 pm I returned to office through out trash, unloaded core boxes checked for messages. I called T+WUS and left progress report for Ralph B.

7:00 pm left site

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-15-05

WITNESS Jeff Schubert DATE

TITLE SWMU 8 May 16, 2005 PROJECT NO. BOOK 2586

Work continued from Page

6:30 am arrived at office
rearranged core boxes
swept floor, checked for messages, called Ralph B.,

7:15 calibrated PID

7:20 drillers arrived; they are going out to SWMU 8 to fix bearing in drill rig

8:30 — called Ralph Basinski and updated him on SWMU drilling progress, sewer pipe near northwest side of Mine Fill B, and bearing problem on drill rig.

8:45 am went to SWMU 8; drillers are working to fix rig

9:25 depth to water in 08MWT06= 13.71 ft bgs
riser ≅ 2.6 feet

9:30 depth to water in 08MWT04 = 6.67 feet bgs
riser ≅ 2.95 feet

9:35 am depth to water in 08MWT02= 7.14 feet bgs
riser height ≅ 2.57 feet

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-16-05

WITNESS Jeff Schubert DATE

TITLE NSWC Crane SWMU 8 May 16, 2005

PROJECT NO.

BOOK 2586

Work continued from Page

9:38 am depth to water in 08MWT01 = 52.72 ft btoc
riser height ≈ 4.8 feet

9:45 am depth to water 08MWT07 = 14.70 ft btoc
riser height = 1.95 feet

9:55 am depth of water 08MWT08 = 12.85 ft btoc
riser height = 5.1 feet

10 am Drillers still working on drill rig. They are trying to replace a couple of bearings

11:30 am drill rig fixed. Drillers taking an early lunch

12:35 pm Drillers back from lunch
Started coring 08MWT03 at 19 feet bgs

1:10 cored 10 feet to 29 feet bgs; no more coring in this hole

1:25 started reaming 08MWT03
30-33 feet bgs relatively hard drilling laminated fine sandstone/ clayey siltstone

2:15 finished reaming hole
orange & tan sandstone

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert

WITNESS

DATE 5-16-05

DATE

TITLE SWMU 8 May 16, 2005

PROJECT NO.

BOOK 2586

Work continued from Page

- lots of water produced between 50 and 60 feet bgs
- total depth 60 feet
- added water of blow of cuttings & clean hole
- 2:20 pulling out rod and roller bit

2:30 pm 10 feet of screen and 53 feet of riser
sandpack 46-60 feet bgs
4 bags of sand used
bentonite seal 36-46 feet bgs
2 full bags bentonite chips

2:50 pm grouted remainder of annulus 3-36 feet bgs
used 35-45 gallons water
4 bags Portland cement
1/3 bag bentonite gel

- picking up equipment and moving to the decon pad

3:00-3:30 pm decontaminating rig and equipment

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert

WITNESS

DATE 5-16-05

DATE

TITLE NSWC Crane SWMU 8 May 16, 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page

3:30 pm set rig up over 08MWT05

3:40 started coring 08MWT05 starting at 20 feet bgs

5:00 pm finished coring to 60 feet bgs

6:00 pm finished reaming to 60 feet

6:15 pm started installing well
10 feet screen
53 feet riser
sandpack 47-60 feet bgs
used 4 full bags of sand
bentonite seal 38-47 feet bgs
2 full bags of bentonite chips
— added water to hydrate chips

6:30 drillers leaving site for day will grout holes in morning

6:50 I dropped off core boxes at office

7:00 pm called Ralph Baranski and left message regarding drilling progress.

7:30 pm left Crane

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-16-05

WITNESS DATE

TITLE NSWC Crane SWMU 8 May 17, 2005

PROJECT N1245

BOOK 2586

Work continued from Page

6:30 am arrived at office and doing paperwork

7:25 am drillers arrived

8:00-8:30 am grouted 08MWT05 and steam cleaned rig and equipment

8:30-9:30 moved rig, trucks, and equipment down to 08MWT09 on Rt. 45
— took ½ hour to set up rig and level. Needed to move 38 feet north of original stake to find level ground. Now located right along treeline.

9:30 am started augering overburden

10:40 am set 10 feet of temporary steel casing into ground.

11:00 am started rock coring at 10 feet bgs

11:20 am 10-15 feet depth interval cored.

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-17-05

WITNESS DATE

TITLE SWMU 8 May 17, 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page

12 noon: finished coring rock at 30 feet bgs; drillers broke for lunch

12:00 - 12:30 pm put last 5 feet of core in core box and labelled core boxes

12:30 pm put caution tape around new wells and measured water levels.

1:10 drillers back from lunch and reaming 08MWT09

3:00 pm finished reaming ~~08MWT~~ 08MWT09

3:30 set well screen (15 ft length) at 15 to 30 feet bgs.

- sandpack 12 to 30 feet bgs (5 bags of sand used)
- bentonite seal 6-12 feet bgs (2 full bags of bentonite used).
- No grout used; will grout remainder of hole next week.

~~[illegible]~~ JPS

3:30 pm went to Donna Zollman's office to explain that I found two conduits exposed

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-17-05

WITNESS DATE

TITLE

PROJECT NO.

BOOK

Work continued from Page

in gullies near 08MWT10, but they are not flagged. She said she would have someone check it out on Thursday or Friday while I am gone.

4:00 - 4:45 moved drill rig and compressor over to 08MWT11 and set up over well location and left rig there for weekend.

4:45 drillers moved trailer and equipment up to decon pad and left it there over weekend.

5:00 drillers left for home

END OF Shift

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-17-05

WITNESS DATE

TITLE NSWC Crane SWMU 8 May 23, 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page

12:30 pm arrived at Crane office; drillers already here. Picked up H&S and other supplies

1:00 pm went over to SWMU 8 decomed equipment and moved it over to 08MWT11.

1:35 Started drilling 08MWT11

1:57 finished augering to 10 feet bgs and set 10 feet of temporary steel casing.

2:00-2:45 pm cored 10 to 30 feet bgs

2:45 pm Started reaming hole

3:35 pm finished reaming hole to 30 feet bgs

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-23-05

WITNESS DATE

TITLE NSWC Crane SWMU 8 May 23, 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page

3:50 finished well 08MWT11
15 feet screen set 15-30 feet bgs
~18 feet riser set 0-15 feet bgs
~3 foot stickup

sandpack 12-30 feet bgs using 5½ bags sand
bentonite seal 4-12 feet bgs using 2 bags bentonite

4:00-4:20 pm moved rig to 08MWT10; took tools and equipment up to decon pad and decomed

5:15 pm drillers left site
I went to office and called Ralph Bastnski to give update.

5:45 I left Crane

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-23-05

WITNESS DATE

TITLE SWMU 8 May 24, 2005 PROJECT NO. 101245 BOOK 2586

Work continued from Page

7:00 am Drillers and I arrived at office; loaded up some supplies

8:40 started split spooning 08MWT10.

9:10 am finished split spooning and augering to 10 feet bgs & reamed out hole and set 10 feet of temporary steel casing.

9:20 am started rock coring

10:10 finished rock coring to depth of 30 feet bgs; hole seems to producing plenty of water

10:20 began rock reaming hole. produces most water at 15-22 feet bgs particularly at 22 feet depth

10:50 finished reaming hole and cleaned out

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-24-05

WITNESS DATE

TITLE SWMU 8 May 24, 2005 PROJECT NO. 15 BOOK 2586

Work continued from Page

11:00 am set 15 feet of screen in hole 15-30 feet bgs
17½ feet of riser 0-15 feet bgs
2½ riser

— sandpack set 12-30 feet bgs using 4⅔ bags of sand
— bentonite seal set 4-12 feet using 2 full bags of bentonite bgs

11:08 am finished sealing hole
11:25 am drillers broke for lunch

12:45 drillers decomned drilling began reassembling forms for cement pads
1:30-3:45 pm drillers drilled holes for barrier posts for 8 wells (08-08)
— will do rest tomorrow morning

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-24-05

WITNESS DATE

TITLE NSWC Crane SWMU 8 May 24, 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page

2:30 - 3:30 pm
Terry Rogalin and I augered two temporary wells on the east side of Bldg 106 Pond

08TW05 8 feet deep
put in 5 feet of screen and 5 feet riser; which leaves a 2 foot stickup.
— located near top of slope

08TW06 located midway down slope to unnamed creek

— 6 feet deep; not sure if there will be water
— used 5 feet of screen and 3 feet of riser

3:40 pm returned to lab; threw out garbage, deconned auger and other equipment

4:45 left Crane

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-24-05

WITNESS DATE

TITLE NSWC Crane SWMU 8 May 25, 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page

7:15 am arrived at Crane office

7:40 at SWMU 8; drillers are drilling post holes for 08MW09 — 08MW11

Talked to Jim Walsh about filling ruts around 08MW10 in the right-of way. He said they will smooth out ruts. Area is not very big

9:00 am east of Bldg 106 Pond hand augered temporary well 08TW07 at bottom of slope

only augered 1½ feet and hit bedrock. This well is slightly uphill from ~~seepage face~~ 08SP01 and already has water in it

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-25-05

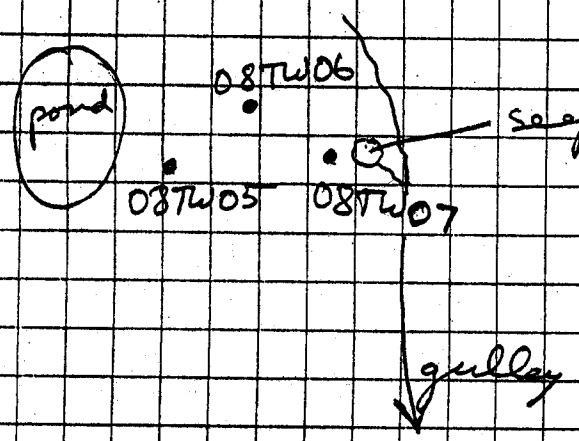
WITNESS DATE

TITLE NSWC Crane SWMU 8 May 25 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page



put 9 inches of screen and 9 inches of riser in 08TW07 backfilled with 14 inches of sandpack and 4 inches bentonite pellets

10 am tried to auger 4th temp well up near same elevation as 08TW05 but about 25 ft farther north

only got down 1 ft in one hole and 2 ft in second hole before hitting refusal

Both holes were dry

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-25-05

WITNESS DATE

TITLE NSWC Crane SWMU 8 May 25, 2005

PROJECT NO. N1245

BOOK 2586

Work continued from Page

11 am finished putting sandpack and bentonite chips around temp wells

— deconned hand auger
— took leftover pipe, screen, sands, bent. chips back to car

11:20 am measured water levels and well dimensions of temp wells

	Stickup ht	depth to H_2O	total depth
08TW05	1.93	9.49	10.10
08TW06	2.23	7.57	8.01
08TW07	1.52	2.44	3.17

11:45 am walked creek bed of unnamed tributary south of Rt 45 looking for rock outcrops and seeps. Mostly ~~for~~ laminated sandstone and some sandstone beds in creek bed (1-2' thick bedding)

no major seeps observed.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-25-05

WITNESS DATE

TITLE SWMU 8 5-25-05 PROJECT NO. BOOK 2586

Work continued from Page

12:15 - 2:15 poured concrete pads and bumper posts

2:15 - 3:00 picked up trash around wells and made plans for tomorrow with drillers

3:00 pm Tom Brent stopped by to see how we were doing. He mentioned he thought that well OSMWT10 looked like it was listing to the side (not vertical). I told him I would check it out.

3:15 pm: OSMWT10 is plumb (vertical). It is the bumper posts that are tilting somewhat. "Little Beaver" power auger was used at other wells to drill bumper posts. Could not

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-25-05

WITNESS DATE

TITLE SWMU 8 5-25-05 PROJECT NO. BOOK 2586

Work continued from Page

start it for OSMWT10 and OSMWT11. As a result, holes for bumper posts were not as deep as they should have been, because they were hand augered. Posts leaned over a bit after filling with cement.

3:15 - 4:00 pm I looked for more seeps along Rt 45, but found none.

4:45 pm left Crane

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-25-05

WITNESS DATE

TITLE SWMU 8 5-26-05

PROJECT NO.

BOOK 2586

Work continued from Page

7:20 am arrived at lab

8 am drillers started painting bumper posts and wells & and loading trucks

8-11 I went into woods looking for seeps previously found & and marking locations. I also dug holes about 1 foot in ground at seep locations so they would be easier to sample

11 drillers done painting and loading trucks. Josh filled in ruts around OBMWT09.

12 noon I returned to lab to decon shovel drop off equipment, dump garbage, and recharge batteries to camera

1 pm returned to SWMU 8 to put locks on all wells and take photos of wells also marked well number on each well

5:10 finished all wells

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeff Schubert DATE 5-26-05

WITNESS DATE

TITLE SWMU 8 5-26-05

PROJECT NO.

BOOK 2586

Work continued from Page

3:45 pm went over to SWMU 12 to map out watersheds and describe surface water sampling locations.

5:00 pm done with field work

6:30 - 8:00 pm unloading equipment in office & cleaning equipment, cleaning office, and xeroxed field logbook.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeff Schubert DATE 5-26-05

WITNESS DATE

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample Location**	SWMU 8	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Measured By**	Terry Rojahn	**Created Date**	12/18/05
Task/Contract #	CTO 0331	**Weather Conditions**	Mostly sunny & Temp 30s	**Modified By**	
WBS Code #	Open	**Measuring Device**	M-Scope	**Modified Date**	
				Printed By	James Goerdt
				Printed Date	3/30/06

Groundwater Measurements

Well ID	Date	Time	Ref.Elev.	Tot. Depth	Level Ind.	Elevation	Thickness	PID/FID	Tidally Influenced
08MWT01	12/17/05	09:25	684.62	56.78	50.71	633.91	NA	NA	N
08MWT02	12/17/05	09:30	685.88	16.62	7.24	678.64	NA	NA	N
08MWT03	12/17/05	09:40	687.66	62.10	53.90	633.76	NA	NA	N
08MWT04	12/17/05	09:35	688.14	14.63	7.19	680.95	NA	NA	N
08MWT05	12/17/05	10:10	687.82	61.97	55.35	632.47	NA	NA	N
08MWT06	12/17/05	10:00	688.36	20.36	18.81	669.55	NA	NA	N
08MWT07	12/17/05	09:15	701.31	34.58	15.79	685.52	NA	NA	N
08MWT08	12/17/05	10:40	697.59	31.99	9.20	688.39	NA	NA	N

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Groundwater Measurements

Well ID	Date	Time	Ref.Elev.	Tot. Depth	Level Ind.	Elevation	Thickness	PID/FID	Tidally Influenced
08MWT09	12/17/05	09:00	637.61	32.12	20.34	617.27	NA	NA	N
08MWT10	12/17/05	08:45	604.22	32.25	16.15	588.07	NA	NA	N
08MWT11	12/17/05	08:35	602.91	32.36	7.52	595.39	NA	NA	N
08MWT12	12/17/05	10:30	685.86	74.53	53.51	632.35	NA	NA	N
08MWT13	12/17/05	09:50	688.25	125.57	101.86	586.39	NA	NA	N
08MWT14	12/17/05	10:20	688.53	117.67	108.25	580.28	NA	NA	N
08SG01	12/17/05	11:15	629.38	NA	5.00	624.38	NA	NA	N
08SG02	12/17/05	11:25	621.90	NA	4.58	617.32	na	na	N

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

Groundwater Measurements

Well ID	Date	Time	Ref.Elev.	Tot. Depth	Level Ind.	Elevation	Thickness	PID/FID	Tidally Influenced
08SG03	12/17/05	11:25	609.23	NA	1.98	607.25	NA	NA	N
08SG04	12/17/05	11:25	598.80	NA	2.08	596.72	NA	NA	N
08SG05	12/17/05	11:25	688.08	NA	DRY	calc	NA	NA	N
08SG06	12/17/05	11:25	551.64	NA	9.47	542.17	NA	NA	N
08SG07	12/17/05	11:25	683.62	NA	2.45	681.17	NA	NA	N

Tetra Tech NUS, Inc.

SWMU 8 Round 3 - Fall 2005 - CRANE NSWC

SURFACE WATER LEVEL LOG

Project Information

Facility Name	CRANE NSWC	**Project #**	112GN1245	**Created By**	Terry Rojahn
TtNUS Project #	112GN1245	**Personnel**	T. Rojahn	**Created Date**	12/19/05
Task/Contract #		**Measuring Device**	M-Scope & 6' ruler	**Modified By**	
WBS Code #		**Remarks**		**Modified Date**	
Weather Conditions	Mostly sunny and Temp 30s			**Printed By**	James Goerdt
				Printed Date	3/30/06
Tidally Influenced	N				

Log Entries

Date	Time	Location ID	Flow Rate (est.)	Type	Measurement	Flow Width	Flow Depth	Flow Velocity	Type
12/17/05	12:05	08SG06	148	Measured	9.47	3	0.11	1	ft-sec
12/17/05	11:45	08SG04	1-3	Estimated	2.08				
12/17/05	11:35	08SG03	1-3	Estimated	1.98				
12/17/05	11:25	08SG02	3-5	Estimated	4.58				
12/17/05	11:15	08SG01	9.0	Measured	5.00	1.0	0.02	1	ft-sec
12/17/05	11:05	08SG05	0	Dry					
12/17/05	11:00	08SG07	0	Stagnant	2.45				

D.3 SURVEY DATA

SWMU 08 SURVEY LOCATIONS- DECEMBER, 2004 - FEBRUARY, 2005					
DATA COMPILED BY: BLEDSOE, TAPP, & RIGGERT, INC					
Location	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Top of PVC Elevation (feet amsl)
SOIL BORING			Elevation	Elevation	Elevation
08SB01	1306963.24	3014841.37	690.62	N/A	N/A
08SB02	1306972.03	3014898.07	690.38	N/A	N/A
08SB03	1306854.04	3014851.95	690.78	N/A	N/A
08SB04	1306745.44	3014938.90	690.59	N/A	N/A
08SB05	1306668.73	3014948.40	690.31	N/A	N/A
08SB06	1306658.71	3015014.79	685.93	N/A	N/A
08SB07	1306635.29	3015085.32	683.17	N/A	N/A
08SB08	1306608.41	3015064.43	684.20	N/A	N/A
08SB09	1306622.90	3015014.74	686.71	N/A	N/A
08SB10	1306537.90	3015024.73	687.56	N/A	N/A
08SB11	1306524.64	3014942.30	688.77	N/A	N/A
08SB12	1306477.26	3015003.33	686.57	N/A	N/A
08SB13	1306446.71	3014961.65	685.46	N/A	N/A
08SB14	1307292.44	3014856.60	690.22	N/A	N/A
SURFACE WATER/SEDIMENT					
08SW/SD001	1307233.03	3014864.63	689.02	N/A	N/A
08SW/SD002	1306858.74	3014858.51	687.65	N/A	N/A
08SW/SD003	1306722.26	3015011.39	682.09	N/A	N/A
08SW/SD004	**Building 106 Pond**				
08SW/SD005	**Building 106 Pond**				
08SW/SD006	1306624.18	3015249.51	650.81	N/A	N/A
08SW/SD007	1306319.57	3015517.73	597.45	N/A	N/A
08SW/SD008	1306118.47	3015320.82	592.99	N/A	N/A
08SW/SD009	1306306.58	3015804.45	581.62	N/A	N/A
SB= Soil Boring SW = Surface Water SG = Staff Guage					
MW = Monitoring Well SD = Sediment SP = Seep					

SURVEY TABLE
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Top of PVC Elevation (feet amsl)
Monitoring Wells					
08MWT001	1306612.22	3015096.71	682.84	684.68	684.62
08MWT002	1306611.21	3015090.07	683.76	685.85	685.88
08MWT003	1306595.51	3015055.82	685.56	687.82	687.66
08MWT004	1306601.17	3015055.05	685.51	688.29	688.14
08MWT005	1306438.87	3014963.79	685.85	687.97	687.82
08MWT006	1306442.25	3014968.67	686.00	688.36	688.36
08MWT007	1306840.18	3014993.62	699.73	701.34	701.31
08MWT008	1306739.74	3014736.53	695.60	697.61	697.59
08MWT009	1306185.27	3015006.81	635.49	637.72	637.61
08MWT010	1306174.25	3015302.10	601.97	604.19	604.22
08MWT011	1306329.81	3015534.85	600.55	602.96	602.91
Temporary Monitoring Wells					
08TW005	1306642.86	3015097.96	678.49	NA	680.54
08TW006	1306652.51	3015115.42	670.46	NA	672.72
08TW007	1306642.36	3015121.14	666.37	NA	667.92
Seeps					
08SP001	1306641.01	3015133.07	664.02	NA	NA
08SP002	1306307.64	3015109.91	630.79	NA	NA
08SP003	***SEE NOTE BELOW			NA	NA
08SP004	1306233.58	3014997.21	642.82	NA	NA
Staff Gauges					
08SG001	1305356.06	3014589.12	629.38	NA	NA
08SG002	1305718.11	3014599.61	621.90	NA	NA
08SG003	1306182.83	3015170.28	609.23	NA	NA
08SG004	1306309.48	3015518.64	598.80	NA	NA
08SG005	1306762.44	3014957.35	688.08	NA	NA
08SG006	1306678.68	3017413.97	551.64	NA	NA
08SG007	1306625.46	3015034.80	681.22	**TOP STAKE=**	**683.62**
08SG008	NOT SAMPLED			NA	NA
Surface Water/Sediment					
08SW/SD010	1305387.16	3014592.92	621.13	NA	NA
08SW/SD011	1306120.89	3015198.55	601.08	NA	NA
08SW/SD012	1306671.60	3015030.59	679.91	NA	NA
08SW/SD013	1307533.18	3014852.70	690.02	NA	NA
08SW/SD014	1306357.90	3016130.68	574.28	NA	NA
08SW/SD015	1305646.99	3014655.36	613.89	NA	NA
08SW/SD016	NOT SAMPLED			NA	NA
08SW/SD017	NOT SAMPLED			NA	NA
08SW/SD018	NOT SAMPLED			NA	NA
08SW/SD019	NOT SAMPLED			NA	NA
08SW/SD020	NOT SAMPLED			NA	NA
Sump					
08SU/SL001-NE COR	1306607.74	3015037.56	685.70	NA	NA
08SU/SL001-SE COR	1306587.67	3015039.53	685.61	NA	NA
08SU/SL001-SW COR	1306586.70	3015028.07	685.49	NA	NA
08SU/SL001-NW COR	1306606.56	3015026.09	685.43	NA	NA

SURVEY TABLE
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Soil Borings					
08SB015	NOT SAMPLED			NA	NA
08SB016	NOT SAMPLED			NA	NA
08SB017	NOT SAMPLED			NA	NA
08SB018	NOT SAMPLED			NA	NA
08SB019	NOT SAMPLED			NA	NA
08SB020	NOT SAMPLED			NA	NA
MW = Monitoring Well TW = Temporary Well SP = Seep SG = Staff Gauge SW = Surface Water					
SD = Sediment SU = Sump SB = Soil Boring					
***NOTE: THE STAKE FOUND BESIDE THE MAPPED POSITION FOR 08SP03 WAS LABELED "08SP04"					
AND WAS LOCATED AS MARKED. THE MAPPED POSITION FOR 08SPO4 WAS HEAVILY WOODED					
AND WOULD HAVE BEEN TIME CONSUMING TO LOCATE THIS TIME OF YEAR.					

SURVEY TABLE
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Top of PVC Elevation (feet amsl)
NOVEMBER, 2005					
Monitoring Wells					
08MWT12	1306319.65	3014841.62	683.33	685.88	685.86
08MWT13	1306588.38	3015057.03	685.68	688.23	688.25
08MWT14	1306435.64	3014956.87	685.86	688.56	688.53
Surface Water/Sediment					
				NA	NA
08SW/SD16	1306649.13	3015139.58	663.91	NA	NA
08SW/SD17	1306522.65	3015464.49	616.91	NA	NA
08SW/SD18	1306579.15	3014300.39	654.29	NA	NA
08SW/SD19	NOT	SAMPLED		NA	NA
08SW/SD20	1306490.85	3016230.70	571.25	NA	NA
08SW/SD21	1306523.45	3016450.26	567.48	NA	NA
Soil Borings					
08SB15	1306568.07	3014845.16	693.67	NA	NA
08SB16	1306615.12	3014813.89	694.09	NA	NA
08SB17	1306708.40	3014816.44	693.05	NA	NA
08SB18	1306758.34	3014809.41	692.71	NA	NA
08SB19	NOT	SAMPLED		NA	NA
08SB20	1306747.70	3014894.66	690.63	NA	NA
08SB21	1306687.12	3014903.30	690.56	NA	NA
08SB22	1306669.63	3014877.65	694.15	NA	NA
08SB23	1306622.95	3014903.20	690.45	NA	NA
08SB24	1306557.93	3014904.51	689.52	NA	NA
08SB25	1306588.64	3014865.04	694.14	NA	NA
08SB26	1306620.79	3014844.01	694.16	NA	NA
08SB27	1306641.12	3014857.98	694.18	NA	NA
08SB28	1306659.30	3014838.28	694.19	NA	NA
08SB29	1306690.72	3014850.70	694.15	NA	NA
08SB30	1306721.65	3014863.82	694.13	NA	NA
08SB31	1306744.37	3014843.89	694.13	NA	NA
08SB32	1306968.02	3014798.24	695.90	NA	NA
08SB33	1307005.20	3014779.63	694.22	NA	NA
08SB34	1307109.58	3014762.98	694.08	NA	NA
08SB35	1307146.58	3014758.57	694.20	NA	NA
08SB36	1307170.08	3014833.39	690.08	NA	NA
08SB37	1307118.53	3014841.08	689.62	NA	NA
08SB38	1307072.11	3014847.44	689.65	NA	NA
08SB39	1307019.26	3014854.60	689.83	NA	NA
08SB40	1306963.85	3014826.70	693.88	NA	NA
08SB41	1306993.90	3014811.89	694.18	NA	NA

SURVEY TABLE
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

08SB42	1307032.35	3014805.77	694.15	NA	NA
08SB43	1307067.34	3014781.66	694.16	NA	NA
08SB44	1307099.07	3014796.23	694.18	NA	NA
08SB45	1307129.46	3014792.18	694.20	NA	NA

MW = Monitoring Well TW = Temporary Well SP = Seep SG = Staff Gauge SW = Surface Water
SD = Sediment SU = Sump SB = Soil Boring

SURVEY TABLE
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Top of PVC Elevation (feet amsl)
DECEMBER, 2005					
Monitoring Wells					
Surface Water/Sediment					
Soil Borings					
08SB19	1306776.29	3014876.74	690.59	NA	NA
MW = Monitoring Well TW = Temporary Well SP = Seep SG = Staff Gauge SW = Surface Water					
SD = Sediment SU = Sump SB = Soil Boring					

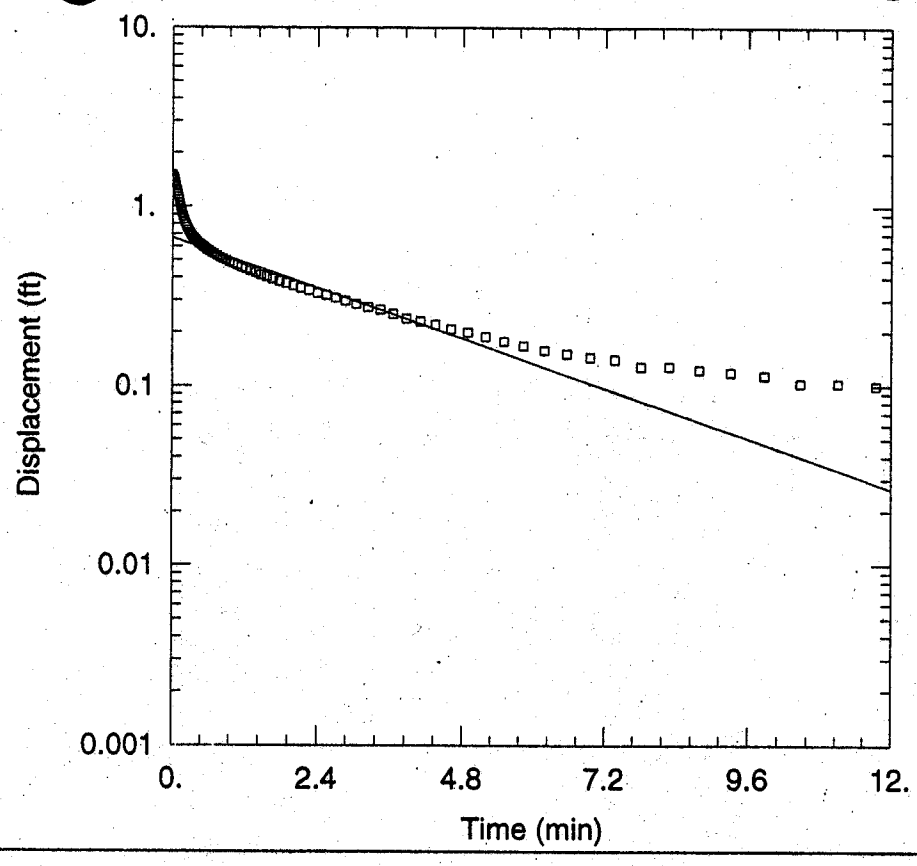
SURVEY TABLE
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Sample Location	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Top of PVC Elevation (feet amsl)
Soil Borings					
08SB046	1306548.85	3014766.34	693.79	NA	NA
08SB047/08TW18	1306543.78	3014795.09	694.28	NA	NA
08SB048/08TW08	1306511.26	3014770.50	693.50	NA	NA
08SB049	1306528.99	3014809.58	694.50	NA	NA
08SB050	1306508.19	3014844.15	693.60	NA	NA
08SB051	1306506.67	3014867.98	688.95	NA	NA
08SB052	1306487.33	3014855.34	689.82	NA	NA
08SB053/08TW09	1306450.81	3014772.73	692.53	NA	NA
08SB054	1306470.68	3014841.16	689.57	NA	NA
08SB055/08TW11	1306491.02	3014938.08	687.64	NA	NA
08SB056/08TW12	1306443.78	3014901.61	686.23	NA	NA
08SB057/08TW13	1306392.77	3014778.02	688.75	NA	NA
08SB058	1306400.97	3014863.75	685.75	NA	NA
08SB059/08TW14	1306376.73	3014866.98	684.92	NA	NA
08SB060/08TW15	1306382.66	3014886.08	684.64	NA	NA
08SB061/08TW16	1306459.37	3014807.58	693.10	NA	NA
08SB062/08TW17	1306440.54	3014840.83	686.84	NA	NA

MW = Monitoring Well TW = Temporary Well SP = Seep SG = Staff Gauge SW = Surface Water
SD = Sediment SU = Sump SB = Soil Boring

APPENDIX E

AQUIFER CHARACTERISTICS, CALCULATIONS, AND RECORDS



SWMU 8 - 08MWT01 - RISING HEAD TEST

Data Set: H:\...\08MWT01-R_Hvorslev.aqt
Date: 07/12/05 Time: 12:54:29

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT01
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 1.12 ft/day
y0 = 0.67 ft

AQUIFER DATA

Saturated Thickness: 7.63 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT01)

Initial Displacement: 1.504 ft
Wellbore Radius: 0.25 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 7.63 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT01

PROJECT NO.: N 1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 20' / 37.72' TOS TEST NO.: 08MWT01-R

STATIC WATER LEVEL (Depth/Elevation): 50.09' / DATE: 6-6-05

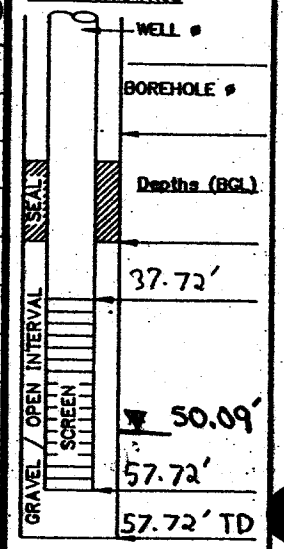
TEST TYPE (Rising/Falling/Constant Head): Rising CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 1 OF 1

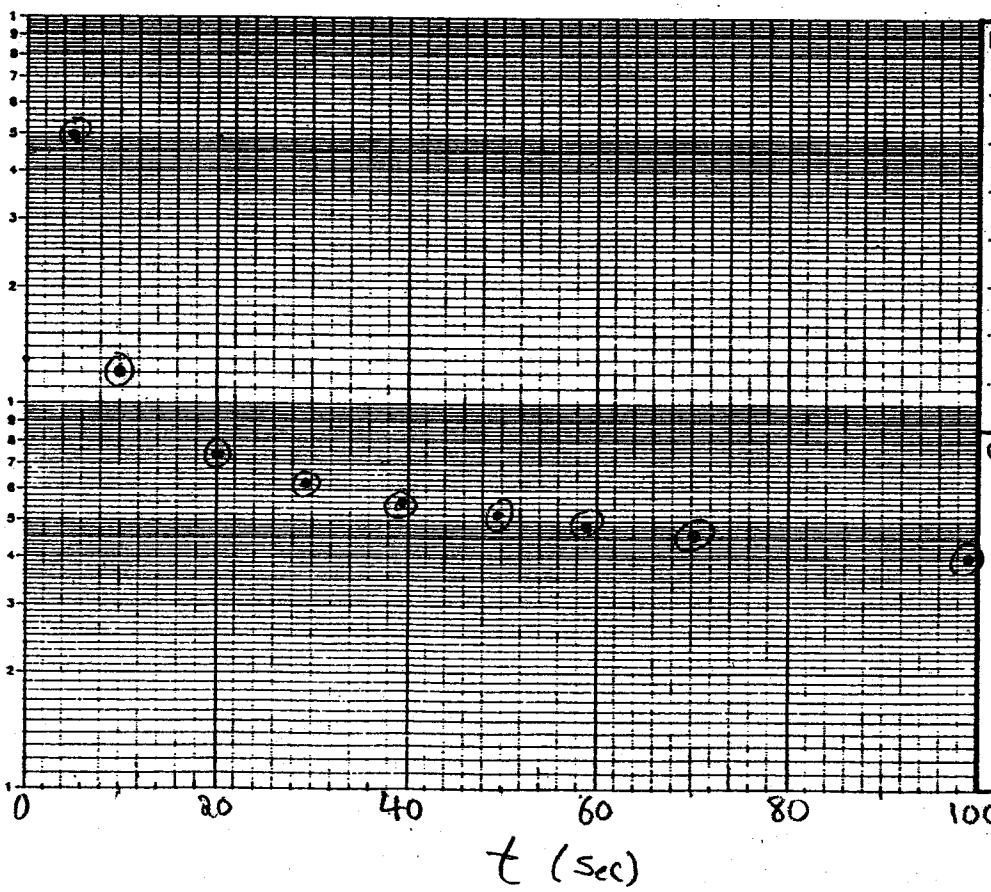
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
5.1		1.494	70.1		0.458
8		1.347	99.3		0.394
10		1.2	199		0.264
12.6		1.029	398.4		0.141
15		0.907			
18.9		0.774			
20		0.749			
25.2		0.667			
29.8		0.626			
39.5		0.565			
49.7		0.522			
59		0.49			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 56.72'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:11:52
Report fror ...\SN00936 2005-06-06 155900 08MWT01-R.bin
Win-Situ V 4.523

Serial num 936
Firmware \ 3.09
Unit name:

Test name: 08MWT01-R

Test define 6/6/2005 15:53:55
Test sched 6/6/2005 15:59:00
Test starte 6/6/2005 15:59:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 104

TOTAL DA 104

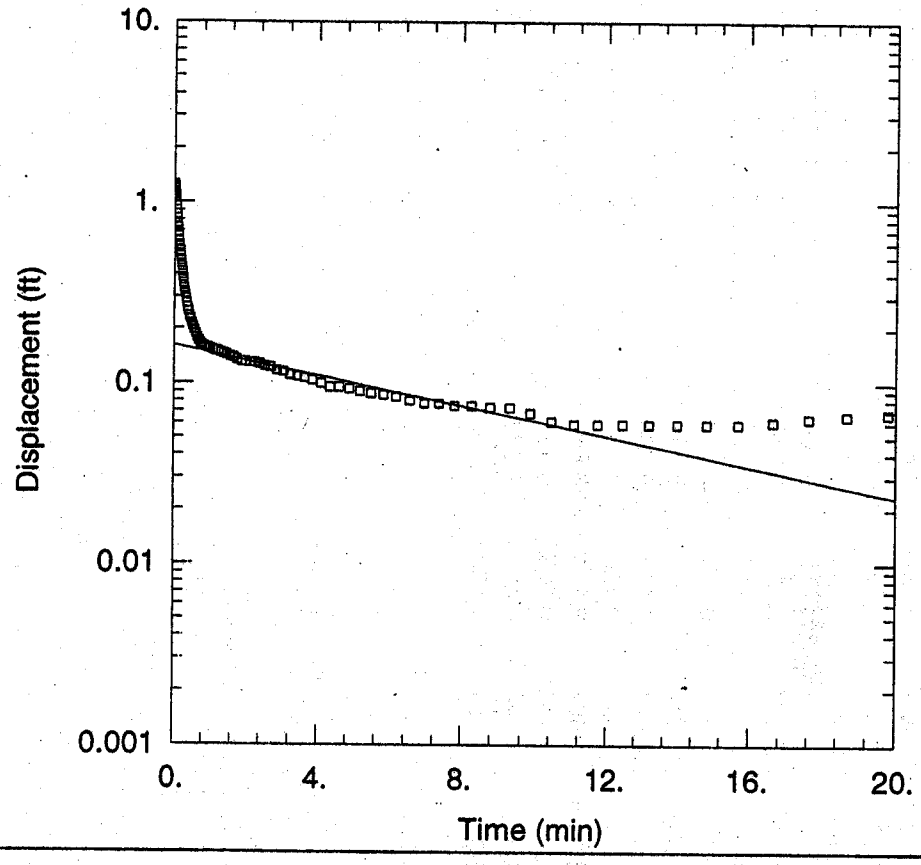
Channel number [1]
Measuren Temperature
Channel name:

Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/6/2005	15:59:00	0	56.51	6.091		
6/6/2005	15:59:00	0.3	56.54	6.097		
6/6/2005	15:59:00	0.6	56.56	6.099		
6/6/2005	15:59:00	0.9	56.56	6.101		
6/6/2005	15:59:01	1.2	56.58	6.101		
6/6/2005	15:59:01	1.5	56.58	6.103		
6/6/2005	15:59:01	1.8	56.58	6.101		
6/6/2005	15:59:02	2.1	56.58	5.87		
6/6/2005	15:59:02	2.4	56.61	5.113		
6/6/2005	15:59:02	2.7	56.61	4.968		
6/6/2005	15:59:03	3	56.61	4.787		
6/6/2005	15:59:03	3.3	56.61	4.71		
6/6/2005	15:59:03	3.6	56.61	4.667		

6/6/2005	15:59:03	3.9	56.61	4.638		
6/6/2005	15:59:04	4.2	56.61	4.613		
6/6/2005	15:59:04	4.5	56.61	4.602		
6/6/2005	15:59:04	4.8	56.61	4.597		
6/6/2005	15:59:05	5.1	56.61	4.597		0.000 <t0
6/6/2005	15:59:05	5.4	56.63	4.601	1.49	0.005
6/6/2005	15:59:05	5.7	56.63	4.61	1.481	0.010
6/6/2005	15:59:06	6	56.63	4.622	1.469	0.015
6/6/2005	15:59:06	6.4	56.63	4.64	1.451	0.022
6/6/2005	15:59:06	6.7	56.63	4.66	1.431	0.027
6/6/2005	15:59:07	7.1	56.63	4.685	1.406	0.033
6/6/2005	15:59:07	7.5	56.63	4.712	1.379	0.040
6/6/2005	15:59:07	8	56.63	4.744		0.048
6/6/2005	15:59:08	8.4	56.63	4.778	1.313	0.055
6/6/2005	15:59:08	8.9	56.63	4.814	1.277	0.063
6/6/2005	15:59:09	9.5	56.63	4.855	1.236	0.073
6/6/2005	15:59:10	10	56.61	4.891		0.082
6/6/2005	15:59:10	10.6	56.61	4.932	1.159	0.092
6/6/2005	15:59:11	11.3	56.61	4.973	1.118	0.103
6/6/2005	15:59:11	11.9	56.61	5.018	1.073	0.113
6/6/2005	15:59:12	12.6	56.58	5.062		0.125
6/6/2005	15:59:13	13.4	56.58	5.105	0.986	0.138
6/6/2005	15:59:14	14.2	56.58	5.145	0.946	0.152
6/6/2005	15:59:15	15	56.58	5.184		0.165
6/6/2005	15:59:15	15.9	56.58	5.222	0.869	0.180
6/6/2005	15:59:16	16.8	56.58	5.256	0.835	0.195
6/6/2005	15:59:17	17.8	56.58	5.288	0.803	0.212
6/6/2005	15:59:18	18.9	56.58	5.317		0.230
6/6/2005	15:59:20	20	56.58	5.342		0.248
6/6/2005	15:59:21	21.2	56.56	5.368	0.723	0.268
6/6/2005	15:59:22	22.4	56.56	5.388	0.703	0.288
6/6/2005	15:59:23	23.8	56.56	5.406	0.685	0.312
6/6/2005	15:59:25	25.2	56.56	5.424		0.335
6/6/2005	15:59:26	26.7	56.56	5.438	0.653	0.360
6/6/2005	15:59:28	28.2	56.56	5.451	0.64	0.385
6/6/2005	15:59:29	29.8	56.56	5.465		0.412
6/6/2005	15:59:31	31.5	56.56	5.479	0.612	0.440
6/6/2005	15:59:33	33.3	56.56	5.49	0.601	0.470
6/6/2005	15:59:35	35.2	56.56	5.501	0.59	0.502
6/6/2005	15:59:37	37.3	56.56	5.512	0.579	0.537
6/6/2005	15:59:39	39.5	56.56	5.526		0.573
6/6/2005	15:59:41	41.8	56.56	5.535	0.556	0.612
6/6/2005	15:59:44	44.3	56.54	5.547	0.544	0.653
6/6/2005	15:59:46	46.9	56.54	5.558	0.533	0.697
6/6/2005	15:59:49	49.7	56.54	5.569		0.743
6/6/2005	15:59:52	52.6	56.54	5.581	0.51	0.792
6/6/2005	15:59:55	55.7	56.54	5.59	0.501	0.843
6/6/2005	15:59:58	59	56.54	5.601		0.898
6/6/2005	16:00:02	62.5	56.54	5.612	0.479	0.957
6/6/2005	16:00:06	66.2	56.54	5.622	0.469	1.018
6/6/2005	16:00:10	70.1	56.54	5.633		1.083
6/6/2005	16:00:14	74.3	56.51	5.645	0.446	1.153

6/6/2005	16:00:18	78.7	56.51	5.654	0.437	1.227
6/6/2005	16:00:23	83.4	56.51	5.665	0.426	1.305
6/6/2005	16:00:28	88.4	56.51	5.676	0.415	1.388
6/6/2005	16:00:33	93.7	56.51	5.688	0.403	1.477
6/6/2005	16:00:39	99.3	56.51	5.697	[redacted]	1.570
6/6/2005	16:00:45	105.2	56.51	5.708	0.383	1.668
6/6/2005	16:00:51	111.5	56.51	5.719	0.372	1.773
6/6/2005	16:00:58	118.1	56.51	5.728	0.363	1.883
6/6/2005	16:01:05	125.1	56.49	5.74	0.351	2.000
6/6/2005	16:01:12	132.6	56.49	5.751	0.34	2.125
6/6/2005	16:01:20	140.5	56.49	5.76	0.331	2.257
6/6/2005	16:01:28	148.9	56.49	5.772	0.319	2.397
6/6/2005	16:01:37	157.8	56.49	5.781	0.31	2.545
6/6/2005	16:01:47	167.2	56.49	5.792	0.299	2.702
6/6/2005	16:01:57	177.2	56.49	5.803	0.288	2.868
6/6/2005	16:02:07	187.8	56.47	5.815	0.276	3.045
6/6/2005	16:02:18	199	56.47	5.827	[redacted]	3.232
6/6/2005	16:02:30	210.9	56.47	5.836	0.255	3.430
6/6/2005	16:02:43	223.5	56.47	5.849	0.242	3.640
6/6/2005	16:02:56	236.8	56.47	5.863	0.228	3.862
6/6/2005	16:03:10	250.9	56.47	5.872	0.219	4.097
6/6/2005	16:03:25	265.8	56.47	5.881	0.21	4.345
6/6/2005	16:03:41	281.6	56.45	5.893	0.198	4.608
6/6/2005	16:03:58	298.4	56.45	5.902	0.189	4.888
6/6/2005	16:04:16	316.2	56.45	5.913	0.178	5.185
6/6/2005	16:04:34	335	56.45	5.924	0.167	5.498
6/6/2005	16:04:54	354.9	56.42	5.934	0.157	5.830
6/6/2005	16:05:15	376	56.42	5.943	0.148	6.182
6/6/2005	16:05:38	398.4	56.42	5.95	[redacted]	6.555
6/6/2005	16:06:02	422.1	56.4	5.957	0.134	6.950
6/6/2005	16:06:27	447.2	56.4	5.961	0.13	7.368
6/6/2005	16:06:53	473.8	56.4	5.973	0.118	7.812
6/6/2005	16:07:21	502	56.38	5.973	0.118	8.282
6/6/2005	16:07:51	531.9	56.38	5.978	0.113	8.780
6/6/2005	16:08:23	563.5	56.38	5.982	0.109	9.307
6/6/2005	16:08:56	597	56.38	5.987	0.104	9.865
6/6/2005	16:09:32	632.5	56.36	5.998	0.093	10.457
6/6/2005	16:10:10	670.1	56.36	5.998	0.093	11.083
6/6/2005	16:10:49	709.9	56.36	6.001	0.09	11.747



SWMU 8 - 08MWT03 - RISING HEAD TEST

Data Set: H:\...\08MWT03-R_Hvorslev.aqt
Date: 07/12/05 Time: 12:54:39

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT03
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.6797 ft/day
y0 = 0.162 ft

AQUIFER DATA

Saturated Thickness: 9.65 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT03)

Initial Displacement: 1.246 ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 9.65 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT03

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' / 52.83' TOS TEST NO.: 08MWT03-R

STATIC WATER LEVEL (Depth/Elevation): 53.18' / DATE: 6-6-05

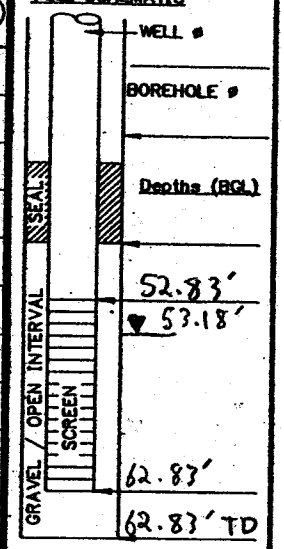
TEST TYPE (Rising/Falling/Constant Head): rising CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 1 OF 1

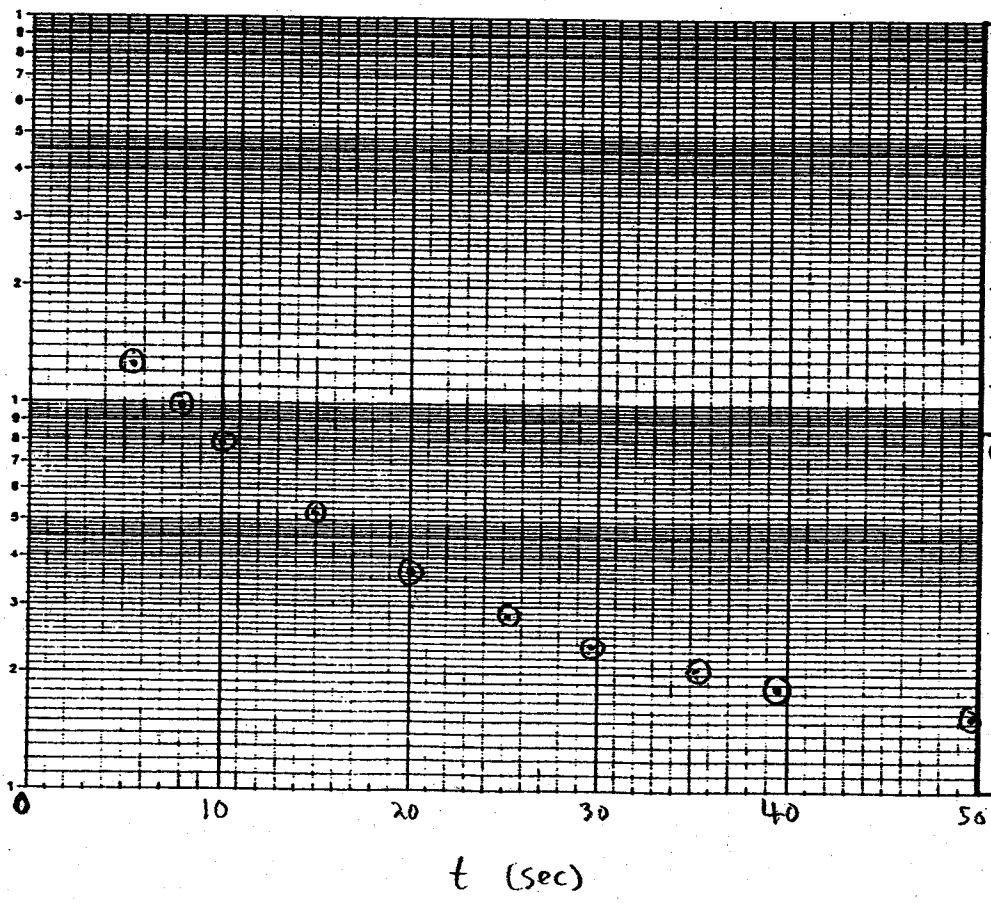
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
5.4		1.236	49.7		0.155
6		1.202	59		0.148
8		0.989	70.1		0.143
10		0.799	99.3		0.131
12.6		0.635			
15		0.527			
17.8		0.429			
20		0.37			
25.2		0.282			
29.8		0.239			
35.2		0.204			
39.5		0.186			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 59'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 10:59:01
Report fror ...\SN00936 2005-06-06 141800 08MWT03-R.bin
Win-Situ V 4.523

Serial num 936
Firmware \ 3.09
Unit name:

Test name: 08MWT03-R

Test define 6/6/2005 14:12:21
Test sched 6/6/2005 14:18:00
Test starte 6/6/2005 14:18:00
Test stopp 6/6/2005 14:39:01

Data gathered using Logarithmic testing
Maximun Seconds.
Number 113

TOTAL DA 113

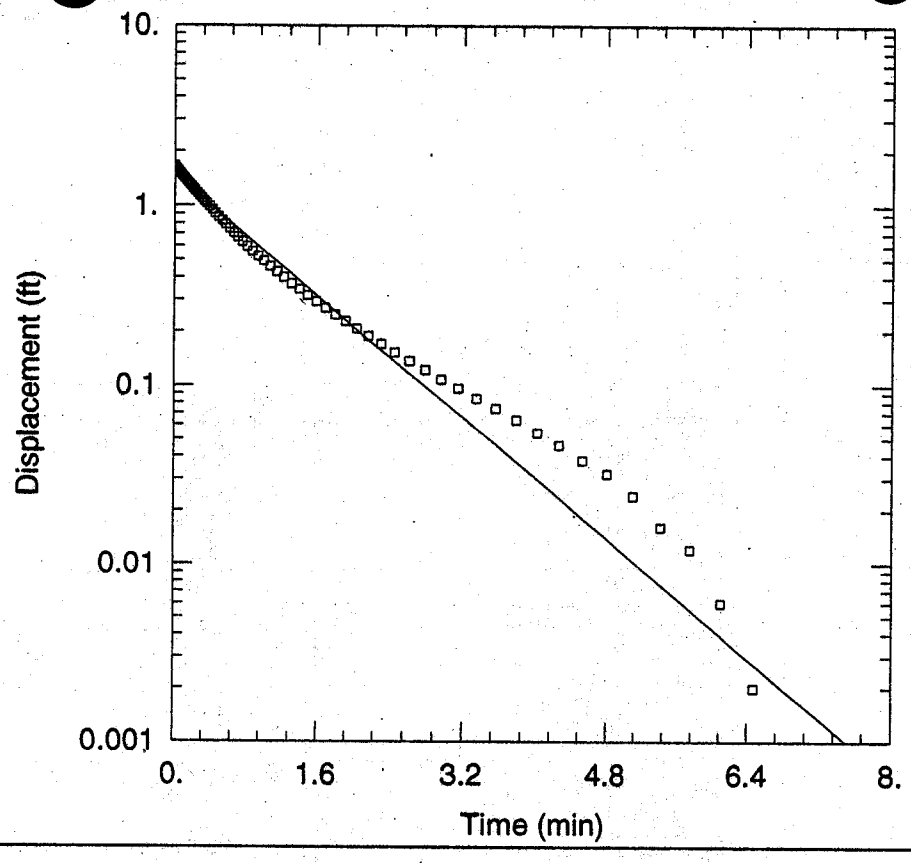
Channel number [1]
Measuren Temperature
Channel name:

Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/6/2005	14:18:00	0	56.81	5.861		
6/6/2005	14:18:00	0.3	56.86	5.867		
6/6/2005	14:18:00	0.6	56.86	5.869		
6/6/2005	14:18:00	0.9	56.88	5.869		
6/6/2005	14:18:01	1.2	56.88	5.871		
6/6/2005	14:18:01	1.5	56.9	5.871		
6/6/2005	14:18:01	1.8	56.9	5.873		
6/6/2005	14:18:02	2.1	56.9	5.871		
6/6/2005	14:18:02	2.4	56.9	5.866		
6/6/2005	14:18:02	2.7	56.9	5.699		
6/6/2005	14:18:03	3	56.9	5.563		
6/6/2005	14:18:03	3.3	56.92	5.397		
6/6/2005	14:18:03	3.6	56.92	5.203		

6/6/2005	14:18:03	3.9	56.92	5.006		
6/6/2005	14:18:04	4.2	56.92	4.82		
6/6/2005	14:18:04	4.5	56.92	4.714		
6/6/2005	14:18:04	4.8	56.92	4.655		
6/6/2005	14:18:05	5.1	56.92	4.63		
6/6/2005	14:18:05	5.4	56.92	4.625	[redacted]	0.000 <t0
6/6/2005	14:18:05	5.7	56.92	4.639	1.222	0.005
6/6/2005	14:18:06	6	56.92	4.659	1.202	0.010
6/6/2005	14:18:06	6.4	56.92	4.693	1.168	0.017
6/6/2005	14:18:06	6.7	56.92	4.732	1.129	0.022
6/6/2005	14:18:07	7.1	56.92	4.777	1.084	0.028
6/6/2005	14:18:07	7.5	56.92	4.822	1.039	0.035
6/6/2005	14:18:07	8	56.92	4.872	[redacted]	0.043
6/6/2005	14:18:08	8.4	56.95	4.922	0.939	0.050
6/6/2005	14:18:08	8.9	56.95	4.971	0.89	0.058
6/6/2005	14:18:09	9.5	56.95	5.019	0.842	0.068
6/6/2005	14:18:10	10	56.92	5.062	[redacted]	0.077
6/6/2005	14:18:10	10.6	56.9	5.106	0.755	0.087
6/6/2005	14:18:11	11.3	56.9	5.149	0.712	0.098
6/6/2005	14:18:11	11.9	56.9	5.187	0.674	0.108
6/6/2005	14:18:12	12.6	56.9	5.226	[redacted]	0.120
6/6/2005	14:18:13	13.4	56.9	5.264	0.597	0.133
6/6/2005	14:18:14	14.2	56.9	5.298	0.563	0.147
6/6/2005	14:18:15	15	56.9	5.334	[redacted]	0.160
6/6/2005	14:18:15	15.9	56.88	5.369	0.492	0.175
6/6/2005	14:18:16	16.8	56.88	5.4	0.461	0.190
6/6/2005	14:18:17	17.8	56.88	5.432	[redacted]	0.207
6/6/2005	14:18:18	18.9	56.88	5.462	0.399	0.225
6/6/2005	14:18:20	20	56.88	5.491	0.37	0.243
6/6/2005	14:18:21	21.2	56.88	5.516	0.345	0.263
6/6/2005	14:18:22	22.4	56.88	5.539	0.322	0.283
6/6/2005	14:18:23	23.8	56.88	5.561	0.3	0.307
6/6/2005	14:18:25	25.2	56.88	5.579	[redacted]	0.330
6/6/2005	14:18:26	26.7	56.88	5.597	0.264	0.355
6/6/2005	14:18:28	28.2	56.88	5.611	0.25	0.380
6/6/2005	14:18:29	29.8	56.88	5.622	[redacted]	0.407
6/6/2005	14:18:31	31.5	56.88	5.636	0.225	0.435
6/6/2005	14:18:33	33.3	56.86	5.645	0.216	0.465
6/6/2005	14:18:35	35.2	56.86	5.657	0.204	0.497
6/6/2005	14:18:37	37.3	56.86	5.666	0.195	0.532
6/6/2005	14:18:39	39.5	56.86	5.675	[redacted]	0.568
6/6/2005	14:18:41	41.8	56.86	5.684	0.177	0.607
6/6/2005	14:18:44	44.3	56.86	5.693	0.168	0.648
6/6/2005	14:18:46	46.9	56.86	5.7	0.161	0.692
6/6/2005	14:18:49	49.7	56.86	5.706	[redacted]	0.738
6/6/2005	14:18:52	52.6	56.86	5.709	0.152	0.787
6/6/2005	14:18:55	55.7	56.86	5.711	0.15	0.838
6/6/2005	14:18:58	59	56.86	5.713	0.148	0.893
6/6/2005	14:19:02	62.5	56.83	5.714	0.147	0.952
6/6/2005	14:19:06	66.2	56.83	5.716	0.145	1.013
6/6/2005	14:19:10	70.1	56.83	5.718	[redacted]	1.078
6/6/2005	14:19:14	74.3	56.83	5.72	0.141	1.148

6/6/2005	14:19:18	78.7	56.83	5.72	0.141	1.222
6/6/2005	14:19:23	83.4	56.83	5.723	0.138	1.300
6/6/2005	14:19:28	88.4	56.83	5.725	0.136	1.383
6/6/2005	14:19:33	93.7	56.83	5.727	0.134	1.472
6/6/2005	14:19:39	99.3	56.83	5.73	[redacted]	1.565
6/6/2005	14:19:45	105.2	56.83	5.732	0.129	1.663
6/6/2005	14:19:51	111.5	56.83	5.736	0.125	1.768
6/6/2005	14:19:58	118.1	56.83	5.739	0.122	1.878
6/6/2005	14:20:05	125.1	56.81	5.739	[redacted]	1.995
6/6/2005	14:20:12	132.6	56.81	5.741	0.12	2.120
6/6/2005	14:20:20	140.5	56.81	5.741	0.12	2.252
6/6/2005	14:20:28	148.9	56.81	5.743	0.118	2.392
6/6/2005	14:20:37	157.8	56.81	5.746	0.115	2.540
6/6/2005	14:20:47	167.2	56.81	5.748	0.113	2.697
6/6/2005	14:20:57	177.2	56.81	5.753	0.108	2.863
6/6/2005	14:21:07	187.8	56.79	5.755	0.106	3.040
6/6/2005	14:21:18	199	56.79	5.76	0.101	3.227
6/6/2005	14:21:30	210.9	56.79	5.762	0.099	3.425
6/6/2005	14:21:43	223.5	56.79	5.764	0.097	3.635
6/6/2005	14:21:56	236.8	56.79	5.767	0.094	3.857
6/6/2005	14:22:10	250.9	56.79	5.771	0.09	4.092
6/6/2005	14:22:25	265.8	56.79	5.776	0.085	4.340
6/6/2005	14:22:41	281.6	56.76	5.776	0.085	4.603
6/6/2005	14:22:58	298.4	56.76	5.778	0.083	4.883
6/6/2005	14:23:16	316.2	56.76	5.781	0.08	5.180
6/6/2005	14:23:34	335	56.76	5.783	0.078	5.493
6/6/2005	14:23:54	354.9	56.76	5.785	0.076	5.825
6/6/2005	14:24:15	376	56.79	5.787	0.074	6.177
6/6/2005	14:24:38	398.4	56.79	5.791	0.07	6.550
6/6/2005	14:25:02	422.1	56.79	5.794	0.067	6.945
6/6/2005	14:25:27	447.2	56.79	5.794	0.067	7.363
6/6/2005	14:25:53	473.8	56.79	5.796	0.065	7.807
6/6/2005	14:26:21	502	56.79	5.796	0.065	8.277
6/6/2005	14:26:51	531.9	56.79	5.798	0.063	8.775
6/6/2005	14:27:23	563.5	56.79	5.798	0.063	9.302
6/6/2005	14:27:56	597	56.79	5.803	0.058	9.860
6/6/2005	14:28:32	632.5	56.79	5.81	0.051	10.452
6/6/2005	14:29:10	670.1	56.79	5.812	0.049	11.078
6/6/2005	14:29:49	709.9	56.79	5.812	0.049	11.742
6/6/2005	14:30:32	752.1	56.79	5.812	0.049	12.445
6/6/2005	14:31:16	796.8	56.79	5.812	0.049	13.190
6/6/2005	14:32:04	844.2	56.79	5.812	0.049	13.980
6/6/2005	14:32:54	894.4	56.79	5.812	0.049	14.817
6/6/2005	14:33:47	947.5	56.79	5.812	0.049	15.702
6/6/2005	14:34:43	1003.8	56.79	5.81	0.051	16.640
6/6/2005	14:35:43	1063.4	56.79	5.807	0.054	17.633
6/6/2005	14:36:46	1126.6	56.79	5.805	0.056	18.687
6/6/2005	14:37:53	1193.5	56.79	5.803	0.058	19.802



SWMU 8 - 08MWT04 - FALLING HEAD TEST

Data Set: H:\...\08MWT04-F_Hvorslev.aqt
Date: 07/12/05 Time: 12:54:46

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT04
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 11.1 ft/day
y0 = 1.492 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT04)

Initial Displacement: 1.66 ft
Wellbore Radius: 0.25 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 6.7 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT04

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5' / 10.22' TOS TEST NO.: 08MWT04-F

STATIC WATER LEVEL (Depth/Elevation): 8.52' / DATE: 6-6-05

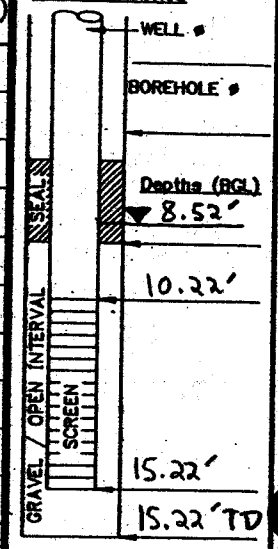
TEST TYPE (Rising/Falling/Constant Head): falling CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 1 OF 2

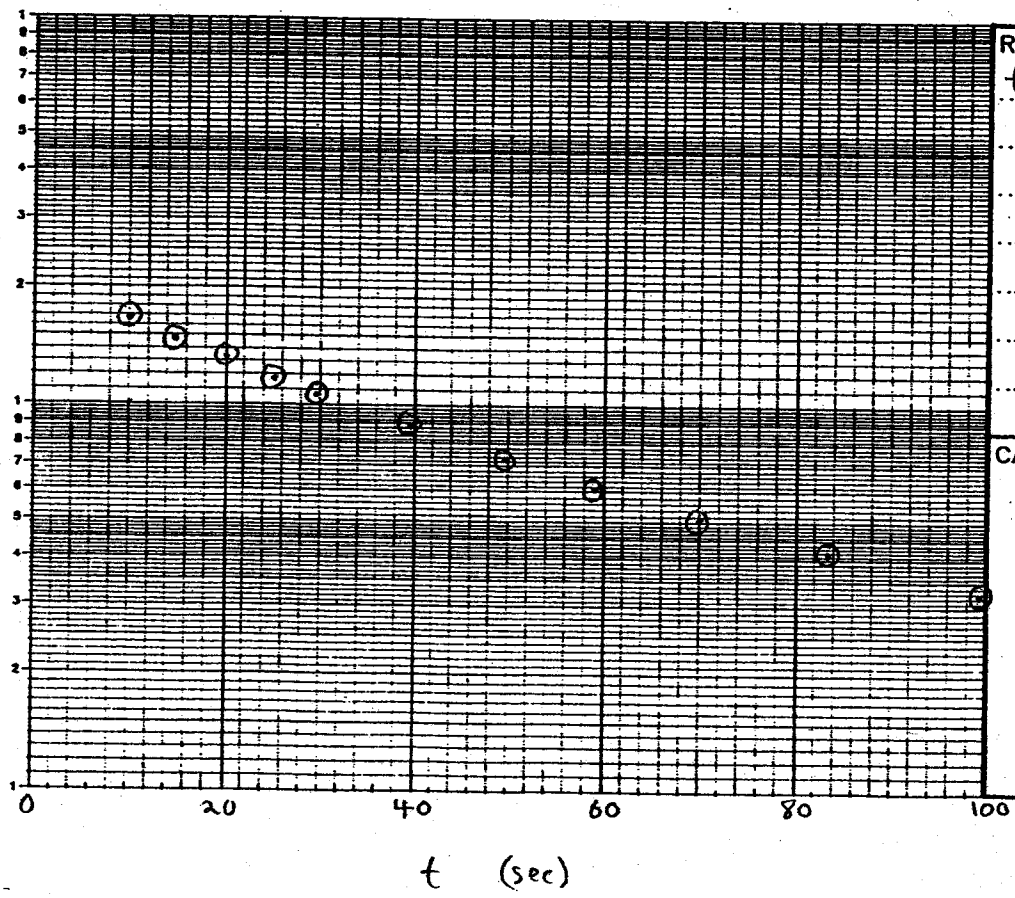
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
10		1.679	70.1		0.511
12.6		1.571	83.4		0.418
15		1.489	99.3		0.336
17.8		1.396	125.1		0.246
20		1.332	140.5		0.207
22.4		1.263	157.8		0.171
25.2		1.189			
29.8		1.08			
35.2		0.966			
39.5		0.885			
49.7		0.726			
59		0.614			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 15.05'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:16:42
Report fror ...\SN09022 2005-06-06 110000 08MWT04-F.bin
Win-Situ V 4.523

Serial num 9022
Firmware \ 3.09
Unit name:

Test name: 08MWT04-F

Test define 6/6/2005 10:52:14
Test sched 6/6/2005 11:00:00
Test starte 6/6/2005 11:00:00
Test stopp 6/6/2005 11:10:42

Data gathered using Logarithmic testing
Maximun Seconds.
Number 102

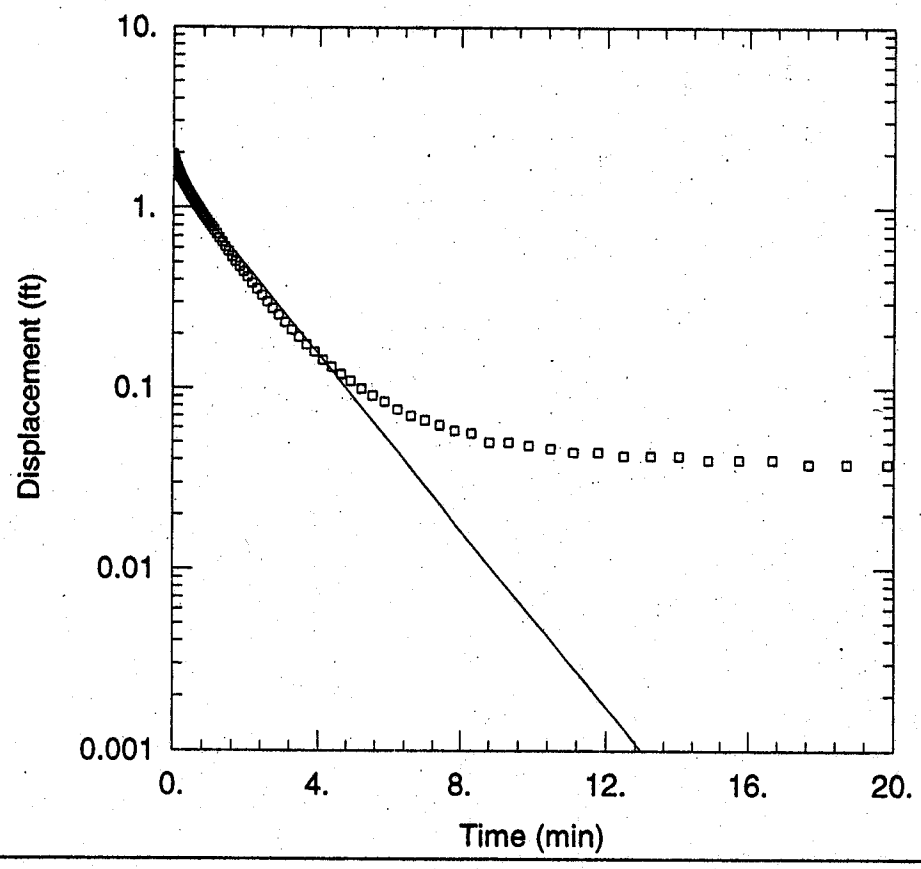
TOTAL DA 102

Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/6/2005	11:00:00	0	6.533		
6/6/2005	11:00:00	0.3	6.545		
6/6/2005	11:00:00	0.6	6.549		
6/6/2005	11:00:00	0.9	6.551		
6/6/2005	11:00:01	1.2	6.553		
6/6/2005	11:00:01	1.5	6.552		
6/6/2005	11:00:01	1.8	6.552		
6/6/2005	11:00:02	2.1	6.552		
6/6/2005	11:00:02	2.4	6.552		
6/6/2005	11:00:02	2.7	6.639		
6/6/2005	11:00:03	3	6.786		
6/6/2005	11:00:03	3.3	7.21		
6/6/2005	11:00:03	3.6	7.52		
6/6/2005	11:00:03	3.9	7.961		
6/6/2005	11:00:04	4.2	8.343		
6/6/2005	11:00:04	4.5	8.768		
6/6/2005	11:00:04	4.8	8.689		

6/6/2005	11:00:05	5.1	8.709		
6/6/2005	11:00:05	5.4	8.478		
6/6/2005	11:00:05	5.7	9.011		
6/6/2005	11:00:06	6	8.486		
6/6/2005	11:00:06	6.4	8.114		
6/6/2005	11:00:06	6.7	8.542		
6/6/2005	11:00:07	7.1	8.391		
6/6/2005	11:00:07	7.5	8.275		
6/6/2005	11:00:07	8	8.16		
6/6/2005	11:00:08	8.4	8.212		
6/6/2005	11:00:08	8.9	8.291		
6/6/2005	11:00:09	9.5	8.2		
6/6/2005	11:00:10	10	8.212	[redacted]	0.000 <t0
6/6/2005	11:00:10	10.6	8.18	-1.647	0.010
6/6/2005	11:00:11	11.3	8.154	-1.621	0.022
6/6/2005	11:00:11	11.9	8.13	-1.597	0.032
6/6/2005	11:00:12	12.6	8.104	[redacted]	0.043
6/6/2005	11:00:13	13.4	8.078	-1.545	0.057
6/6/2005	11:00:14	14.2	8.05	-1.517	0.070
6/6/2005	11:00:15	15	8.022	[redacted]	0.083
6/6/2005	11:00:15	15.9	7.991	-1.458	0.098
6/6/2005	11:00:16	16.8	7.961	-1.428	0.113
6/6/2005	11:00:17	17.8	7.929	[redacted]	0.130
6/6/2005	11:00:18	18.9	7.897	-1.364	0.148
6/6/2005	11:00:20	20	7.865	-1.332	0.167
6/6/2005	11:00:21	21.2	7.831	-1.298	0.187
6/6/2005	11:00:22	22.4	7.796	[redacted]	0.207
6/6/2005	11:00:23	23.8	7.76	-1.227	0.230
6/6/2005	11:00:25	25.2	7.722	-1.189	0.253
6/6/2005	11:00:26	26.7	7.686	-1.153	0.278
6/6/2005	11:00:28	28.2	7.652	[redacted]	0.303
6/6/2005	11:00:29	29.8	7.613	-1.08	0.330
6/6/2005	11:00:31	31.5	7.575	-1.042	0.358
6/6/2005	11:00:33	33.3	7.539	-1.006	0.388
6/6/2005	11:00:35	35.2	7.499	[redacted]	0.420
6/6/2005	11:00:37	37.3	7.458	-0.925	0.455
6/6/2005	11:00:39	39.5	7.418	-0.885	0.492
6/6/2005	11:00:41	41.8	7.38	-0.847	0.530
6/6/2005	11:00:44	44.3	7.34	-0.807	0.572
6/6/2005	11:00:46	46.9	7.299	-0.766	0.615
6/6/2005	11:00:49	49.7	7.259	[redacted]	0.662
6/6/2005	11:00:52	52.6	7.221	-0.688	0.710
6/6/2005	11:00:55	55.7	7.185	-0.652	0.762
6/6/2005	11:00:58	59	7.147	[redacted]	0.817
6/6/2005	11:01:02	62.5	7.11	-0.577	0.875
6/6/2005	11:01:06	66.2	7.076	-0.543	0.937
6/6/2005	11:01:10	70.1	7.044	-0.511	1.002
6/6/2005	11:01:14	74.3	7.012	-0.479	1.072
6/6/2005	11:01:18	78.7	6.98	-0.447	1.145
6/6/2005	11:01:23	83.4	6.951	[redacted]	1.223
6/6/2005	11:01:28	88.4	6.921	-0.388	1.307
6/6/2005	11:01:33	93.7	6.895	-0.362	1.395

6/6/2005	11:01:39	99.3	6.869	[redacted]	1.488
6/6/2005	11:01:45	105.2	6.845	-0.312	1.587
6/6/2005	11:01:51	111.5	6.821	-0.288	1.692
6/6/2005	11:01:58	118.1	6.799	-0.266	1.802
6/6/2005	11:02:05	125.1	6.779	[redacted]	1.918
6/6/2005	11:02:12	132.6	6.759	-0.226	2.043
6/6/2005	11:02:20	140.5	6.74	-0.207	2.175
6/6/2005	11:02:28	148.9	6.722	-0.189	2.315
6/6/2005	11:02:37	157.8	6.704	[redacted]	2.463
6/6/2005	11:02:47	167.2	6.688	-0.155	2.620
6/6/2005	11:02:57	177.2	6.674	-0.141	2.787
6/6/2005	11:03:07	187.8	6.66	-0.127	2.963
6/6/2005	11:03:18	199	6.648	-0.115	3.150
6/6/2005	11:03:30	210.9	6.636	-0.103	3.348
6/6/2005	11:03:43	223.5	6.626	-0.093	3.558
6/6/2005	11:03:56	236.8	6.616	-0.083	3.780
6/6/2005	11:04:10	250.9	6.606	-0.073	4.015
6/6/2005	11:04:25	265.8	6.598	-0.065	4.263
6/6/2005	11:04:41	281.6	6.59	-0.057	4.527
6/6/2005	11:04:58	298.4	6.584	-0.051	4.807
6/6/2005	11:05:16	316.2	6.576	-0.043	5.103
6/6/2005	11:05:34	335	6.568	-0.035	5.417
6/6/2005	11:05:54	354.9	6.564	-0.031	5.748
6/6/2005	11:06:15	376	6.558	-0.025	6.100
6/6/2005	11:06:38	398.4	6.554	-0.021	6.473
6/6/2005	11:07:02	422.1	6.55	-0.017	6.868
6/6/2005	11:07:27	447.2	6.545	-0.012	7.287
6/6/2005	11:07:53	473.8	6.541	-0.008	7.730
6/6/2005	11:08:21	502	6.537	-0.004	8.200
6/6/2005	11:08:51	531.9	6.535	-0.002	8.698
6/6/2005	11:09:23	563.5	6.533	0	9.225
6/6/2005	11:09:56	597	6.532	0.001	9.783
6/6/2005	11:10:32	632.5	6.529	0.004	10.375



SWMU 8 - 08MWT04 - RISING HEAD TEST

Data Set: H:\...\08MWT04-R_Hvorslev.aqt
Date: 07/12/05 Time: 12:54:52

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT04
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 6.399 ft/day
y0 = 1.463 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT04)

Initial Displacement: 1.971 ft
Wellbore Radius: 0.25 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 6.7 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT04

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 5' / 10.22' TOS TEST NO.: 08MWT04-R

STATIC WATER LEVEL (Depth/Elevation): 8.52' / DATE: 6-6-05

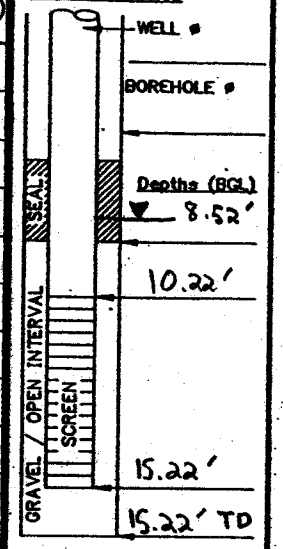
TEST TYPE (Rising/Falling/Constant Head): rising CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 2 OF 2

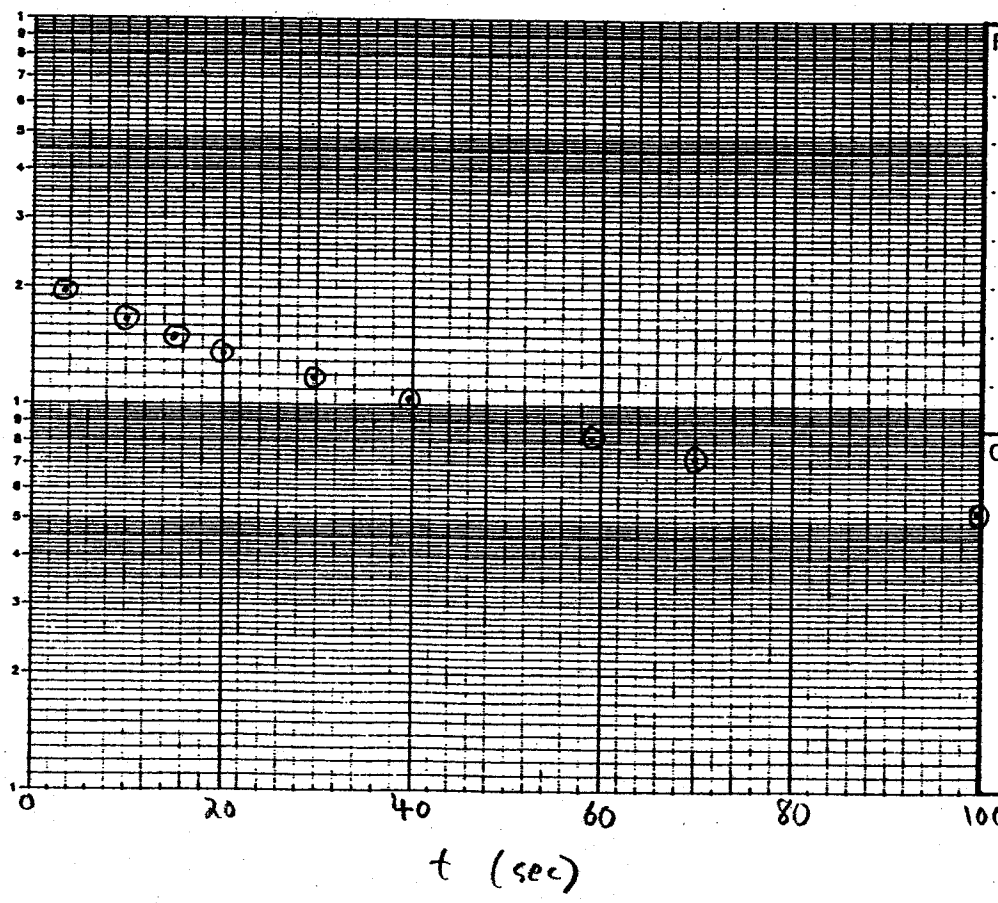
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
3.6		1.96	70.1		0.742
5.1		1.876	99.3		0.528
7.5		1.747	125.1		0.404
10		1.654	148.9		0.317
12.6		1.574	199		0.2
15		1.501			
20		1.376			
25.2		1.271			
29.8		1.191			
39.5		1.048			
49.7		0.927			
59		0.834			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 15.05'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:17:25
Report fror ...\SN09022 2005-06-06 112200 08MWT04-R.bin
Win-Situ V 4.523

Serial num 9022
Firmware \ 3.09
Unit name:

Test name: 08MWT04-R

Test define 6/6/2005 11:15:44
Test sched 6/6/2005 11:22:00
Test starte 6/6/2005 11:22:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 114

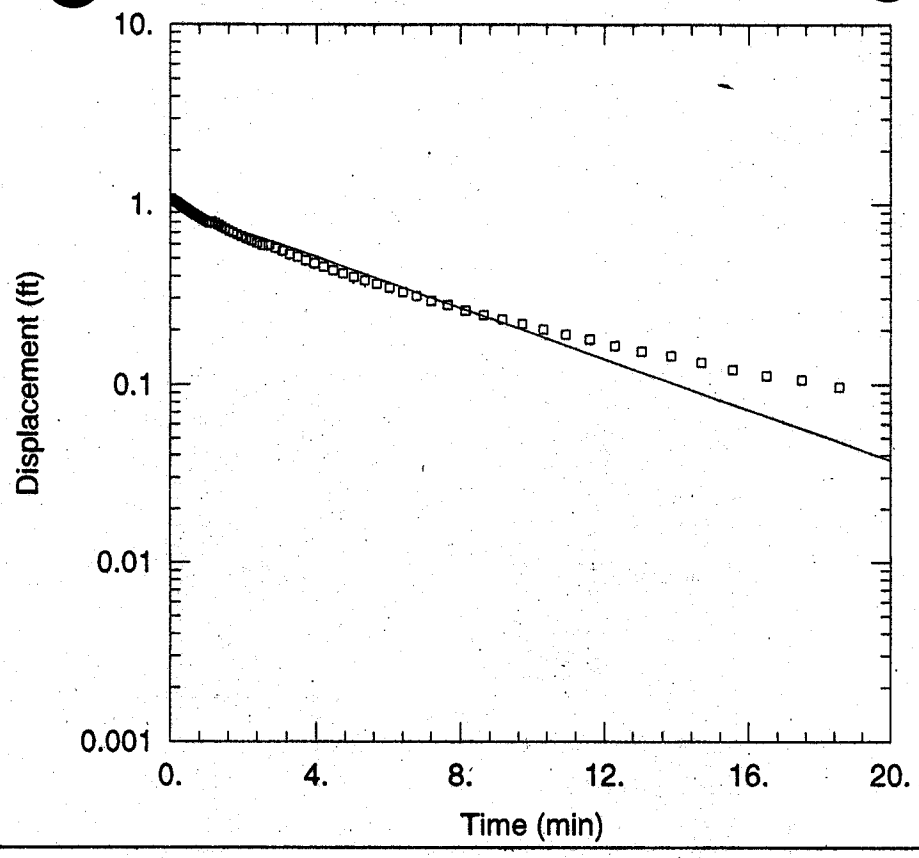
TOTAL DA 114

Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/6/2005	11:22:00	0	6.514		
6/6/2005	11:22:00	0.3	6.521		
6/6/2005	11:22:00	0.6	6.525		
6/6/2005	11:22:00	0.9	6.527		
6/6/2005	11:22:01	1.2	6.531		
6/6/2005	11:22:01	1.5	6.583		
6/6/2005	11:22:01	1.8	6.499		
6/6/2005	11:22:02	2.1	6.472		
6/6/2005	11:22:02	2.4	6.507		
6/6/2005	11:22:02	2.7	5.188		
6/6/2005	11:22:03	3	5.834		
6/6/2005	11:22:03	3.3	4.918		
6/6/2005	11:22:03	3.6	4.554	[redacted]	0.000 <t0
6/6/2005	11:22:03	3.9	4.562	1.952	0.005
6/6/2005	11:22:04	4.2	4.574	1.94	0.010
6/6/2005	11:22:04	4.5	4.592	1.922	0.015
6/6/2005	11:22:04	4.8	4.616	1.898	0.020

6/6/2005	11:22:05	5.1	4.638	[redacted]	0.025
6/6/2005	11:22:05	5.4	4.656	1.858	0.030
6/6/2005	11:22:05	5.7	4.662	1.852	0.035
6/6/2005	11:22:06	6	4.69	1.824	0.040
6/6/2005	11:22:06	6.4	4.711	1.803	0.047
6/6/2005	11:22:06	6.7	4.731	1.783	0.052
6/6/2005	11:22:07	7.1	4.747	1.767	0.058
6/6/2005	11:22:07	7.5	4.767	[redacted]	0.065
6/6/2005	11:22:07	8	4.785	1.729	0.073
6/6/2005	11:22:08	8.4	4.805	1.709	0.080
6/6/2005	11:22:08	8.9	4.823	1.691	0.088
6/6/2005	11:22:09	9.5	4.847	1.667	0.098
6/6/2005	11:22:10	10	4.86	[redacted]	0.107
6/6/2005	11:22:10	10.6	4.876	1.638	0.117
6/6/2005	11:22:11	11.3	4.898	1.616	0.128
6/6/2005	11:22:11	11.9	4.918	1.596	0.138
6/6/2005	11:22:12	12.6	4.94	[redacted]	0.150
6/6/2005	11:22:13	13.4	4.963	1.551	0.163
6/6/2005	11:22:14	14.2	4.987	1.527	0.177
6/6/2005	11:22:15	15	5.013	[redacted]	0.190
6/6/2005	11:22:15	15.9	5.037	1.477	0.205
6/6/2005	11:22:16	16.8	5.061	1.453	0.220
6/6/2005	11:22:17	17.8	5.087	1.427	0.237
6/6/2005	11:22:18	18.9	5.112	1.402	0.255
6/6/2005	11:22:20	20	5.138	[redacted]	0.273
6/6/2005	11:22:21	21.2	5.166	1.348	0.293
6/6/2005	11:22:22	22.4	5.188	1.326	0.313
6/6/2005	11:22:23	23.8	5.217	1.297	0.337
6/6/2005	11:22:25	25.2	5.243	1.271	0.360
6/6/2005	11:22:26	26.7	5.271	1.243	0.385
6/6/2005	11:22:28	28.2	5.297	[redacted]	0.410
6/6/2005	11:22:29	29.8	5.323	1.191	0.437
6/6/2005	11:22:31	31.5	5.351	1.163	0.465
6/6/2005	11:22:33	33.3	5.378	1.136	0.495
6/6/2005	11:22:35	35.2	5.404	1.11	0.527
6/6/2005	11:22:37	37.3	5.434	1.08	0.562
6/6/2005	11:22:39	39.5	5.466	[redacted]	0.598
6/6/2005	11:22:41	41.8	5.496	1.018	0.637
6/6/2005	11:22:44	44.3	5.527	0.987	0.678
6/6/2005	11:22:46	46.9	5.557	0.957	0.722
6/6/2005	11:22:49	49.7	5.587	[redacted]	0.768
6/6/2005	11:22:52	52.6	5.617	0.897	0.817
6/6/2005	11:22:55	55.7	5.649	0.865	0.868
6/6/2005	11:22:58	59	5.68	[redacted]	0.923
6/6/2005	11:23:02	62.5	5.71	0.804	0.982
6/6/2005	11:23:06	66.2	5.74	0.774	1.043
6/6/2005	11:23:10	70.1	5.772	[redacted]	1.108
6/6/2005	11:23:14	74.3	5.807	0.707	1.178
6/6/2005	11:23:18	78.7	5.841	0.673	1.252
6/6/2005	11:23:23	83.4	5.877	0.637	1.330
6/6/2005	11:23:28	88.4	5.915	0.599	1.413
6/6/2005	11:23:33	93.7	5.95	0.564	1.502

6/6/2005	11:23:39	99.3	5.986	[redacted]	1.595
6/6/2005	11:23:45	105.2	6.018	0.496	1.693
6/6/2005	11:23:51	111.5	6.05	0.464	1.798
6/6/2005	11:23:58	118.1	6.08	0.434	1.908
6/6/2005	11:24:05	125.1	6.11	[redacted]	2.025
6/6/2005	11:24:12	132.6	6.141	0.373	2.150
6/6/2005	11:24:20	140.5	6.169	0.345	2.282
6/6/2005	11:24:28	148.9	6.197	[redacted]	2.422
6/6/2005	11:24:37	157.8	6.223	0.291	2.570
6/6/2005	11:24:47	167.2	6.247	0.267	2.727
6/6/2005	11:24:57	177.2	6.269	0.245	2.893
6/6/2005	11:25:07	187.8	6.292	0.222	3.070
6/6/2005	11:25:18	199	6.314	[redacted]	3.257
6/6/2005	11:25:30	210.9	6.332	0.182	3.455
6/6/2005	11:25:43	223.5	6.35	0.164	3.665
6/6/2005	11:25:56	236.8	6.366	0.148	3.887
6/6/2005	11:26:10	250.9	6.382	0.132	4.122
6/6/2005	11:26:25	265.8	6.394	0.12	4.370
6/6/2005	11:26:41	281.6	6.406	0.108	4.633
6/6/2005	11:26:58	298.4	6.416	0.098	4.913
6/6/2005	11:27:16	316.2	6.426	0.088	5.210
6/6/2005	11:27:34	335	6.434	0.08	5.523
6/6/2005	11:27:54	354.9	6.441	0.073	5.855
6/6/2005	11:28:15	376	6.449	0.065	6.207
6/6/2005	11:28:38	398.4	6.455	0.059	6.580
6/6/2005	11:29:02	422.1	6.459	0.055	6.975
6/6/2005	11:29:27	447.2	6.463	0.051	7.393
6/6/2005	11:29:53	473.8	6.467	0.047	7.837
6/6/2005	11:30:21	502	6.469	0.045	8.307
6/6/2005	11:30:51	531.9	6.475	0.039	8.805
6/6/2005	11:31:23	563.5	6.475	0.039	9.332
6/6/2005	11:31:56	597	6.477	0.037	9.890
6/6/2005	11:32:32	632.5	6.479	0.035	10.482
6/6/2005	11:33:10	670.1	6.481	0.033	11.108
6/6/2005	11:33:49	709.9	6.481	0.033	11.772
6/6/2005	11:34:32	752.1	6.483	0.031	12.475
6/6/2005	11:35:16	796.8	6.483	0.031	13.220
6/6/2005	11:36:04	844.2	6.483	0.031	14.010
6/6/2005	11:36:54	894.4	6.485	0.029	14.847
6/6/2005	11:37:47	947.5	6.485	0.029	15.732
6/6/2005	11:38:43	1003.8	6.485	0.029	16.670
6/6/2005	11:39:43	1063.4	6.487	0.027	17.663
6/6/2005	11:40:46	1126.6	6.487	0.027	18.717
6/6/2005	11:41:53	1193.5	6.487	0.027	19.832
6/6/2005	11:43:04	1264.4	6.487	0.027	21.013



SWMU 8 - 08MWT05 - FALLING HEAD TEST

Data Set: H:\...\08MWT05-F_Hvorslev.aqt
Date: 07/12/05 Time: 12:54:58

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT05
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 1.143 ft/day
y0 = 0.9802 ft

AQUIFER DATA

Saturated Thickness: 10.16 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT05)

Initial Displacement: 1.074 ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 10.16 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT05

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' / 52.72' TOS TEST NO.: 08MWT05-F

STATIC WATER LEVEL (Depth/Elevation): 52.56' / DATE: 6-6-05

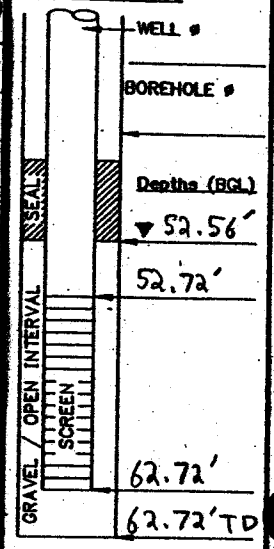
TEST TYPE (Rising/Falling/Constant Head): falling CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 1 OF 2

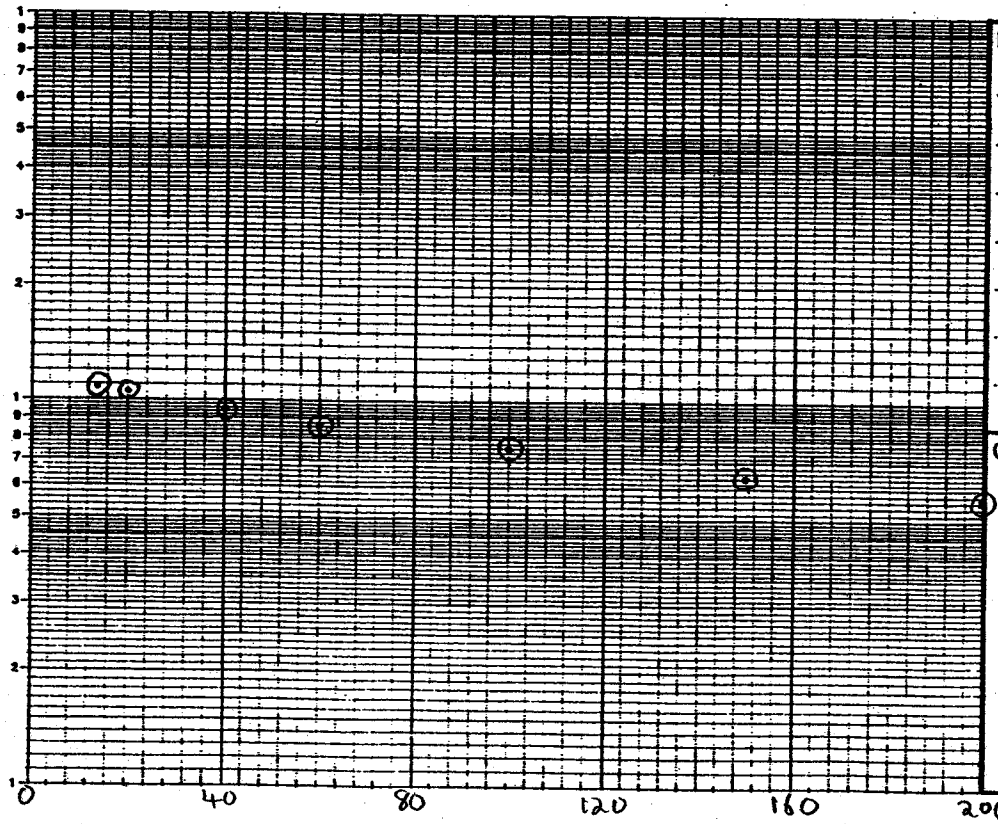
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
14.2		1.087	125.1		0.695
17.8		1.072	148.9		0.643
20		1.061	177.2		0.604
22.4		1.052	199		0.562
25.2		1.036	250.9		0.483
29.8		1.011	298.4		0.426
35.2		0.981	398.4		0.338
39.5		0.956	502		0.27
49.7		0.909			
59		0.871			
70.1		0.83			
99.3		0.765			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 61.72'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:12:55
Report fror ...\SN00936 2005-06-06 172000 08MWT05-F.bin
Win-Situ V 4.523

Serial num 936
Firmware \ 3.09
Unit name:

Test name: 08MWT05-F

Test define 6/6/2005 17:14:43
Test sched 6/6/2005 17:20:00
Test starte 6/6/2005 17:20:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 112

TOTAL DA 112

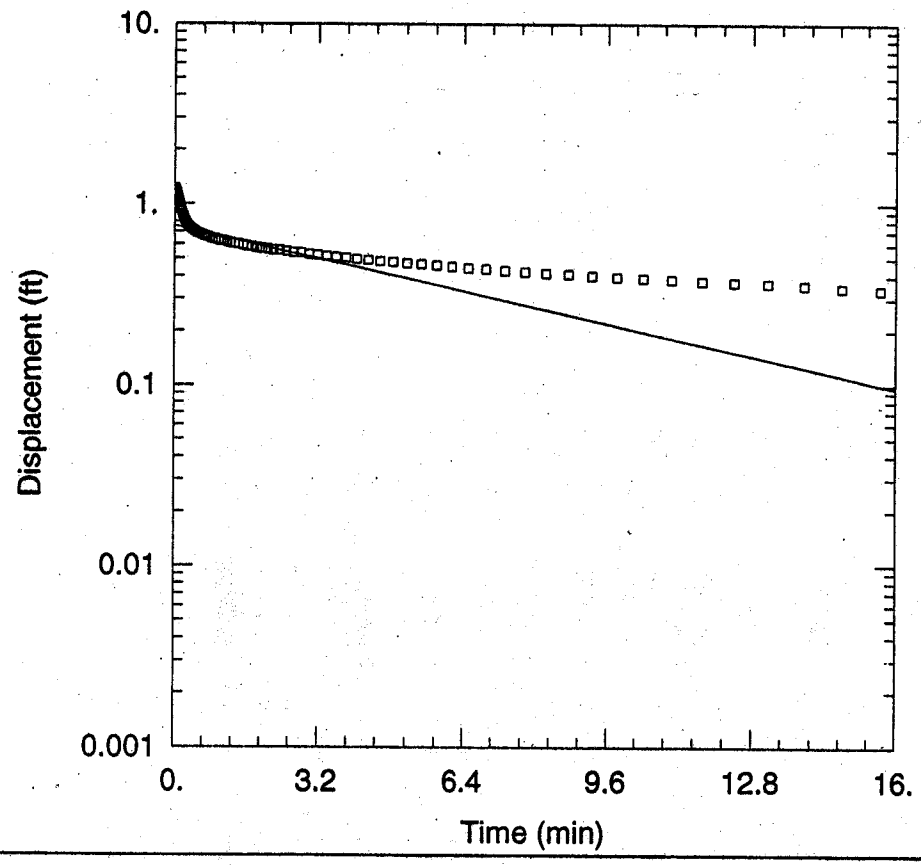
Channel number [1]
Measuren Temperature
Channel name:

Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/6/2005	17:20:00	0	57.24	7.89		
6/6/2005	17:20:00	0.3	57.29	7.899		
6/6/2005	17:20:00	0.6	57.31	7.901		
6/6/2005	17:20:00	0.9	57.31	7.903		
6/6/2005	17:20:01	1.2	57.31	7.903		
6/6/2005	17:20:01	1.5	57.33	7.902		
6/6/2005	17:20:01	1.8	57.33	7.905		
6/6/2005	17:20:02	2.1	57.33	7.954		
6/6/2005	17:20:02	2.4	57.33	8.093		
6/6/2005	17:20:02	2.7	57.36	8.167		
6/6/2005	17:20:03	3	57.36	8.343		
6/6/2005	17:20:03	3.3	57.36	8.413		
6/6/2005	17:20:03	3.6	57.36	8.468		

6/6/2005	17:20:03	3.9	57.36	8.549			
6/6/2005	17:20:04	4.2	57.36	8.59			
6/6/2005	17:20:04	4.5	57.36	8.642			
6/6/2005	17:20:04	4.8	57.36	8.699			
6/6/2005	17:20:05	5.1	57.36	8.744			
6/6/2005	17:20:05	5.4	57.36	8.775			
6/6/2005	17:20:05	5.7	57.36	8.807			
6/6/2005	17:20:06	6	57.36	8.839			
6/6/2005	17:20:06	6.4	57.36	8.868			
6/6/2005	17:20:06	6.7	57.36	8.889			
6/6/2005	17:20:07	7.1	57.38	8.909			
6/6/2005	17:20:07	7.5	57.38	8.924			
6/6/2005	17:20:07	8	57.38	8.938			
6/6/2005	17:20:08	8.4	57.38	8.949			
6/6/2005	17:20:08	8.9	57.38	8.956			
6/6/2005	17:20:09	9.5	57.38	8.963			
6/6/2005	17:20:10	10	57.36	8.963			
6/6/2005	17:20:10	10.6	57.36	8.963			
6/6/2005	17:20:11	11.3	57.33	8.964			
6/6/2005	17:20:11	11.9	57.33	8.975			
6/6/2005	17:20:12	12.6	57.33	8.975			
6/6/2005	17:20:13	13.4	57.33	8.977			
6/6/2005	17:20:14	14.2	57.33	8.977	[redacted]	0.000	<t0
6/6/2005	17:20:15	15	57.33	8.975	-1.085	0.013	
6/6/2005	17:20:15	15.9	57.33	8.973	-1.083	0.028	
6/6/2005	17:20:16	16.8	57.31	8.969	-1.079	0.043	
6/6/2005	17:20:17	17.8	57.31	8.962	[redacted]	0.060	
6/6/2005	17:20:18	18.9	57.31	8.957	-1.067	0.078	
6/6/2005	17:20:20	20	57.31	8.951	-1.061	0.097	
6/6/2005	17:20:21	21.2	57.31	8.946	-1.056	0.117	
6/6/2005	17:20:22	22.4	57.31	8.942	[redacted]	0.137	
6/6/2005	17:20:23	23.8	57.31	8.935	-1.045	0.160	
6/6/2005	17:20:25	25.2	57.31	8.926	-1.036	0.183	
6/6/2005	17:20:26	26.7	57.31	8.919	-1.029	0.208	
6/6/2005	17:20:28	28.2	57.31	8.91	-1.02	0.233	
6/6/2005	17:20:29	29.8	57.31	8.901	[redacted]	0.260	
6/6/2005	17:20:31	31.5	57.31	8.892	-1.002	0.288	
6/6/2005	17:20:33	33.3	57.31	8.88	-0.99	0.318	
6/6/2005	17:20:35	35.2	57.31	8.871	-0.981	0.350	
6/6/2005	17:20:37	37.3	57.29	8.86	-0.97	0.385	
6/6/2005	17:20:39	39.5	57.31	8.846	[redacted]	0.422	
6/6/2005	17:20:41	41.8	57.29	8.838	-0.948	0.460	
6/6/2005	17:20:44	44.3	57.29	8.824	-0.934	0.502	
6/6/2005	17:20:46	46.9	57.29	8.813	-0.923	0.545	
6/6/2005	17:20:49	49.7	57.29	8.799	[redacted]	0.592	
6/6/2005	17:20:52	52.6	57.29	8.786	-0.896	0.640	
6/6/2005	17:20:55	55.7	57.29	8.772	-0.882	0.692	
6/6/2005	17:20:58	59	57.29	8.761	[redacted]	0.747	
6/6/2005	17:21:02	62.5	57.29	8.747	-0.857	0.805	
6/6/2005	17:21:06	66.2	57.29	8.734	-0.844	0.867	
6/6/2005	17:21:10	70.1	57.29	8.72	[redacted]	0.932	
6/6/2005	17:21:14	74.3	57.29	8.704	-0.814	1.002	

6/6/2005	17:21:18	78.7	57.29	8.691	-0.801	1.075
6/6/2005	17:21:23	83.4	57.27	8.705	-0.815	1.153
6/6/2005	17:21:28	88.4	57.27	8.691	-0.801	1.237
6/6/2005	17:21:33	93.7	57.27	8.673	-0.783	1.325
6/6/2005	17:21:39	99.3	57.27	8.655	[redacted]	1.418
6/6/2005	17:21:45	105.2	57.27	8.637	-0.747	1.517
6/6/2005	17:21:51	111.5	57.27	8.619	-0.729	1.622
6/6/2005	17:21:58	118.1	57.27	8.603	-0.713	1.732
6/6/2005	17:22:05	125.1	57.27	8.585	[redacted]	1.848
6/6/2005	17:22:12	132.6	57.27	8.567	-0.677	1.973
6/6/2005	17:22:20	140.5	57.27	8.549	-0.659	2.105
6/6/2005	17:22:28	148.9	57.27	8.533	-0.643	2.245
6/6/2005	17:22:37	157.8	57.27	8.512	-0.622	2.393
6/6/2005	17:22:47	167.2	57.27	8.494	-0.604	2.550
6/6/2005	17:22:57	177.2	57.27	8.494	[redacted]	2.717
6/6/2005	17:23:07	187.8	57.24	8.474	-0.584	2.893
6/6/2005	17:23:18	199	57.24	8.452	-0.562	3.080
6/6/2005	17:23:30	210.9	57.27	8.431	-0.541	3.278
6/6/2005	17:23:43	223.5	57.24	8.413	-0.523	3.488
6/6/2005	17:23:56	236.8	57.24	8.391	-0.501	3.710
6/6/2005	17:24:10	250.9	57.24	8.373	[redacted]	3.945
6/6/2005	17:24:25	265.8	57.24	8.354	-0.464	4.193
6/6/2005	17:24:41	281.6	57.24	8.334	-0.444	4.457
6/6/2005	17:24:58	298.4	57.24	8.316	[redacted]	4.737
6/6/2005	17:25:16	316.2	57.24	8.298	-0.408	5.033
6/6/2005	17:25:34	335	57.24	8.28	-0.39	5.347
6/6/2005	17:25:54	354.9	57.24	8.264	-0.374	5.678
6/6/2005	17:26:15	376	57.24	8.246	-0.356	6.030
6/6/2005	17:26:38	398.4	57.24	8.228	[redacted]	6.403
6/6/2005	17:27:02	422.1	57.24	8.212	-0.322	6.798
6/6/2005	17:27:27	447.2	57.24	8.194	-0.304	7.217
6/6/2005	17:27:53	473.8	57.24	8.178	-0.288	7.660
6/6/2005	17:28:21	502	57.24	8.16	[redacted]	8.130
6/6/2005	17:28:51	531.9	57.24	8.146	-0.256	8.628
6/6/2005	17:29:23	563.5	57.24	8.133	-0.243	9.155
6/6/2005	17:29:56	597	57.24	8.119	-0.229	9.713
6/6/2005	17:30:32	632.5	57.24	8.105	-0.215	10.305
6/6/2005	17:31:10	670.1	57.24	8.092	[redacted]	10.932
6/6/2005	17:31:49	709.9	57.24	8.081	-0.191	11.595
6/6/2005	17:32:32	752.1	57.22	8.067	-0.177	12.298
6/6/2005	17:33:16	796.8	57.24	8.056	-0.166	13.043
6/6/2005	17:34:04	844.2	57.22	8.047	-0.157	13.833
6/6/2005	17:34:54	894.4	57.22	8.036	[redacted]	14.670
6/6/2005	17:35:47	947.5	57.22	8.024	-0.134	15.555
6/6/2005	17:36:43	1003.8	57.22	8.015	-0.125	16.493
6/6/2005	17:37:43	1063.4	57.22	8.009	-0.119	17.487
6/6/2005	17:38:46	1126.6	57.22	8	[redacted]	18.540



SWMU 8 - 08MWT05 - RISING HEAD TEST

Data Set: H:\...\08MWT05-R_Hvorslev.aqt
Date: 07/12/05 Time: 12:55:05

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT05
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.9066 ft/day
y0 = 0.7574 ft

AQUIFER DATA

Saturated Thickness: 10.16 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT05)

Initial Displacement: 1.223 ft
Wellbore Radius: 0.25 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 10.16 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT05

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 10' / 52.72' TOS TEST NO.: 08MWT05-R

STATIC WATER LEVEL (Depth/Elevation): 52.56' / DATE: 6-6-05

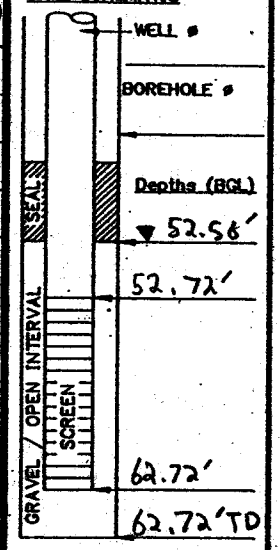
TEST TYPE (Rising/Falling/Constant Head): rising CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 2 OF 2

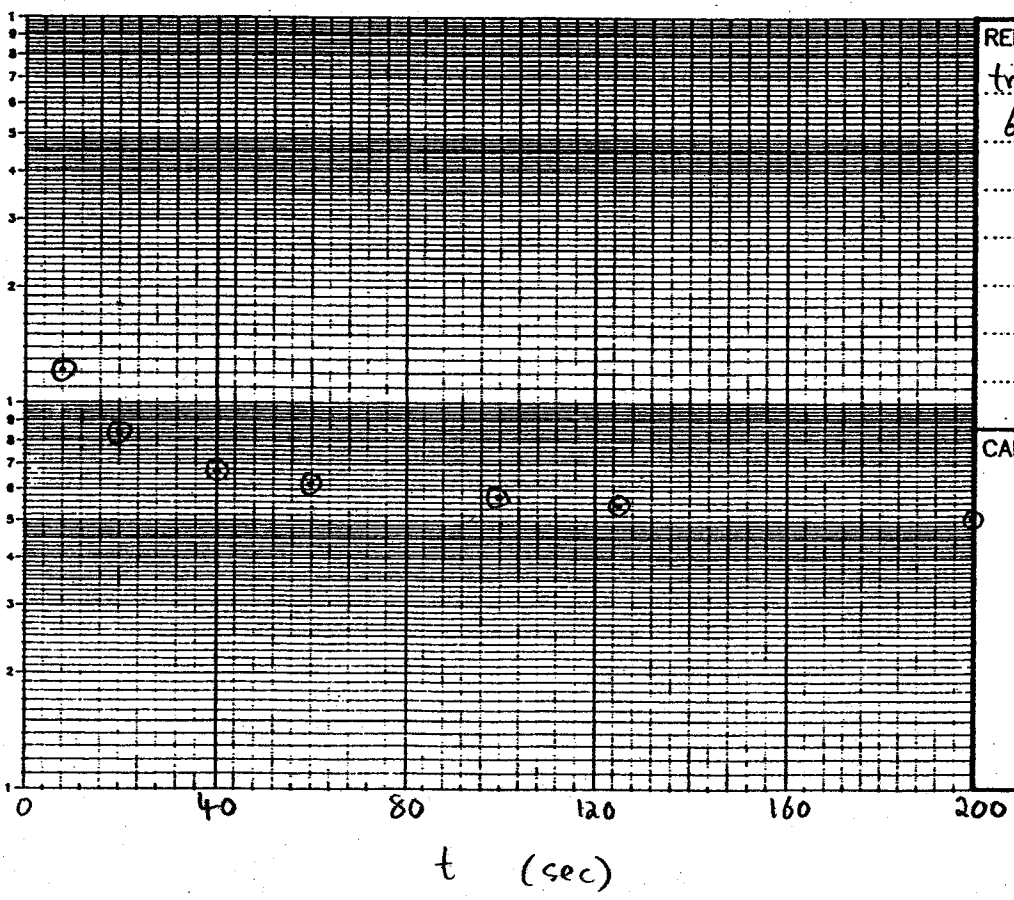
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
8		1.209	148.9		0.542
10		1.172	199		0.51
15		0.984	298.4		0.465
20		0.837	398.4		0.428
25.2		0.757	502		0.401
29.8		0.719	709.9		0.362
39.5		0.676			
49.7		0.651			
59		0.63			
70.1		0.614			
99.3		0.58			
125.1		0.557			

WELL SCHEMATIC



Indicate SWL Depth on Drawing



REMARKS:
transducer set at 61.72'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:14:08
Report fror ...\SN00936 2005-06-06 181900 08MWT05-R.bin
Win-Situ V 4.523

Serial num 936
Firmware \ 3.09
Unit name:

Test name: 08MWT05-R

Test define 6/6/2005 18:13:49
Test sched 6/6/2005 18:19:00
Test starte 6/6/2005 18:19:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 124

TOTAL DA 124

Channel number [1]
Measuren Temperature
Channel name:

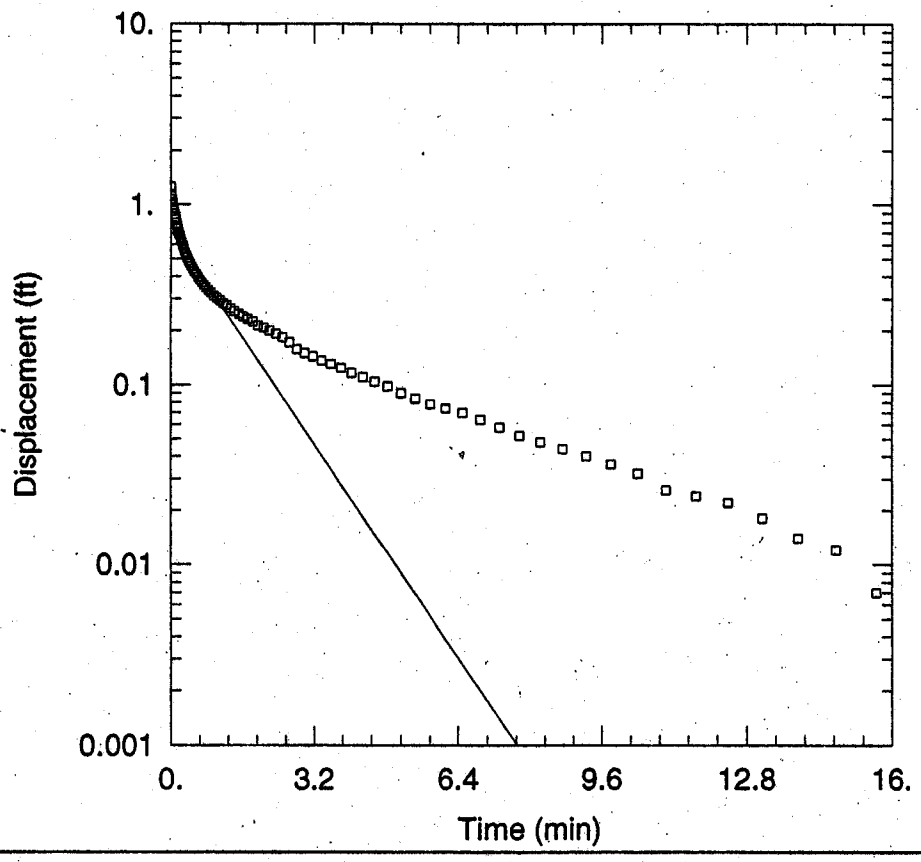
Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O H	adjusted ET (min)
6/6/2005	18:19:00	0	57.2	7.912	
6/6/2005	18:19:00	0.3	57.24	7.92	
6/6/2005	18:19:00	0.6	57.24	7.922	
6/6/2005	18:19:00	0.9	57.27	7.924	
6/6/2005	18:19:01	1.2	57.27	7.924	
6/6/2005	18:19:01	1.5	57.27	7.926	
6/6/2005	18:19:01	1.8	57.29	7.926	
6/6/2005	18:19:02	2.1	57.29	7.926	
6/6/2005	18:19:02	2.4	57.29	7.709	
6/6/2005	18:19:02	2.7	57.29	7.466	
6/6/2005	18:19:03	3	57.29	7.304	
6/6/2005	18:19:03	3.3	57.29	7.238	
6/6/2005	18:19:03	3.6	57.31	7.088	

6/6/2005	18:19:03	3.9	57.31	7.029			
6/6/2005	18:19:04	4.2	57.31	6.964			
6/6/2005	18:19:04	4.5	57.31	6.903			
6/6/2005	18:19:04	4.8	57.31	6.864			
6/6/2005	18:19:05	5.1	57.31	6.823			
6/6/2005	18:19:05	5.4	57.31	6.794			
6/6/2005	18:19:05	5.7	57.31	6.769			
6/6/2005	18:19:06	6	57.31	6.749			
6/6/2005	18:19:06	6.4	57.31	6.731			
6/6/2005	18:19:06	6.7	57.31	6.717			
6/6/2005	18:19:07	7.1	57.31	6.708			
6/6/2005	18:19:07	7.5	57.31	6.703			
6/6/2005	18:19:07	8	57.31	6.703	[redacted]	0.000	<t0
6/6/2005	18:19:08	8.4	57.31	6.708	1.204	0.007	
6/6/2005	18:19:08	8.9	57.31	6.717	1.195	0.015	
6/6/2005	18:19:09	9.5	57.33	6.728	1.184	0.025	
6/6/2005	18:19:10	10	57.31	6.74	[redacted]	0.033	
6/6/2005	18:19:10	10.6	57.29	6.758	1.154	0.043	
6/6/2005	18:19:11	11.3	57.29	6.781	1.131	0.055	
6/6/2005	18:19:11	11.9	57.29	6.806	1.106	0.065	
6/6/2005	18:19:12	12.6	57.29	6.835	1.077	0.077	
6/6/2005	18:19:13	13.4	57.29	6.864	1.048	0.090	
6/6/2005	18:19:14	14.2	57.29	6.896	1.016	0.103	
6/6/2005	18:19:15	15	57.29	6.928	[redacted]	0.117	
6/6/2005	18:19:15	15.9	57.27	6.96	0.952	0.132	
6/6/2005	18:19:16	16.8	57.27	6.992	0.92	0.147	
6/6/2005	18:19:17	17.8	57.27	7.021	0.891	0.163	
6/6/2005	18:19:18	18.9	57.27	7.048	0.864	0.182	
6/6/2005	18:19:20	20	57.27	7.075	[redacted]	0.200	
6/6/2005	18:19:21	21.2	57.27	7.098	0.814	0.220	
6/6/2005	18:19:22	22.4	57.27	7.118	0.794	0.240	
6/6/2005	18:19:23	23.8	57.27	7.136	0.776	0.263	
6/6/2005	18:19:25	25.2	57.27	7.155	[redacted]	0.287	
6/6/2005	18:19:26	26.7	57.27	7.168	0.744	0.312	
6/6/2005	18:19:28	28.2	57.27	7.182	0.73	0.337	
6/6/2005	18:19:29	29.8	57.27	7.193	0.719	0.363	
6/6/2005	18:19:31	31.5	57.27	7.202	[redacted]	0.392	
6/6/2005	18:19:33	33.3	57.27	7.211	0.701	0.422	
6/6/2005	18:19:35	35.2	57.24	7.221	0.691	0.453	
6/6/2005	18:19:37	37.3	57.24	7.23	0.682	0.488	
6/6/2005	18:19:39	39.5	57.24	7.236	[redacted]	0.525	
6/6/2005	18:19:41	41.8	57.24	7.243	0.669	0.563	
6/6/2005	18:19:44	44.3	57.24	7.25	0.662	0.605	
6/6/2005	18:19:46	46.9	57.24	7.257	0.655	0.648	
6/6/2005	18:19:49	49.7	57.24	7.261	[redacted]	0.695	
6/6/2005	18:19:52	52.6	57.24	7.268	0.644	0.743	
6/6/2005	18:19:55	55.7	57.24	7.275	0.637	0.795	
6/6/2005	18:19:58	59	57.24	7.282	[redacted]	0.850	
6/6/2005	18:20:02	62.5	57.24	7.286	0.626	0.908	
6/6/2005	18:20:06	66.2	57.24	7.293	0.619	0.970	
6/6/2005	18:20:10	70.1	57.24	7.298	[redacted]	1.035	
6/6/2005	18:20:14	74.3	57.24	7.302	0.61	1.105	

6/6/2005	18:20:18	78.7	57.22	7.309	0.603	1.178
6/6/2005	18:20:23	83.4	57.24	7.316	0.596	1.257
6/6/2005	18:20:28	88.4	57.22	7.321	0.591	1.340
6/6/2005	18:20:33	93.7	57.22	7.325	0.587	1.428
6/6/2005	18:20:39	99.3	57.22	7.332	[redacted]	1.522
6/6/2005	18:20:45	105.2	57.22	7.339	0.573	1.620
6/6/2005	18:20:51	111.5	57.22	7.343	0.569	1.725
6/6/2005	18:20:58	118.1	57.22	7.35	0.562	1.835
6/6/2005	18:21:05	125.1	57.22	7.355	[redacted]	1.952
6/6/2005	18:21:12	132.6	57.22	7.359	0.553	2.077
6/6/2005	18:21:20	140.5	57.22	7.366	0.546	2.208
6/6/2005	18:21:28	148.9	57.22	7.37	[redacted]	2.348
6/6/2005	18:21:37	157.8	57.22	7.377	0.535	2.497
6/6/2005	18:21:47	167.2	57.22	7.384	0.528	2.653
6/6/2005	18:21:57	177.2	57.22	7.388	0.524	2.820
6/6/2005	18:22:07	187.8	57.22	7.395	0.517	2.997
6/6/2005	18:22:18	199	57.22	7.402	[redacted]	3.183
6/6/2005	18:22:30	210.9	57.22	7.409	0.503	3.382
6/6/2005	18:22:43	223.5	57.22	7.416	0.496	3.592
6/6/2005	18:22:56	236.8	57.22	7.422	0.49	3.813
6/6/2005	18:23:10	250.9	57.22	7.429	0.483	4.048
6/6/2005	18:23:25	265.8	57.2	7.436	0.476	4.297
6/6/2005	18:23:41	281.6	57.2	7.443	0.469	4.560
6/6/2005	18:23:58	298.4	57.22	7.447	[redacted]	4.840
6/6/2005	18:24:16	316.2	57.2	7.455	0.457	5.137
6/6/2005	18:24:34	335	57.2	7.461	0.451	5.450
6/6/2005	18:24:54	354.9	57.2	7.468	0.444	5.782
6/6/2005	18:25:15	376	57.2	7.475	0.437	6.133
6/6/2005	18:25:38	398.4	57.2	7.484	[redacted]	6.507
6/6/2005	18:26:02	422.1	57.2	7.488	0.424	6.902
6/6/2005	18:26:27	447.2	57.2	7.498	0.414	7.320
6/6/2005	18:26:53	473.8	57.22	7.504	0.408	7.763
6/6/2005	18:27:21	502	57.2	7.511	[redacted]	8.233
6/6/2005	18:27:51	531.9	57.22	7.517	0.395	8.732
6/6/2005	18:28:23	563.5	57.2	7.525	0.387	9.258
6/6/2005	18:28:56	597	57.2	7.531	0.381	9.817
6/6/2005	18:29:32	632.5	57.2	7.536	0.376	10.408
6/6/2005	18:30:10	670.1	57.2	7.543	0.369	11.035
6/6/2005	18:30:49	709.9	57.2	7.55	[redacted]	11.698
6/6/2005	18:31:32	752.1	57.2	7.556	0.356	12.402
6/6/2005	18:32:16	796.8	57.2	7.561	0.351	13.147
6/6/2005	18:33:04	844.2	57.2	7.57	0.342	13.937
6/6/2005	18:33:54	894.4	57.2	7.581	0.331	14.773
6/6/2005	18:34:47	947.5	57.2	7.59	0.322	15.658
6/6/2005	18:35:43	1003.8	57.2	7.599	[redacted]	16.597
6/6/2005	18:36:43	1063.4	57.2	7.608	0.304	17.590
6/6/2005	18:37:46	1126.6	57.2	7.615	0.297	18.643
6/6/2005	18:38:53	1193.5	57.2	7.624	0.288	19.758
6/6/2005	18:40:04	1264.4	57.2	7.633	0.279	20.940
6/6/2005	18:41:19	1339.5	57.2	7.638	0.274	22.192
6/6/2005	18:42:38	1419	57.2	7.645	0.267	23.517
6/6/2005	18:44:03	1503.3	57.2	7.649	[redacted]	24.922

6/6/2005	18:45:32	1592.6	57.2	7.654	0.258	26.410
6/6/2005	18:47:07	1687.1	57.2	7.66	0.252	27.985
6/6/2005	18:48:47	1787.2	57.2	7.665	0.247	29.653
6/6/2005	18:50:33	1893.3	57.2	7.67	0.242	31.422
6/6/2005	18:52:25	2005.7	57.2	7.674	0.238	33.295
6/6/2005	18:54:24	2124.7	57.2	7.676	0.236	35.278
6/6/2005	18:56:30	2250.8	57.2	7.679	[redacted]	37.380



SWMU 8 - 08MWT07 - FALLING HEAD TEST

Data Set: H:\...\08MWT07-F_Hvorslev.aqt
Date: 07/12/05 Time: 13:13:20

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT07
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 4.426 ft/day
y0 = 0.7184 ft

AQUIFER DATA

Saturated Thickness: 20.34 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT07)

Initial Displacement: 1.259 ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 20.34 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT07

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 15' / 19.91' TOS TEST NO.: 08MWT07-F

STATIC WATER LEVEL (Depth/Elevation): 14.57' / DATE: 6-7-05

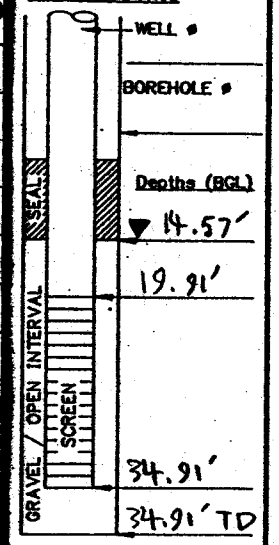
TEST TYPE (Rising/Falling/Constant Head): falling CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 1 OF 2

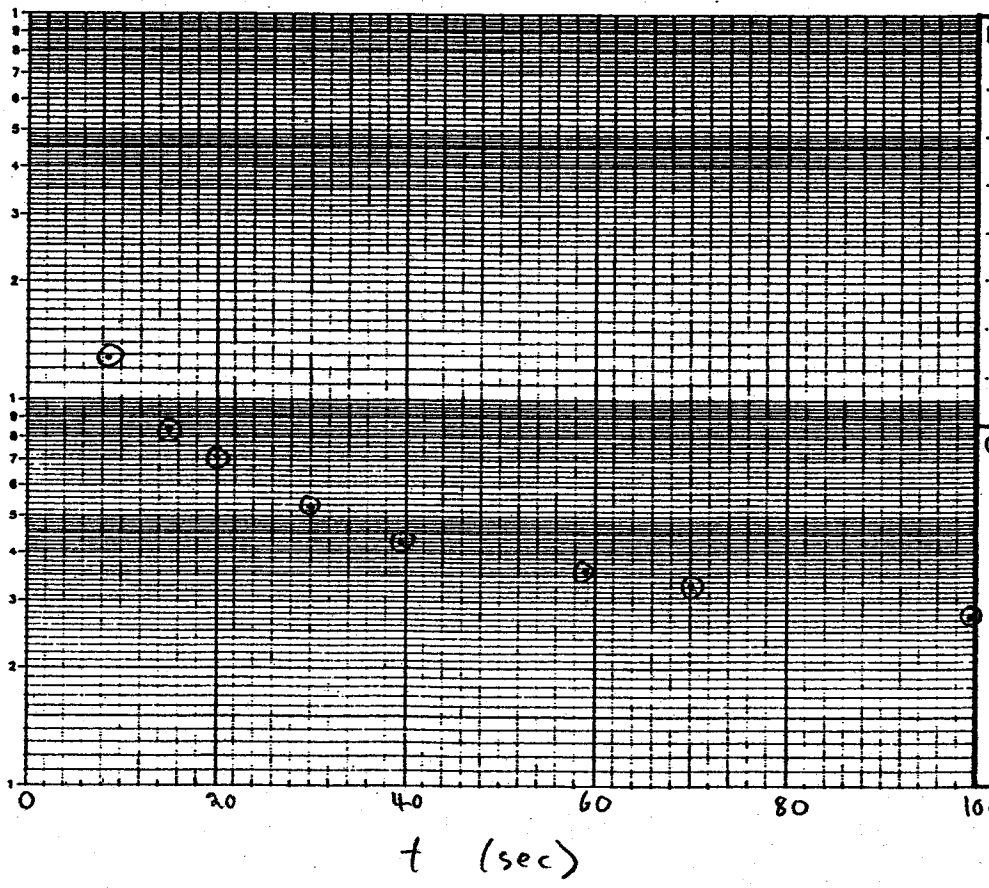
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
8.4		1.29	70.1		0.335
10		1.104	99.3		0.279
12.6		0.953	140.5		0.231
15		0.855	199		0.175
17.8		0.767			
20		0.708			
25.2		0.6			
29.8		0.536			
35.2		0.486			
39.5		0.456			
49.7		0.401			
59		0.365			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 33.91'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:19:00
Report fror ...\SN09022 2005-06-07 180700 08MWT07-F.bin
Win-Situ V 4.523

Serial num 9022
Firmware \ 3.09
Unit name:

Test name: 08MWT07-F

Test define 6/7/2005 18:01:48
Test sched 6/7/2005 18:07:00
Test starte 6/7/2005 18:07:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 113

TOTAL DA 113

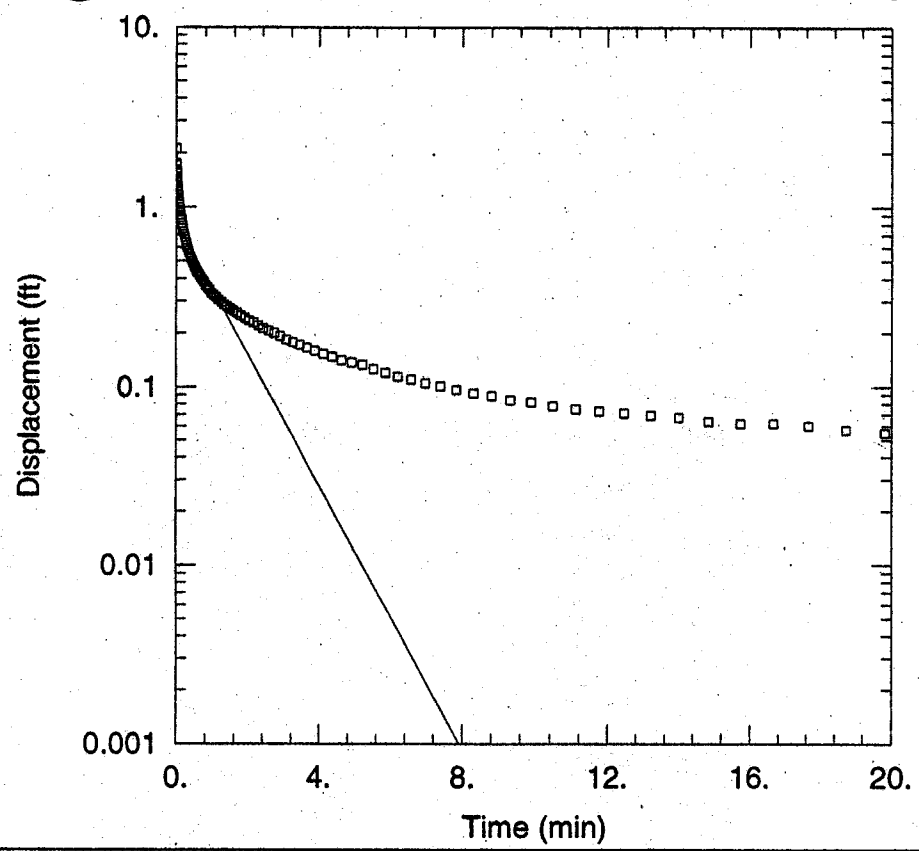
Channel number [1]
Measuren Temperature
Channel name:

Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/7/2005	18:07:00	0	56.7	19.425		
6/7/2005	18:07:00	0.3	56.74	19.443		
6/7/2005	18:07:00	0.6	56.77	19.446		
6/7/2005	18:07:00	0.9	56.77	19.45		
6/7/2005	18:07:01	1.2	56.79	19.452		
6/7/2005	18:07:01	1.5	56.79	19.454		
6/7/2005	18:07:01	1.8	56.79	19.454		
6/7/2005	18:07:02	2.1	56.79	19.456		
6/7/2005	18:07:02	2.4	56.79	19.456		
6/7/2005	18:07:02	2.7	56.79	19.456		
6/7/2005	18:07:03	3	56.79	19.456		
6/7/2005	18:07:03	3.3	56.81	19.46		
6/7/2005	18:07:03	3.6	56.81	19.538		

6/7/2005	18:07:03	3.9	56.81	19.89		
6/7/2005	18:07:04	4.2	56.81	20.783		
6/7/2005	18:07:04	4.5	56.81	21.291		
6/7/2005	18:07:04	4.8	56.81	21.649		
6/7/2005	18:07:05	5.1	56.81	21.438		
6/7/2005	18:07:05	5.4	56.81	21.53		
6/7/2005	18:07:05	5.7	56.81	21.191		
6/7/2005	18:07:06	6	56.81	21.062		
6/7/2005	18:07:06	6.4	56.81	20.874		
6/7/2005	18:07:06	6.7	56.81	20.789		
6/7/2005	18:07:07	7.1	56.81	20.719		
6/7/2005	18:07:07	7.5	56.81	20.619		
6/7/2005	18:07:07	8	56.81	20.665		
6/7/2005	18:07:08	8.4	56.81	20.715	[redacted]	0.000 <t0
6/7/2005	18:07:08	8.9	56.81	20.597	-1.172	0.008
6/7/2005	18:07:09	9.5	56.84	20.574	-1.149	0.018
6/7/2005	18:07:10	10	56.79	20.529	[redacted]	0.027
6/7/2005	18:07:10	10.6	56.79	20.486	-1.061	0.037
6/7/2005	18:07:11	11.3	56.77	20.449	-1.024	0.048
6/7/2005	18:07:11	11.9	56.77	20.412	-0.987	0.058
6/7/2005	18:07:12	12.6	56.77	20.378	[redacted]	0.070
6/7/2005	18:07:13	13.4	56.77	20.342	-0.917	0.083
6/7/2005	18:07:14	14.2	56.77	20.31	-0.885	0.097
6/7/2005	18:07:15	15	56.77	20.28	[redacted]	0.110
6/7/2005	18:07:15	15.9	56.77	20.248	-0.823	0.125
6/7/2005	18:07:16	16.8	56.77	20.222	-0.797	0.140
6/7/2005	18:07:17	17.8	56.77	20.192	[redacted]	0.157
6/7/2005	18:07:18	18.9	56.77	20.159	-0.734	0.175
6/7/2005	18:07:20	20	56.77	20.133	-0.708	0.193
6/7/2005	18:07:21	21.2	56.74	20.103	-0.678	0.213
6/7/2005	18:07:22	22.4	56.74	20.077	-0.652	0.233
6/7/2005	18:07:23	23.8	56.74	20.049	-0.624	0.257
6/7/2005	18:07:25	25.2	56.74	20.025	[redacted]	0.280
6/7/2005	18:07:26	26.7	56.74	20.001	-0.576	0.305
6/7/2005	18:07:28	28.2	56.74	19.981	-0.556	0.330
6/7/2005	18:07:29	29.8	56.74	19.961	[redacted]	0.357
6/7/2005	18:07:31	31.5	56.74	19.943	-0.518	0.385
6/7/2005	18:07:33	33.3	56.74	19.927	-0.502	0.415
6/7/2005	18:07:35	35.2	56.74	19.911	[redacted]	0.447
6/7/2005	18:07:37	37.3	56.74	19.895	-0.47	0.482
6/7/2005	18:07:39	39.5	56.74	19.881	-0.456	0.518
6/7/2005	18:07:41	41.8	56.74	19.867	-0.442	0.557
6/7/2005	18:07:44	44.3	56.74	19.852	-0.427	0.598
6/7/2005	18:07:46	46.9	56.74	19.838	-0.413	0.642
6/7/2005	18:07:49	49.7	56.74	19.826	[redacted]	0.688
6/7/2005	18:07:52	52.6	56.74	19.814	-0.389	0.737
6/7/2005	18:07:55	55.7	56.74	19.802	-0.377	0.788
6/7/2005	18:07:58	59	56.74	19.79	[redacted]	0.843
6/7/2005	18:08:02	62.5	56.74	19.78	-0.355	0.902
6/7/2005	18:08:06	66.2	56.72	19.768	-0.343	0.963
6/7/2005	18:08:10	70.1	56.72	19.76	[redacted]	1.028
6/7/2005	18:08:14	74.3	56.72	19.75	-0.325	1.098

6/7/2005	18:08:18	78.7	56.72	19.74	-0.315	1.172
6/7/2005	18:08:23	83.4	56.72	19.732	-0.307	1.250
6/7/2005	18:08:28	88.4	56.72	19.722	-0.297	1.333
6/7/2005	18:08:33	93.7	56.72	19.712	-0.287	1.422
6/7/2005	18:08:39	99.3	56.72	19.704	[redacted]	1.515
6/7/2005	18:08:45	105.2	56.72	19.696	-0.271	1.613
6/7/2005	18:08:51	111.5	56.72	19.688	-0.263	1.718
6/7/2005	18:08:58	118.1	56.72	19.68	-0.255	1.828
6/7/2005	18:09:05	125.1	56.72	19.67	-0.245	1.945
6/7/2005	18:09:12	132.6	56.72	19.664	-0.239	2.070
6/7/2005	18:09:20	140.5	56.72	19.656	[redacted]	2.202
6/7/2005	18:09:28	148.9	56.72	19.648	-0.223	2.342
6/7/2005	18:09:37	157.8	56.72	19.64	-0.215	2.490
6/7/2005	18:09:47	167.2	56.72	19.628	-0.203	2.647
6/7/2005	18:09:57	177.2	56.72	19.614	-0.189	2.813
6/7/2005	18:10:07	187.8	56.72	19.606	-0.181	2.990
6/7/2005	18:10:18	199	56.7	19.6	[redacted]	3.177
6/7/2005	18:10:30	210.9	56.7	19.592	-0.167	3.375
6/7/2005	18:10:43	223.5	56.7	19.586	-0.161	3.585
6/7/2005	18:10:56	236.8	56.7	19.58	-0.155	3.807
6/7/2005	18:11:10	250.9	56.7	19.572	-0.147	4.042
6/7/2005	18:11:25	265.8	56.7	19.566	-0.141	4.290
6/7/2005	18:11:41	281.6	56.7	19.56	-0.135	4.553
6/7/2005	18:11:58	298.4	56.7	19.554	[redacted]	4.833
6/7/2005	18:12:16	316.2	56.7	19.546	-0.121	5.130
6/7/2005	18:12:34	335	56.7	19.54	-0.115	5.443
6/7/2005	18:12:54	354.9	56.7	19.534	-0.109	5.775
6/7/2005	18:13:15	376	56.7	19.53	-0.105	6.127
6/7/2005	18:13:38	398.4	56.7	19.526	-0.101	6.500
6/7/2005	18:14:02	422.1	56.7	19.52	-0.095	6.895
6/7/2005	18:14:27	447.2	56.7	19.514	-0.089	7.313
6/7/2005	18:14:53	473.8	56.7	19.508	-0.083	7.757
6/7/2005	18:15:21	502	56.7	19.504	-0.079	8.227
6/7/2005	18:15:51	531.9	56.7	19.5	-0.075	8.725
6/7/2005	18:16:23	563.5	56.7	19.496	-0.071	9.252
6/7/2005	18:16:56	597	56.7	19.492	-0.067	9.810
6/7/2005	18:17:32	632.5	56.7	19.488	-0.063	10.402
6/7/2005	18:18:10	670.1	56.7	19.482	-0.057	11.028
6/7/2005	18:18:49	709.9	56.7	19.48	-0.055	11.692
6/7/2005	18:19:32	752.1	56.7	19.478	-0.053	12.395
6/7/2005	18:20:16	796.8	56.7	19.474	-0.049	13.140
6/7/2005	18:21:04	844.2	56.7	19.47	-0.045	13.930
6/7/2005	18:21:54	894.4	56.7	19.468	-0.043	14.767
6/7/2005	18:22:47	947.5	56.7	19.463	-0.038	15.652
6/7/2005	18:23:43	1003.8	56.72	19.459	-0.034	16.590
6/7/2005	18:24:43	1063.4	56.72	19.457	-0.032	17.583
6/7/2005	18:25:46	1126.6	56.72	19.453	-0.028	18.637
6/7/2005	18:26:53	1193.5	56.72	19.461	-0.036	19.752



SWMU 8 - 08MWT07 - RISING HEAD TEST

Data Set: H:\...\08MWT07-R_Hvorslev.aqt
Date: 07/12/05 Time: 13:14:07

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT07
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 4.389 ft/day
y0 = 0.8185 ft

AQUIFER DATA

Saturated Thickness: 20.34 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT07)

Initial Displacement: 2.103 ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 20.34 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT07

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 15' / 19.91' TOS TEST NO.: 08MWT07-R

STATIC WATER LEVEL (Depth/Elevation): 14.57' / DATE: 6-7-05

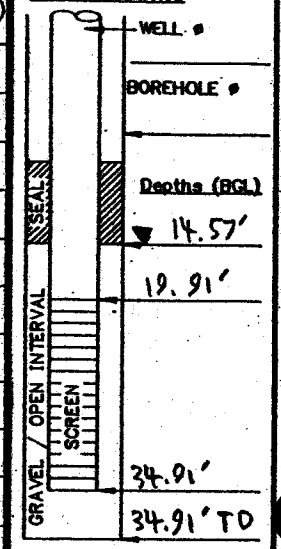
TEST TYPE (Rising/Falling/Constant Head): rising CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 2 OF 2

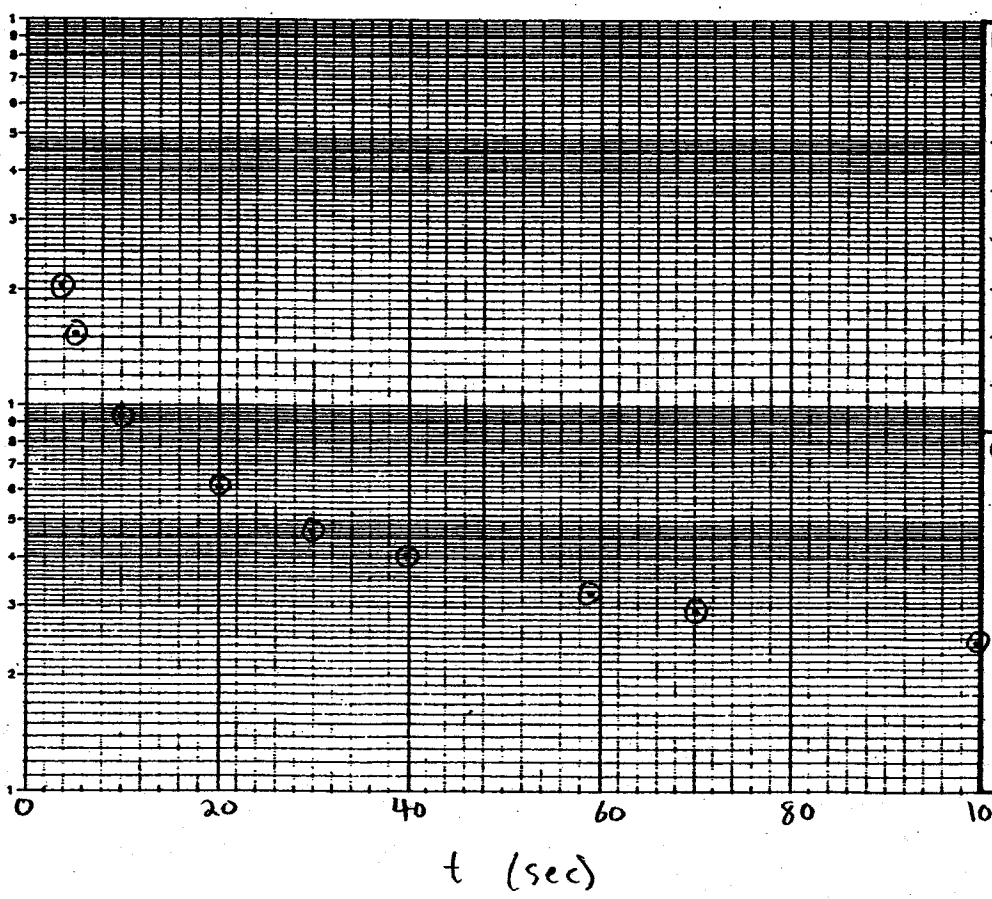
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
3.9		2.08	70.1		0.292
5.1		1.522	99.3		0.241
7.5		1.136	140.5		0.197
10		0.945			
12.6		0.822			
15		0.734			
20		0.612			
25.2		0.529			
29.8		0.477			
39.5		0.406			
49.7		0.36			
59		0.324			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 33.91'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:19:58
Report fror ...\SN09022 2005-06-07 183400 08MWT07-R.bin
Win-Situ V 4.523

Serial num 9022
Firmware \ 3.09
Unit name:

Test name: 08MWT07-R

Test define 6/7/2005 18:29:00
Test sched 6/7/2005 18:34:00
Test starte 6/7/2005 18:34:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 126

TOTAL DA 126

Channel number [1]
Measuren Temperature
Channel name:

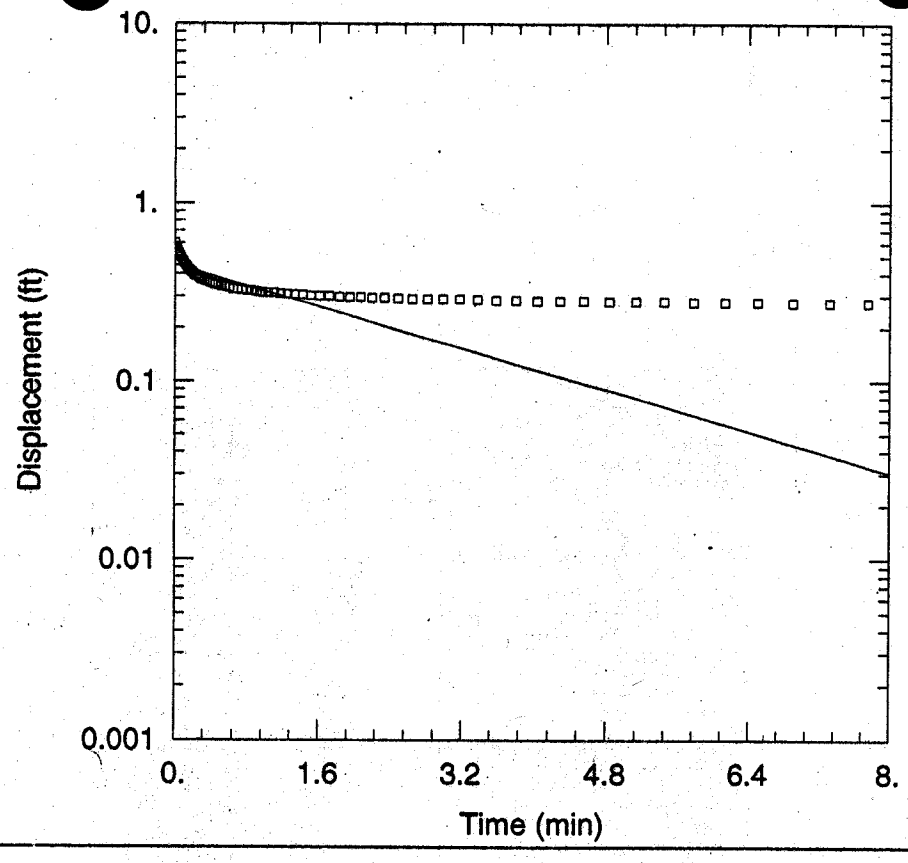
Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/7/2005	18:34:00	0	56.72	19.451		
6/7/2005	18:34:00	0.3	56.77	19.464		
6/7/2005	18:34:00	0.6	56.79	19.468		
6/7/2005	18:34:00	0.9	56.79	19.472		
6/7/2005	18:34:01	1.2	56.79	19.474		
6/7/2005	18:34:01	1.5	56.81	19.474		
6/7/2005	18:34:01	1.8	56.81	19.474		
6/7/2005	18:34:02	2.1	56.81	19.474		
6/7/2005	18:34:02	2.4	56.81	19.476		
6/7/2005	18:34:02	2.7	56.81	19.476		
6/7/2005	18:34:03	3	56.81	18.19		
6/7/2005	18:34:03	3.3	56.81	18.668		
6/7/2005	18:34:03	3.6	56.81	18.004		

6/7/2005	18:34:03	3.9	56.81	17.371	[redacted]	0.000 <t0
6/7/2005	18:34:04	4.2	56.81	17.73	1.721	0.005
6/7/2005	18:34:04	4.5	56.84	17.772	1.679	0.010
6/7/2005	18:34:04	4.8	56.84	17.875	1.576	0.015
6/7/2005	18:34:05	5.1	56.84	17.929	[redacted]	0.020
6/7/2005	18:34:05	5.4	56.84	18.007	1.444	0.025
6/7/2005	18:34:05	5.7	56.84	18.063	1.388	0.030
6/7/2005	18:34:06	6	56.84	18.11	1.341	0.035
6/7/2005	18:34:06	6.4	56.84	18.172	1.279	0.042
6/7/2005	18:34:06	6.7	56.84	18.22	1.231	0.047
6/7/2005	18:34:07	7.1	56.84	18.268	1.183	0.053
6/7/2005	18:34:07	7.5	56.84	18.315	[redacted]	0.060
6/7/2005	18:34:07	8	56.84	18.361	1.09	0.068
6/7/2005	18:34:08	8.4	56.84	18.401	1.05	0.075
6/7/2005	18:34:08	8.9	56.84	18.441	1.01	0.083
6/7/2005	18:34:09	9.5	56.84	18.479	0.972	0.093
6/7/2005	18:34:10	10	56.81	18.506	[redacted]	0.102
6/7/2005	18:34:10	10.6	56.81	18.538	0.913	0.112
6/7/2005	18:34:11	11.3	56.81	18.57	0.881	0.123
6/7/2005	18:34:11	11.9	56.79	18.6	0.851	0.133
6/7/2005	18:34:12	12.6	56.79	18.629	[redacted]	0.145
6/7/2005	18:34:13	13.4	56.79	18.663	0.788	0.158
6/7/2005	18:34:14	14.2	56.79	18.691	0.76	0.172
6/7/2005	18:34:15	15	56.79	18.717	[redacted]	0.185
6/7/2005	18:34:15	15.9	56.79	18.743	0.708	0.200
6/7/2005	18:34:16	16.8	56.79	18.767	0.684	0.215
6/7/2005	18:34:17	17.8	56.79	18.791	0.66	0.232
6/7/2005	18:34:18	18.9	56.79	18.817	0.634	0.250
6/7/2005	18:34:20	20	56.79	18.839	[redacted]	0.268
6/7/2005	18:34:21	21.2	56.79	18.862	0.589	0.288
6/7/2005	18:34:22	22.4	56.79	18.882	0.569	0.308
6/7/2005	18:34:23	23.8	56.79	18.902	0.549	0.332
6/7/2005	18:34:25	25.2	56.79	18.922	[redacted]	0.355
6/7/2005	18:34:26	26.7	56.79	18.94	0.511	0.380
6/7/2005	18:34:28	28.2	56.77	18.956	0.495	0.405
6/7/2005	18:34:29	29.8	56.79	18.974	[redacted]	0.432
6/7/2005	18:34:31	31.5	56.79	18.99	0.461	0.460
6/7/2005	18:34:33	33.3	56.77	19.005	0.446	0.490
6/7/2005	18:34:35	35.2	56.79	19.018	0.433	0.522
6/7/2005	18:34:37	37.3	56.77	19.035	0.416	0.557
6/7/2005	18:34:39	39.5	56.77	19.045	[redacted]	0.593
6/7/2005	18:34:41	41.8	56.77	19.055	0.396	0.632
6/7/2005	18:34:44	44.3	56.77	19.067	0.384	0.673
6/7/2005	18:34:46	46.9	56.77	19.081	0.37	0.717
6/7/2005	18:34:49	49.7	56.77	19.091	[redacted]	0.763
6/7/2005	18:34:52	52.6	56.77	19.107	0.344	0.812
6/7/2005	18:34:55	55.7	56.77	19.117	0.334	0.863
6/7/2005	18:34:58	59	56.77	19.127	[redacted]	0.918
6/7/2005	18:35:02	62.5	56.77	19.141	0.31	0.977
6/7/2005	18:35:06	66.2	56.77	19.149	0.302	1.038
6/7/2005	18:35:10	70.1	56.77	19.159	[redacted]	1.103
6/7/2005	18:35:14	74.3	56.77	19.169	0.282	1.173

6/7/2005	18:35:18	78.7	56.77	19.177	0.274	1.247
6/7/2005	18:35:23	83.4	56.74	19.188	0.263	1.325
6/7/2005	18:35:28	88.4	56.74	19.194	0.257	1.408
6/7/2005	18:35:33	93.7	56.74	19.202	0.249	1.497
6/7/2005	18:35:39	99.3	56.74	19.21	[redacted]	1.590
6/7/2005	18:35:45	105.2	56.74	19.216	0.235	1.688
6/7/2005	18:35:51	111.5	56.74	19.224	0.227	1.793
6/7/2005	18:35:58	118.1	56.74	19.232	0.219	1.903
6/7/2005	18:36:05	125.1	56.74	19.24	0.211	2.020
6/7/2005	18:36:12	132.6	56.74	19.246	0.205	2.145
6/7/2005	18:36:20	140.5	56.74	19.254	[redacted]	2.277
6/7/2005	18:36:28	148.9	56.72	19.262	0.189	2.417
6/7/2005	18:36:37	157.8	56.72	19.268	0.183	2.565
6/7/2005	18:36:47	167.2	56.72	19.274	0.177	2.722
6/7/2005	18:36:57	177.2	56.72	19.282	0.169	2.888
6/7/2005	18:37:07	187.8	56.72	19.29	0.161	3.065
6/7/2005	18:37:18	199	56.72	19.296	0.155	3.252
6/7/2005	18:37:30	210.9	56.72	19.302	0.149	3.450
6/7/2005	18:37:43	223.5	56.72	19.308	0.143	3.660
6/7/2005	18:37:56	236.8	56.7	19.315	0.136	3.882
6/7/2005	18:38:10	250.9	56.7	19.321	0.13	4.117
6/7/2005	18:38:25	265.8	56.7	19.327	0.124	4.365
6/7/2005	18:38:41	281.6	56.68	19.333	0.118	4.628
6/7/2005	18:38:58	298.4	56.68	19.337	0.114	4.908
6/7/2005	18:39:16	316.2	56.68	19.341	0.11	5.205
6/7/2005	18:39:34	335	56.65	19.348	0.103	5.518
6/7/2005	18:39:54	354.9	56.65	19.354	0.097	5.850
6/7/2005	18:40:15	376	56.63	19.36	0.091	6.202
6/7/2005	18:40:38	398.4	56.61	19.364	0.087	6.575
6/7/2005	18:41:02	422.1	56.59	19.369	0.082	6.970
6/7/2005	18:41:27	447.2	56.56	19.373	0.078	7.388
6/7/2005	18:41:53	473.8	56.52	19.378	0.073	7.832
6/7/2005	18:42:21	502	56.47	19.382	0.069	8.302
6/7/2005	18:42:51	531.9	56.43	19.385	0.066	8.800
6/7/2005	18:43:23	563.5	56.4	19.39	0.061	9.327
6/7/2005	18:43:56	597	56.4	19.392	0.059	9.885
6/7/2005	18:44:32	632.5	56.4	19.396	0.055	10.477
6/7/2005	18:45:10	670.1	56.43	19.399	0.052	11.103
6/7/2005	18:45:49	709.9	56.45	19.401	0.05	11.767
6/7/2005	18:46:32	752.1	56.43	19.403	0.048	12.470
6/7/2005	18:47:16	796.8	56.43	19.405	0.046	13.215
6/7/2005	18:48:04	844.2	56.43	19.407	0.044	14.005
6/7/2005	18:48:54	894.4	56.38	19.41	0.041	14.842
6/7/2005	18:49:47	947.5	56.38	19.412	0.039	15.727
6/7/2005	18:50:43	1003.8	56.38	19.412	0.039	16.665
6/7/2005	18:51:43	1063.4	56.36	19.414	0.037	17.658
6/7/2005	18:52:46	1126.6	56.34	19.417	0.034	18.712
6/7/2005	18:53:53	1193.5	56.34	19.419	0.032	19.827
6/7/2005	18:55:04	1264.4	56.34	19.421	0.03	21.008
6/7/2005	18:56:19	1339.5	56.34	19.421	0.03	22.260
6/7/2005	18:57:38	1419	56.34	19.421	0.03	23.585
6/7/2005	18:59:03	1503.3	56.34	19.421	0.03	24.990

6/7/2005	19:00:32	1592.6	56.34	19.423	0.028	26.478
6/7/2005	19:02:07	1687.1	56.34	19.425	0.026	28.053
6/7/2005	19:03:47	1787.2	56.34	19.425	0.026	29.722
6/7/2005	19:05:33	1893.3	56.36	19.426	0.025	31.490
6/7/2005	19:07:25	2005.7	56.36	19.426	0.025	33.363
6/7/2005	19:09:24	2124.7	56.36	19.426	0.025	35.347
6/7/2005	19:11:30	2250.8	56.36	19.428	0.023	37.448
6/7/2005	19:13:44	2384.4	56.36	19.428	0.023	39.675
6/7/2005	19:16:05	2525.9	56.36	19.434	0.017	42.033



SWMU 8 - 08MWT09 - RISING HEAD TEST

Data Set: H:\...\08MWT09-R_Hvorslev.aqt
Date: 07/12/05 Time: 13:14:53

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT09
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 1.746 ft/day
y0 = 0.4498 ft

AQUIFER DATA

Saturated Thickness: 13.44 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT09)

Initial Displacement: 0.599 ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 13.44 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT09

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 15' / 17.60' TOS TEST NO.: 08MWT09-R

STATIC WATER LEVEL (Depth/Elevation): 19.16' / DATE: 6-7-05

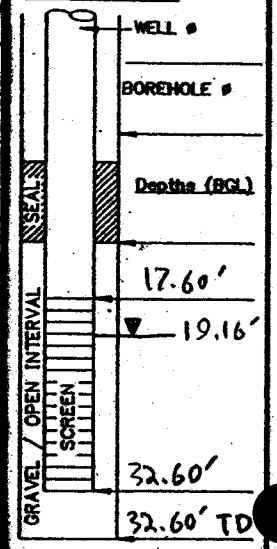
TEST TYPE (Rising/Falling/Constant Head): rising CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 1' solid slug PAGE 1 OF 1

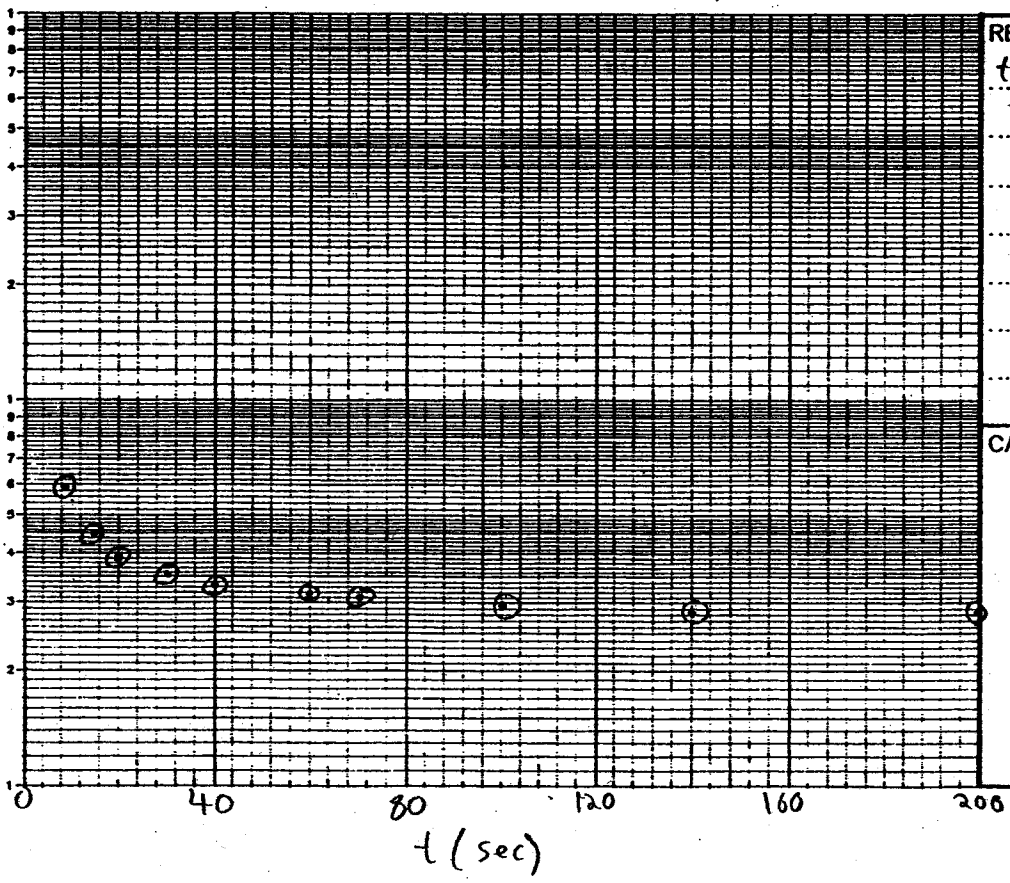
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
8.4		0.591	99.3		0.295
10		0.543	140.5		0.286
12.6		0.486	199		0.281
15		0.448	398.4		0.27
17.8		0.416	796.8		0.263
20		0.398			
25.2		0.37			
29.8		0.357			
39.5		0.336			
49.7		0.323			
59		0.316			
70.1		0.307			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 31.60'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:15:55
Report fror ...\SN00936 2005-06-07 165300 08MWT09-R.bin
Win-Situ V 4.523

Serial num 936
Firmware \ 3.09
Unit name:

Test name: 08MWT09-R

Test define 6/7/2005 16:43:20
Test sched 6/7/2005 16:53:00
Test starte 6/7/2005 16:53:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 149

TOTAL DA 149

Channel number [1]
Measuren Temperature
Channel name:

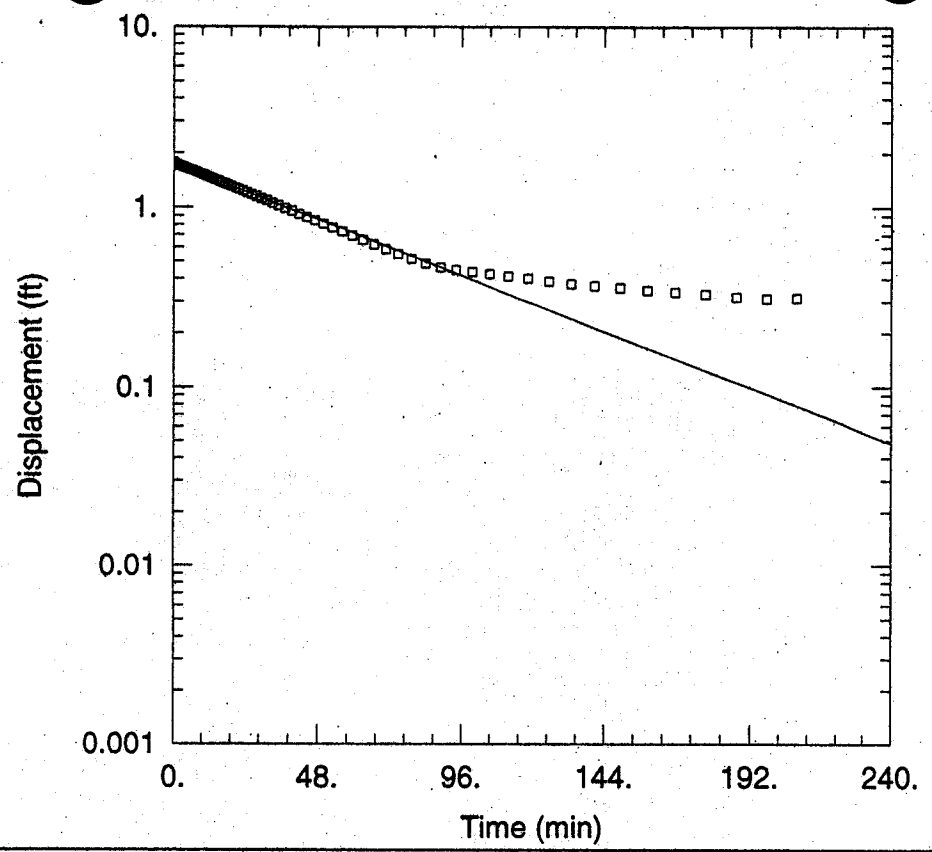
Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/7/2005	16:53:00	0	55.24	10.111		
6/7/2005	16:53:00	0.3	55.29	10.115		
6/7/2005	16:53:00	0.6	55.31	10.114		
6/7/2005	16:53:00	0.9	55.31	10.119		
6/7/2005	16:53:01	1.2	55.31	10.121		
6/7/2005	16:53:01	1.5	55.33	10.118		
6/7/2005	16:53:01	1.8	55.33	10.116		
6/7/2005	16:53:02	2.1	55.33	9.955		
6/7/2005	16:53:02	2.4	55.33	9.93		
6/7/2005	16:53:02	2.7	55.35	9.966		
6/7/2005	16:53:03	3	55.35	9.645		
6/7/2005	16:53:03	3.3	55.35	9.468		
6/7/2005	16:53:03	3.6	55.35	9.455		

6/7/2005	16:53:03	3.9	55.35	9.335		
6/7/2005	16:53:04	4.2	55.35	9.382		
6/7/2005	16:53:04	4.5	55.35	9.425		
6/7/2005	16:53:04	4.8	55.35	9.366		
6/7/2005	16:53:05	5.1	55.35	9.416		
6/7/2005	16:53:05	5.4	55.35	9.446		
6/7/2005	16:53:05	5.7	55.35	9.409		
6/7/2005	16:53:06	6	55.35	9.45		
6/7/2005	16:53:06	6.4	55.38	9.468		
6/7/2005	16:53:06	6.7	55.38	9.459		
6/7/2005	16:53:07	7.1	55.38	9.499		
6/7/2005	16:53:07	7.5	55.38	9.488		
6/7/2005	16:53:07	8	55.38	9.527		
6/7/2005	16:53:08	8.4	55.38	9.52		0.000 <t0
6/7/2005	16:53:08	8.9	55.38	9.549	0.562	0.008
6/7/2005	16:53:09	9.5	55.38	9.556	0.555	0.018
6/7/2005	16:53:10	10	55.35	9.568		0.027
6/7/2005	16:53:10	10.6	55.35	9.586	0.525	0.037
6/7/2005	16:53:11	11.3	55.33	9.595	0.516	0.048
6/7/2005	16:53:11	11.9	55.33	9.609	0.502	0.058
6/7/2005	16:53:12	12.6	55.33	9.625		0.070
6/7/2005	16:53:13	13.4	55.33	9.638	0.473	0.083
6/7/2005	16:53:14	14.2	55.33	9.652	0.459	0.097
6/7/2005	16:53:15	15	55.33	9.663		0.110
6/7/2005	16:53:15	15.9	55.33	9.675	0.436	0.125
6/7/2005	16:53:16	16.8	55.33	9.686	0.425	0.140
6/7/2005	16:53:17	17.8	55.33	9.695		0.157
6/7/2005	16:53:18	18.9	55.31	9.704	0.407	0.175
6/7/2005	16:53:20	20	55.31	9.713		0.193
6/7/2005	16:53:21	21.2	55.31	9.723	0.388	0.213
6/7/2005	16:53:22	22.4	55.31	9.727	0.384	0.233
6/7/2005	16:53:23	23.8	55.31	9.734	0.377	0.257
6/7/2005	16:53:25	25.2	55.31	9.741		0.280
6/7/2005	16:53:26	26.7	55.31	9.745	0.366	0.305
6/7/2005	16:53:28	28.2	55.31	9.75	0.361	0.330
6/7/2005	16:53:29	29.8	55.31	9.754		0.357
6/7/2005	16:53:31	31.5	55.31	9.759	0.352	0.385
6/7/2005	16:53:33	33.3	55.31	9.763	0.348	0.415
6/7/2005	16:53:35	35.2	55.31	9.768	0.343	0.447
6/7/2005	16:53:37	37.3	55.31	9.77	0.341	0.482
6/7/2005	16:53:39	39.5	55.31	9.775		0.518
6/7/2005	16:53:41	41.8	55.31	9.777	0.334	0.557
6/7/2005	16:53:44	44.3	55.31	9.781	0.33	0.598
6/7/2005	16:53:46	46.9	55.31	9.788	0.323	0.642
6/7/2005	16:53:49	49.7	55.31	9.788		0.688
6/7/2005	16:53:52	52.6	55.29	9.791	0.32	0.737
6/7/2005	16:53:55	55.7	55.29	9.793	0.318	0.788
6/7/2005	16:53:58	59	55.29	9.795		0.843
6/7/2005	16:54:02	62.5	55.29	9.798	0.313	0.902
6/7/2005	16:54:06	66.2	55.29	9.802	0.309	0.963
6/7/2005	16:54:10	70.1	55.29	9.804		1.028
6/7/2005	16:54:14	74.3	55.29	9.804	0.307	1.098

6/7/2005	16:54:18	78.7	55.29	9.807	0.304	1.172
6/7/2005	16:54:23	83.4	55.29	9.809	0.302	1.250
6/7/2005	16:54:28	88.4	55.29	9.811	0.3	1.333
6/7/2005	16:54:33	93.7	55.29	9.813	0.298	1.422
6/7/2005	16:54:39	99.3	55.26	9.816	[redacted]	1.515
6/7/2005	16:54:45	105.2	55.26	9.818	0.293	1.613
6/7/2005	16:54:51	111.5	55.26	9.818	0.293	1.718
6/7/2005	16:54:58	118.1	55.26	9.821	0.29	1.828
6/7/2005	16:55:05	125.1	55.26	9.823	0.288	1.945
6/7/2005	16:55:12	132.6	55.26	9.823	0.288	2.070
6/7/2005	16:55:20	140.5	55.26	9.825	[redacted]	2.202
6/7/2005	16:55:28	148.9	55.26	9.825	0.286	2.342
6/7/2005	16:55:37	157.8	55.26	9.827	0.284	2.490
6/7/2005	16:55:47	167.2	55.26	9.83	0.281	2.647
6/7/2005	16:55:57	177.2	55.26	9.83	0.281	2.813
6/7/2005	16:56:07	187.8	55.26	9.83	0.281	2.990
6/7/2005	16:56:18	199	55.26	9.83	[redacted]	3.177
6/7/2005	16:56:30	210.9	55.26	9.832	0.279	3.375
6/7/2005	16:56:43	223.5	55.26	9.834	0.277	3.585
6/7/2005	16:56:56	236.8	55.26	9.834	0.277	3.807
6/7/2005	16:57:10	250.9	55.26	9.837	0.274	4.042
6/7/2005	16:57:25	265.8	55.24	9.837	0.274	4.290
6/7/2005	16:57:41	281.6	55.26	9.837	0.274	4.553
6/7/2005	16:57:58	298.4	55.24	9.839	[redacted]	4.833
6/7/2005	16:58:16	316.2	55.24	9.839	0.272	5.130
6/7/2005	16:58:34	335	55.26	9.839	0.272	5.443
6/7/2005	16:58:54	354.9	55.24	9.841	0.27	5.775
6/7/2005	16:59:15	376	55.24	9.841	0.27	6.127
6/7/2005	16:59:38	398.4	55.24	9.841	[redacted]	6.500
6/7/2005	17:00:02	422.1	55.24	9.844	0.267	6.895
6/7/2005	17:00:27	447.2	55.24	9.844	0.267	7.313
6/7/2005	17:00:53	473.8	55.24	9.844	0.267	7.757
6/7/2005	17:01:21	502	55.24	9.844	0.267	8.227
6/7/2005	17:01:51	531.9	55.24	9.844	0.267	8.725
6/7/2005	17:02:23	563.5	55.24	9.846	0.265	9.252
6/7/2005	17:02:56	597	55.24	9.846	[redacted]	9.810
6/7/2005	17:03:32	632.5	55.24	9.846	0.265	10.402
6/7/2005	17:04:10	670.1	55.24	9.846	0.265	11.028
6/7/2005	17:04:49	709.9	55.24	9.846	0.265	11.692
6/7/2005	17:05:32	752.1	55.24	9.846	0.265	12.395
6/7/2005	17:06:16	796.8	55.24	9.848	[redacted]	13.140
6/7/2005	17:07:04	844.2	55.24	9.848	0.263	13.930
6/7/2005	17:07:54	894.4	55.24	9.848	0.263	14.767
6/7/2005	17:08:47	947.5	55.24	9.848	0.263	15.652
6/7/2005	17:09:43	1003.8	55.24	9.848	[redacted]	16.590
6/7/2005	17:10:43	1063.4	55.24	9.846	0.265	17.583
6/7/2005	17:11:46	1126.6	55.24	9.846	0.265	18.637
6/7/2005	17:12:53	1193.5	55.24	9.846		
6/7/2005	17:14:04	1264.4	55.22	9.846		
6/7/2005	17:15:19	1339.5	55.22	9.846		
6/7/2005	17:16:38	1419	55.22	9.846		
6/7/2005	17:18:03	1503.3	55.22	9.846		

6/7/2005	17:19:32	1592.6	55.22	9.846
6/7/2005	17:21:07	1687.1	55.22	9.846
6/7/2005	17:22:47	1787.2	55.22	9.844
6/7/2005	17:24:33	1893.3	55.22	9.844
6/7/2005	17:26:25	2005.7	55.22	9.844
6/7/2005	17:28:24	2124.7	55.22	9.842
6/7/2005	17:30:30	2250.8	55.22	9.844
6/7/2005	17:32:44	2384.4	55.24	9.841
6/7/2005	17:35:05	2525.9	55.24	9.841
6/7/2005	17:37:35	2675.8	55.24	9.839
6/7/2005	17:40:14	2834.6	55.24	9.837
6/7/2005	17:43:02	3002.8	55.24	9.837
6/7/2005	17:46:00	3180.9	55.24	9.835
6/7/2005	17:49:09	3369.6	55.24	9.832
6/7/2005	17:52:29	3569.5	55.24	9.832
6/7/2005	17:56:01	3781.2	55.24	9.83
6/7/2005	17:59:45	4005.5	55.26	9.832
6/7/2005	18:03:43	4243.1	55.26	9.83
6/7/2005	18:07:54	4494.7	55.26	9.825
6/7/2005	18:12:21	4761.3	55.26	9.823
6/7/2005	18:17:03	5043.7	55.26	9.818
6/7/2005	18:22:02	5342.8	55.26	9.816
6/7/2005	18:27:19	5659.6	55.26	9.812
6/7/2005	18:32:55	5995.2	55.24	9.81
6/7/2005	18:38:50	6350.7	55.24	9.805
6/7/2005	18:45:07	6727.2	55.24	9.798
6/7/2005	18:51:46	7126.1	55.26	9.796
6/7/2005	18:58:48	7548.6	55.24	9.789
6/7/2005	19:06:16	7996.1	55.26	9.784
6/7/2005	19:14:10	8470.1	55.24	9.778
6/7/2005	19:22:32	8972.2	55.24	9.771
6/7/2005	19:31:24	9504.1	55.24	9.762



SWMU 8 - 08MWT11 - FALLING HEAD TEST

Data Set: H:\...\08MWT11-F_Hvorslev.aqt
Date: 07/12/05 Time: 12:55:30

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT11
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.07756 ft/day
y0 = 1.752 ft

AQUIFER DATA

Saturated Thickness: 23.12 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT11)

Initial Displacement: 1.778 ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 23.12 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT11

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 15'/17.81' TOS TEST NO.: 08MWT11-F

STATIC WATER LEVEL (Depth/Elevation): 9.69' / DATE: 6-7-05

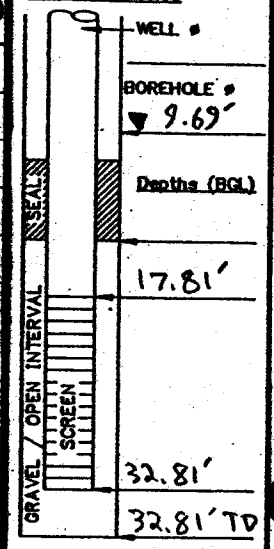
TEST TYPE (Rising/Falling/Constant Head): falling CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 1 OF 2

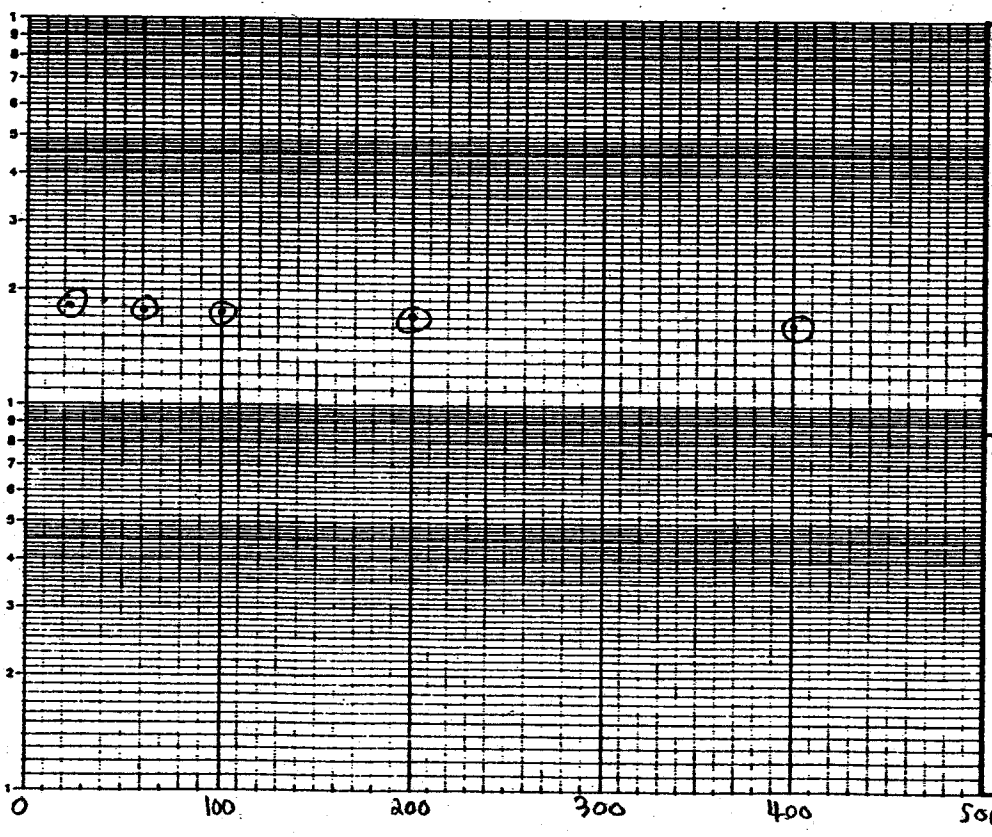
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
22.4		1.81	2005.7		1.088
25.2		1.8	3002.8		0.839
29.8		1.796	4005.5		0.654
35.2		1.79	5995.2		0.469
39.5		1.788	11864.3		0.344
49.7		1.78			
59		1.776			
99.3		1.756			
199		1.712			
398.4		1.638			
597		1.556			
1193.5		1.337			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 31.81'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:18:01
Report fror ...\SN09022 2005-06-07 093700 08MWT11-F.bin
Win-Situ V 4.523

Serial num 9022
Firmware \ 3.09
Unit name:

Test name: Test #3

Test define 6/7/2005 9:31:18
Test sched 6/7/2005 9:37:00
Test starte 6/7/2005 9:37:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 154

TOTAL DA 154

Channel number [1]
Measuren Temperature
Channel name:

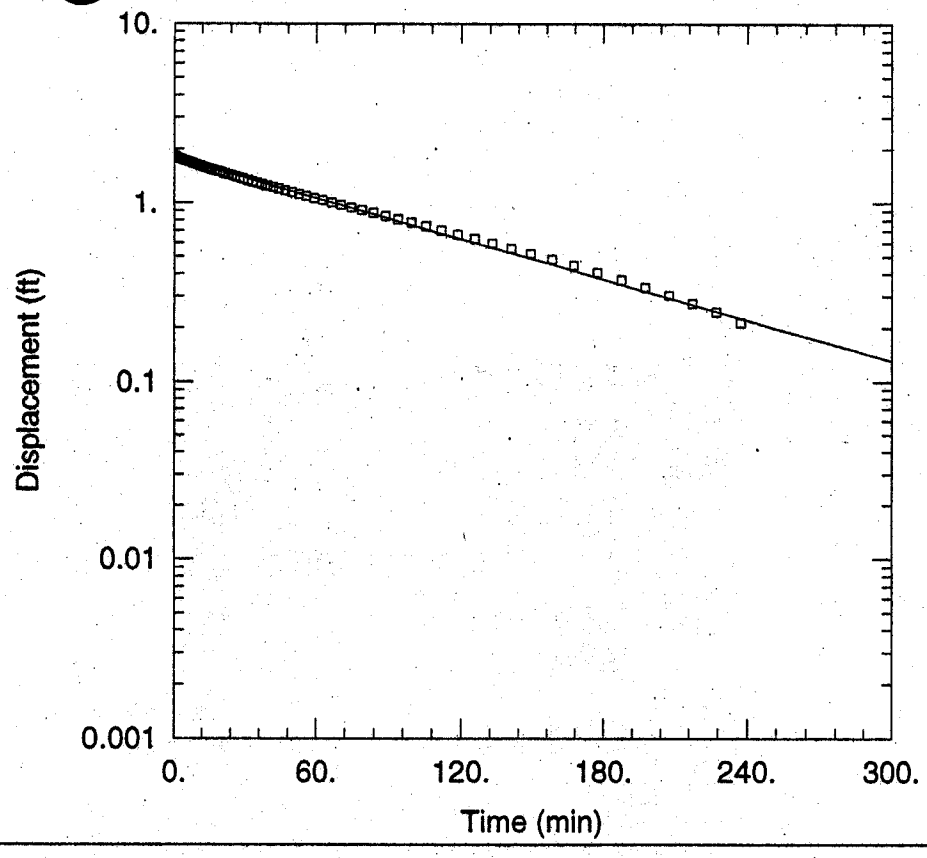
Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	H	adjusted ET (min)
6/7/2005	9:37:00	0	55.13	22.602		
6/7/2005	9:37:00	0.3	55.18	22.619		
6/7/2005	9:37:00	0.6	55.2	22.625		
6/7/2005	9:37:00	0.9	55.2	22.627		
6/7/2005	9:37:01	1.2	55.2	22.629		
6/7/2005	9:37:01	1.5	55.2	22.631		
6/7/2005	9:37:01	1.8	55.22	22.63		
6/7/2005	9:37:02	2.1	55.22	22.63		
6/7/2005	9:37:02	2.4	55.22	22.632		
6/7/2005	9:37:02	2.7	55.22	22.632		
6/7/2005	9:37:03	3	55.22	22.632		
6/7/2005	9:37:03	3.3	55.22	22.634		
6/7/2005	9:37:03	3.6	55.22	22.634		

6/7/2005	9:37:03	3.9	55.22	22.634		
6/7/2005	9:37:04	4.2	55.25	22.634		
6/7/2005	9:37:04	4.5	55.22	22.634		
6/7/2005	9:37:04	4.8	55.25	22.634		
6/7/2005	9:37:05	5.1	55.25	22.634		
6/7/2005	9:37:05	5.4	55.25	22.634		
6/7/2005	9:37:05	5.7	55.25	22.636		
6/7/2005	9:37:06	6	55.25	22.636		
6/7/2005	9:37:06	6.4	55.25	22.634		
6/7/2005	9:37:06	6.7	55.25	22.634		
6/7/2005	9:37:07	7.1	55.25	22.612		
6/7/2005	9:37:07	7.5	55.25	22.596		
6/7/2005	9:37:07	8	55.25	22.63		
6/7/2005	9:37:08	8.4	55.25	22.586		
6/7/2005	9:37:08	8.9	55.25	22.642		
6/7/2005	9:37:09	9.5	55.25	22.612		
6/7/2005	9:37:10	10	55.22	23.867		
6/7/2005	9:37:10	10.6	55.2	24.799		
6/7/2005	9:37:11	11.3	55.2	25.267		
6/7/2005	9:37:11	11.9	55.2	24.924		
6/7/2005	9:37:12	12.6	55.2	24.514		
6/7/2005	9:37:13	13.4	55.2	24.211		
6/7/2005	9:37:14	14.2	55.2	24.466		
6/7/2005	9:37:15	15	55.2	24.416		
6/7/2005	9:37:15	15.9	55.2	24.351		
6/7/2005	9:37:16	16.8	55.2	24.472		
6/7/2005	9:37:17	17.8	55.2	24.436		
6/7/2005	9:37:18	18.9	55.18	24.406		
6/7/2005	9:37:20	20	55.18	24.372		
6/7/2005	9:37:21	21.2	55.18	24.41		
6/7/2005	9:37:22	22.4	55.18	24.412	[redacted]	0.000 <t0
6/7/2005	9:37:23	23.8	55.18	24.408	-1.806	0.023
6/7/2005	9:37:25	25.2	55.18	24.402	[redacted]	0.047
6/7/2005	9:37:26	26.7	55.18	24.4	-1.798	0.072
6/7/2005	9:37:28	28.2	55.18	24.398	-1.796	0.097
6/7/2005	9:37:29	29.8	55.18	24.398	[redacted]	0.123
6/7/2005	9:37:31	31.5	55.18	24.396	-1.794	0.152
6/7/2005	9:37:33	33.3	55.18	24.396	-1.794	0.182
6/7/2005	9:37:35	35.2	55.18	24.392	[redacted]	0.213
6/7/2005	9:37:37	37.3	55.18	24.392	-1.79	0.248
6/7/2005	9:37:39	39.5	55.18	24.39	[redacted]	0.285
6/7/2005	9:37:41	41.8	55.18	24.388	-1.786	0.323
6/7/2005	9:37:44	44.3	55.18	24.386	-1.784	0.365
6/7/2005	9:37:46	46.9	55.18	24.384	-1.782	0.408
6/7/2005	9:37:49	49.7	55.18	24.382	[redacted]	0.455
6/7/2005	9:37:52	52.6	55.18	24.382	-1.78	0.503
6/7/2005	9:37:55	55.7	55.16	24.38	-1.778	0.555
6/7/2005	9:37:58	59	55.16	24.378	[redacted]	0.610
6/7/2005	9:38:02	62.5	55.16	24.376	-1.774	0.668
6/7/2005	9:38:06	66.2	55.16	24.374	-1.772	0.730
6/7/2005	9:38:10	70.1	55.16	24.374	[redacted]	0.795
6/7/2005	9:38:14	74.3	55.16	24.37	-1.768	0.865

6/7/2005	9:38:18	78.7	55.16	24.366	-1.764	0.938
6/7/2005	9:38:23	83.4	55.16	24.366	-1.764	1.017
6/7/2005	9:38:28	88.4	55.16	24.364	-1.762	1.100
6/7/2005	9:38:33	93.7	55.16	24.36	-1.758	1.188
6/7/2005	9:38:39	99.3	55.16	24.358	[redacted]	1.282
6/7/2005	9:38:45	105.2	55.16	24.354	-1.752	1.380
6/7/2005	9:38:51	111.5	55.16	24.352	-1.75	1.485
6/7/2005	9:38:58	118.1	55.16	24.35	-1.748	1.595
6/7/2005	9:39:05	125.1	55.16	24.346	-1.744	1.712
6/7/2005	9:39:12	132.6	55.13	24.344	-1.742	1.837
6/7/2005	9:39:20	140.5	55.13	24.34	-1.738	1.968
6/7/2005	9:39:28	148.9	55.13	24.336	[redacted]	2.108
6/7/2005	9:39:37	157.8	55.13	24.332	-1.73	2.257
6/7/2005	9:39:47	167.2	55.13	24.328	-1.726	2.413
6/7/2005	9:39:57	177.2	55.13	24.322	-1.72	2.580
6/7/2005	9:40:07	187.8	55.13	24.32	-1.718	2.757
6/7/2005	9:40:18	199	55.13	24.314	[redacted]	2.943
6/7/2005	9:40:30	210.9	55.13	24.31	-1.708	3.142
6/7/2005	9:40:43	223.5	55.13	24.304	-1.702	3.352
6/7/2005	9:40:56	236.8	55.13	24.298	-1.696	3.573
6/7/2005	9:41:10	250.9	55.13	24.294	-1.692	3.808
6/7/2005	9:41:25	265.8	55.13	24.288	-1.686	4.057
6/7/2005	9:41:41	281.6	55.13	24.282	-1.68	4.320
6/7/2005	9:41:58	298.4	55.13	24.276	[redacted]	4.600
6/7/2005	9:42:16	316.2	55.13	24.268	-1.666	4.897
6/7/2005	9:42:34	335	55.13	24.262	-1.66	5.210
6/7/2005	9:42:54	354.9	55.13	24.256	-1.654	5.542
6/7/2005	9:43:15	376	55.13	24.248	-1.646	5.893
6/7/2005	9:43:38	398.4	55.13	24.24	[redacted]	6.267
6/7/2005	9:44:02	422.1	55.13	24.23	-1.628	6.662
6/7/2005	9:44:27	447.2	55.13	24.218	-1.616	7.080
6/7/2005	9:44:53	473.8	55.13	24.208	-1.606	7.523
6/7/2005	9:45:21	502	55.13	24.196	-1.594	7.993
6/7/2005	9:45:51	531.9	55.13	24.184	-1.582	8.492
6/7/2005	9:46:23	563.5	55.13	24.172	-1.57	9.018
6/7/2005	9:46:56	597	55.13	24.158	[redacted]	9.577
6/7/2005	9:47:32	632.5	55.13	24.146	-1.544	10.168
6/7/2005	9:48:10	670.1	55.13	24.13	-1.528	10.795
6/7/2005	9:48:49	709.9	55.13	24.114	-1.512	11.458
6/7/2005	9:49:32	752.1	55.13	24.098	-1.496	12.162
6/7/2005	9:50:16	796.8	55.13	24.079	-1.477	12.907
6/7/2005	9:51:04	844.2	55.13	24.061	-1.459	13.697
6/7/2005	9:51:54	894.4	55.13	24.043	[redacted]	14.533
6/7/2005	9:52:47	947.5	55.13	24.025	-1.423	15.418
6/7/2005	9:53:43	1003.8	55.13	24.005	-1.403	16.357
6/7/2005	9:54:43	1063.4	55.13	23.985	-1.383	17.350
6/7/2005	9:55:46	1126.6	55.13	23.963	-1.361	18.403
6/7/2005	9:56:53	1193.5	55.13	23.939	[redacted]	19.518
6/7/2005	9:58:04	1264.4	55.16	23.914	-1.312	20.700
6/7/2005	9:59:19	1339.5	55.16	23.89	-1.288	21.952
6/7/2005	10:00:38	1419	55.16	23.864	-1.262	23.277
6/7/2005	10:02:03	1503.3	55.16	23.838	[redacted]	24.682

6/7/2005	10:03:32	1592.6	55.16	23.812	-1.21	26.170
6/7/2005	10:05:07	1687.1	55.16	23.782	-1.18	27.745
6/7/2005	10:06:47	1787.2	55.16	23.752	-1.15	29.413
6/7/2005	10:08:33	1893.3	55.16	23.724	-1.122	31.182
6/7/2005	10:10:25	2005.7	55.16	23.69	[redacted]	33.055
6/7/2005	10:12:24	2124.7	55.16	23.658	-1.056	35.038
6/7/2005	10:14:30	2250.8	55.16	23.623	-1.021	37.140
6/7/2005	10:16:44	2384.4	55.16	23.589	-0.987	39.367
6/7/2005	10:19:05	2525.9	55.16	23.551	-0.949	41.725
6/7/2005	10:21:35	2675.8	55.16	23.515	-0.913	44.223
6/7/2005	10:24:14	2834.6	55.16	23.479	-0.877	46.870
6/7/2005	10:27:02	3002.8	55.16	23.441	[redacted]	49.673
6/7/2005	10:30:00	3180.9	55.16	23.403	-0.801	52.642
6/7/2005	10:33:09	3369.6	55.16	23.366	-0.764	55.787
6/7/2005	10:36:29	3569.5	55.18	23.328	-0.726	59.118
6/7/2005	10:40:01	3781.2	55.16	23.292	-0.69	62.647
6/7/2005	10:43:45	4005.5	55.18	23.256	[redacted]	66.385
6/7/2005	10:47:43	4243.1	55.18	23.219	-0.617	70.345
6/7/2005	10:51:54	4494.7	55.16	23.184	-0.582	74.538
6/7/2005	10:56:21	4761.3	55.18	23.151	-0.549	78.982
6/7/2005	11:01:03	5043.7	55.18	23.121	-0.519	83.688
6/7/2005	11:06:02	5342.8	55.18	23.097	-0.495	88.673
6/7/2005	11:11:19	5659.6	55.18	23.083	-0.481	93.953
6/7/2005	11:16:55	5995.2	55.18	23.071	[redacted]	99.547
6/7/2005	11:22:50	6350.7	55.18	23.059	-0.457	105.472
6/7/2005	11:29:07	6727.2	55.18	23.047	-0.445	111.747
6/7/2005	11:35:46	7126.1	55.18	23.035	-0.433	118.395
6/7/2005	11:42:48	7548.6	55.18	23.021	-0.419	125.437
6/7/2005	11:50:16	7996.1	55.18	23.009	-0.407	132.895
6/7/2005	11:58:10	8470.1	55.18	22.999	-0.397	140.795
6/7/2005	12:06:32	8972.2	55.18	22.991	[redacted]	149.163
6/7/2005	12:15:24	9504.1	55.18	22.979	-0.377	158.028
6/7/2005	12:24:47	10067.5	55.2	22.972	-0.37	167.418
6/7/2005	12:34:44	10664.3	55.2	22.964	-0.362	177.365
6/7/2005	12:44:44	11264.3	55.2	22.952	-0.35	187.365
6/7/2005	12:54:44	11864.3	55.2	22.946	[redacted]	197.365
6/7/2005	13:04:44	12464.3	55.2	22.948	-0.346	207.365



SWMU 8 - 08MWT11 - RISING HEAD TEST

Data Set: H:\...\08MWT11-R_Hvorslev.aqt
Date: 07/12/05 Time: 12:55:39

PROJECT INFORMATION

Company: Tetra Tech NUS, Inc.
Client: Navy - CRANE
Project: N1245
Test Location: NSWC CRANE - Indiana
Test Well: 08MWT11
Test Date: 6-6-2005

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.04537 ft/day
y0 = 1.798 ft

AQUIFER DATA

Saturated Thickness: 23.12 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (08MWT11)

Initial Displacement: 1.837 ft
Wellbore Radius: 0.25 ft
Screen Length: 15. ft
Gravel Pack Porosity: 0.35

Casing Radius: 0.08333 ft
Well Skin Radius: 0.25 ft
Total Well Penetration Depth: 23.12 ft

HYDRAULIC CONDUCTIVITY TESTING DATA SHEET

PROJECT NAME: SWMU 8 WELL/BORING NO.: 08MWT11

PROJECT NO.: N1245 GEOLOGIST: C. Doolan

WELL DIAMETER: 2" SCREEN LENGTH/DEPTH: 15'/17.81' TOS TEST NO.: 08MWT11-R

STATIC WATER LEVEL (Depth/Elevation): 9.69'/ DATE: 6-7-05

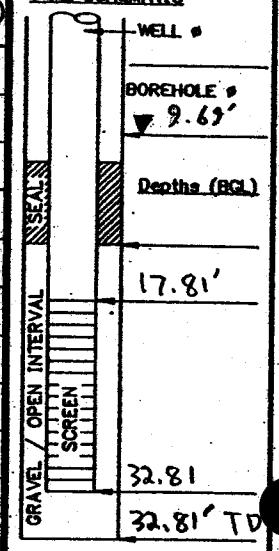
TEST TYPE (Rising/Falling/Constant Head): rising CHECKED:

METHOD OF INDUCING WATER LEVEL CHANGE: 2' solid slug PAGE 2 OF 2

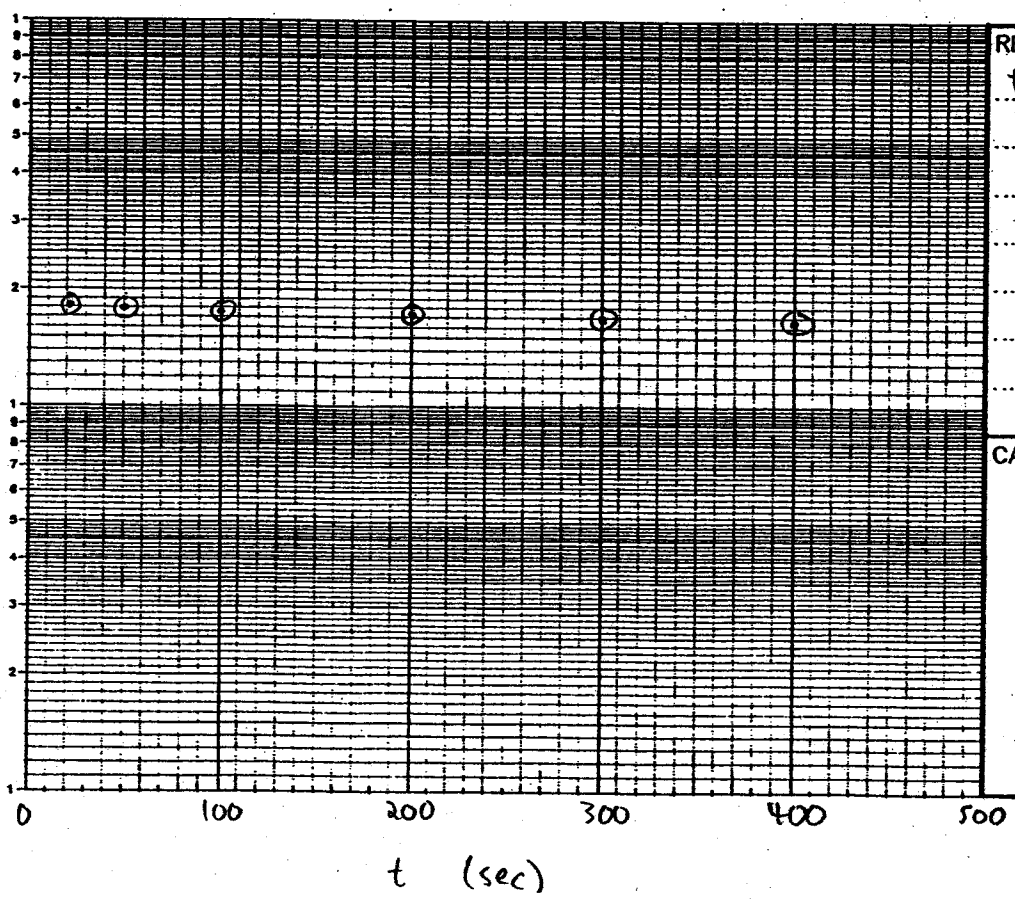
REFERENCE PT. FOR WL MEAS. (Top of Casing, Transducer, etc.): TOC

ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)	ELAPSED TIME (min. or sec.)	MEASURED WATER LEVEL (feet)	DRAWDOWN OR HEAD (ΔH) (feet)
21.2		1.814	5995.2		0.752
25.2		1.808	10067.5		0.422
29.8		1.804	13064.3		0.25
39.5		1.798			
49.7		1.79			
70.1		1.779			
99.3		1.767			
199		1.731			
298.4		1.697			
398.4		1.665			
1592.6		1.375			
3002.8		1.125			

WELL SCHEMATIC



▽ Indicate SWL Depth on Drawing



REMARKS:
transducer set at 31.81'

CALCS, SKETCH MAPS, ETC.:

In-Situ Inc. MiniTroll Pro

Report gen 6/13/2005 11:18:37
Report fror ...\SN09022 2005-06-07 131600 08MWT11-R.bin
Win-Situ V 4.523

Serial num 9022
Firmware \ 3.09
Unit name:

Test name: 08MWT11-R

Test define 6/7/2005 13:10:58
Test sched 6/7/2005 13:16:00
Test starte 6/7/2005 13:16:00
Test stopp N/A N/A

Data gathered using Logarithmic testing
Maximun Seconds.
Number 157

TOTAL DA 157

Channel number [1]
Measuren Temperature
Channel name:

Channel number [2]
Measuren Pressure
Channel name:
Sensor R 30 PSIG.
Specific g 1

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O H	adjusted ET (min)
6/7/2005	13:16:00	0	55.2	22.976	
6/7/2005	13:16:00	0.3	55.25	22.994	
6/7/2005	13:16:00	0.6	55.27	22.999	
6/7/2005	13:16:00	0.9	55.27	23.001	
6/7/2005	13:16:01	1.2	55.29	22.999	
6/7/2005	13:16:01	1.5	55.29	22.011	
6/7/2005	13:16:01	1.8	55.29	19.95	
6/7/2005	13:16:02	2.1	55.29	20.86	
6/7/2005	13:16:02	2.4	55.29	22.005	
6/7/2005	13:16:02	2.7	55.29	20.203	
6/7/2005	13:16:03	3	55.29	20.603	
6/7/2005	13:16:03	3.3	55.29	21.876	
6/7/2005	13:16:03	3.6	55.29	20.782	

6/7/2005	13:16:03	3.9	55.31	20.5		
6/7/2005	13:16:04	4.2	55.31	21.621		
6/7/2005	13:16:04	4.5	55.31	21.175		
6/7/2005	13:16:04	4.8	55.31	20.573		
6/7/2005	13:16:05	5.1	55.31	21.334		
6/7/2005	13:16:05	5.4	55.31	21.37		
6/7/2005	13:16:05	5.7	55.31	20.739		
6/7/2005	13:16:06	6	55.31	21.123		
6/7/2005	13:16:06	6.4	55.31	21.348		
6/7/2005	13:16:06	6.7	55.31	20.848		
6/7/2005	13:16:07	7.1	55.31	21.316		
6/7/2005	13:16:07	7.5	55.31	21.041		
6/7/2005	13:16:07	8	55.31	21.163		
6/7/2005	13:16:08	8.4	55.31	21.147		
6/7/2005	13:16:08	8.9	55.31	21.159		
6/7/2005	13:16:09	9.5	55.34	21.121		
6/7/2005	13:16:10	10	55.29	21.212		
6/7/2005	13:16:10	10.6	55.29	21.075		
6/7/2005	13:16:11	11.3	55.27	21.192		
6/7/2005	13:16:11	11.9	55.27	21.168		
6/7/2005	13:16:12	12.6	55.27	21.116		
6/7/2005	13:16:13	13.4	55.27	21.15		
6/7/2005	13:16:14	14.2	55.27	21.174		
6/7/2005	13:16:15	15	55.27	21.174		
6/7/2005	13:16:15	15.9	55.27	21.168		
6/7/2005	13:16:16	16.8	55.27	21.164		
6/7/2005	13:16:17	17.8	55.27	21.166		
6/7/2005	13:16:18	18.9	55.27	21.166		
6/7/2005	13:16:20	20	55.27	21.166		
6/7/2005	13:16:21	21.2	55.25	21.162	[redacted]	0.000 <t0
6/7/2005	13:16:22	22.4	55.27	21.164	1.812	0.020
6/7/2005	13:16:23	23.8	55.25	21.168	1.808	0.043
6/7/2005	13:16:25	25.2	55.25	21.168	[redacted]	0.067
6/7/2005	13:16:26	26.7	55.25	21.17	1.806	0.092
6/7/2005	13:16:28	28.2	55.25	21.17	1.806	0.117
6/7/2005	13:16:29	29.8	55.25	21.172	[redacted]	0.143
6/7/2005	13:16:31	31.5	55.25	21.172	1.804	0.172
6/7/2005	13:16:33	33.3	55.25	21.172	1.804	0.202
6/7/2005	13:16:35	35.2	55.25	21.176	1.8	0.233
6/7/2005	13:16:37	37.3	55.25	21.176	1.8	0.268
6/7/2005	13:16:39	39.5	55.25	21.178	[redacted]	0.305
6/7/2005	13:16:41	41.8	55.25	21.18	1.796	0.343
6/7/2005	13:16:44	44.3	55.25	21.182	1.794	0.385
6/7/2005	13:16:46	46.9	55.25	21.184	1.792	0.428
6/7/2005	13:16:49	49.7	55.25	21.186	[redacted]	0.475
6/7/2005	13:16:52	52.6	55.25	21.186	1.79	0.523
6/7/2005	13:16:55	55.7	55.25	21.188	1.788	0.575
6/7/2005	13:16:58	59	55.25	21.19	1.786	0.630
6/7/2005	13:17:02	62.5	55.25	21.19	1.786	0.688
6/7/2005	13:17:06	66.2	55.25	21.194	1.782	0.750
6/7/2005	13:17:10	70.1	55.22	21.197	[redacted]	0.815
6/7/2005	13:17:14	74.3	55.22	21.199	1.777	0.885

6/7/2005	13:17:18	78.7	55.22	21.201	1.775	0.958
6/7/2005	13:17:23	83.4	55.22	21.203	1.773	1.037
6/7/2005	13:17:28	88.4	55.22	21.205	1.771	1.120
6/7/2005	13:17:33	93.7	55.22	21.207	1.769	1.208
6/7/2005	13:17:39	99.3	55.22	21.209	[redacted]	1.302
6/7/2005	13:17:45	105.2	55.22	21.211	1.765	1.400
6/7/2005	13:17:51	111.5	55.22	21.215	1.761	1.505
6/7/2005	13:17:58	118.1	55.22	21.217	1.759	1.615
6/7/2005	13:18:05	125.1	55.22	21.219	1.757	1.732
6/7/2005	13:18:12	132.6	55.22	21.221	1.755	1.857
6/7/2005	13:18:20	140.5	55.22	21.225	1.751	1.988
6/7/2005	13:18:28	148.9	55.22	21.229	[redacted]	2.128
6/7/2005	13:18:37	157.8	55.22	21.231	1.745	2.277
6/7/2005	13:18:47	167.2	55.22	21.235	1.741	2.433
6/7/2005	13:18:57	177.2	55.2	21.237	1.739	2.600
6/7/2005	13:19:07	187.8	55.2	21.243	1.733	2.777
6/7/2005	13:19:18	199	55.2	21.245	[redacted]	2.963
6/7/2005	13:19:30	210.9	55.2	21.251	1.725	3.162
6/7/2005	13:19:43	223.5	55.2	21.253	1.723	3.372
6/7/2005	13:19:56	236.8	55.2	21.259	1.717	3.593
6/7/2005	13:20:10	250.9	55.2	21.263	1.713	3.828
6/7/2005	13:20:25	265.8	55.2	21.269	1.707	4.077
6/7/2005	13:20:41	281.6	55.2	21.273	1.703	4.340
6/7/2005	13:20:58	298.4	55.2	21.279	[redacted]	4.620
6/7/2005	13:21:16	316.2	55.2	21.285	1.691	4.917
6/7/2005	13:21:34	335	55.2	21.291	1.685	5.230
6/7/2005	13:21:54	354.9	55.2	21.297	1.679	5.562
6/7/2005	13:22:15	376	55.2	21.303	1.673	5.913
6/7/2005	13:22:38	398.4	55.2	21.311	[redacted]	6.287
6/7/2005	13:23:02	422.1	55.2	21.317	1.659	6.682
6/7/2005	13:23:27	447.2	55.2	21.325	1.651	7.100
6/7/2005	13:23:53	473.8	55.2	21.334	1.642	7.543
6/7/2005	13:24:21	502	55.2	21.34	1.636	8.013
6/7/2005	13:24:51	531.9	55.18	21.348	1.628	8.512
6/7/2005	13:25:23	563.5	55.2	21.358	1.618	9.038
6/7/2005	13:25:56	597	55.2	21.368	[redacted]	9.597
6/7/2005	13:26:32	632.5	55.18	21.378	1.598	10.188
6/7/2005	13:27:10	670.1	55.2	21.388	1.588	10.815
6/7/2005	13:27:49	709.9	55.18	21.398	1.578	11.478
6/7/2005	13:28:32	752.1	55.18	21.41	1.566	12.182
6/7/2005	13:29:16	796.8	55.18	21.422	[redacted]	12.927
6/7/2005	13:30:04	844.2	55.2	21.434	1.542	13.717
6/7/2005	13:30:54	894.4	55.18	21.446	1.53	14.553
6/7/2005	13:31:47	947.5	55.18	21.458	1.518	15.438
6/7/2005	13:32:43	1003.8	55.18	21.472	[redacted]	16.377
6/7/2005	13:33:43	1063.4	55.2	21.484	1.492	17.370
6/7/2005	13:34:46	1126.6	55.2	21.498	1.478	18.423
6/7/2005	13:35:53	1193.5	55.2	21.514	1.462	19.538
6/7/2005	13:37:04	1264.4	55.2	21.532	1.444	20.720
6/7/2005	13:38:19	1339.5	55.2	21.546	1.43	21.972
6/7/2005	13:39:38	1419	55.2	21.564	1.412	23.297
6/7/2005	13:41:03	1503.3	55.2	21.583	1.393	24.702

6/7/2005	13:42:32	1592.6	55.2	21.601	[redacted]	26.190
6/7/2005	13:44:07	1687.1	55.18	21.621	1.355	27.765
6/7/2005	13:45:47	1787.2	55.18	21.639	1.337	29.433
6/7/2005	13:47:33	1893.3	55.18	21.661	1.315	31.202
6/7/2005	13:49:25	2005.7	55.16	21.682	[redacted]	33.075
6/7/2005	13:51:24	2124.7	55.16	21.704	1.272	35.058
6/7/2005	13:53:30	2250.8	55.16	21.726	1.25	37.160
6/7/2005	13:55:44	2384.4	55.16	21.75	1.226	39.387
6/7/2005	13:58:05	2525.9	55.16	21.774	1.202	41.745
6/7/2005	14:00:35	2675.8	55.13	21.798	1.178	44.243
6/7/2005	14:03:14	2834.6	55.13	21.825	1.151	46.890
6/7/2005	14:06:02	3002.8	55.13	21.851	[redacted]	49.693
6/7/2005	14:09:00	3180.9	55.16	21.878	1.098	52.662
6/7/2005	14:12:09	3369.6	55.13	21.905	1.071	55.807
6/7/2005	14:15:29	3569.5	55.13	21.935	1.041	59.138
6/7/2005	14:19:01	3781.2	55.11	21.963	1.013	62.667
6/7/2005	14:22:45	4005.5	55.09	21.994	[redacted]	66.405
6/7/2005	14:26:43	4243.1	55.11	22.026	0.95	70.365
6/7/2005	14:30:54	4494.7	55.13	22.058	0.918	74.558
6/7/2005	14:35:21	4761.3	55.13	22.088	0.888	79.002
6/7/2005	14:40:03	5043.7	55.16	22.121	0.855	83.708
6/7/2005	14:45:02	5342.8	55.16	22.156	0.82	88.693
6/7/2005	14:50:19	5659.6	55.16	22.19	0.786	93.973
6/7/2005	14:55:55	5995.2	55.16	22.224	[redacted]	99.567
6/7/2005	15:01:50	6350.7	55.16	22.258	0.718	105.492
6/7/2005	15:08:07	6727.2	55.11	22.295	0.681	111.767
6/7/2005	15:14:46	7126.1	55.09	22.331	0.645	118.415
6/7/2005	15:21:48	7548.6	55.06	22.368	0.608	125.457
6/7/2005	15:29:16	7996.1	55.06	22.404	0.572	132.915
6/7/2005	15:37:10	8470.1	55	22.441	0.535	140.815
6/7/2005	15:45:32	8972.2	55	22.479	0.497	149.183
6/7/2005	15:54:24	9504.1	54.95	22.516	0.46	158.048
6/7/2005	16:03:47	10067.5	54.95	22.554	[redacted]	167.438
6/7/2005	16:13:44	10664.3	54.95	22.592	0.384	177.385
6/7/2005	16:23:44	11264.3	54.95	22.629	0.347	187.385
6/7/2005	16:33:44	11864.3	54.93	22.663	0.313	197.385
6/7/2005	16:43:44	12464.3	54.91	22.695	0.281	207.385
6/7/2005	16:53:44	13064.3	54.86	22.726	[redacted]	217.385
6/7/2005	17:03:44	13664.3	54.86	22.754	0.222	227.385
6/7/2005	17:13:44	14264.3	54.84	22.785	[redacted]	237.385

APPENDIX F

HEALTH AND SAFETY DOCUMENTATION

Tt
EFS

SWMUS 8, 9 & 17

FIGURE 8-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing investigation activities at NSWC Crane, and that I have received site-specific training that included the elements presented below:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- The contents of the health and safety plan including Table 5-1 and 6-1
- Emergency response procedures (evacuation and assembly points)
- Review contents of relevant Material Safety Data Sheets
- Review of Safe Work Permits

I have been given the opportunity to ask questions and that my questions have been answered to my satisfaction. The dates of my training and my medical surveillance requirements are accurate and correct to the best of my knowledge.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam
DON WESTERHOFF	9/27/05	1/22/93	6/2/05		4/1/05
Dave Hickey	9/27/05	1/91	2/05		12/04
Jay McFall	9-27-05	2-19-04	2-15-05		2-11-05
Derek Lovrich	9-27-05	5-12-05			5-12-05
TERRY RAMAH-I	9-27-05	10-85	2-25-05	3-88	11-10-04
Jeff Schubert	10/4/05	1/12/90	2-25-05	8/15/92	5/2/05
Jim WALSH	10/4-05	5/11/87	12/28/04		1/31/05
Josh Dean	10/4/05	4/27/02	12/28/04	~~DKS~~ JPS	9-17-04
Chad Mahaffy	10-4-05	10/2/02	12/28/04	~~9/12/04~~ JPS	9-17-04

CTO ~~0168~~ 0321, 0376,

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220
Tel 412.921.7090 • Fax 412.921.4040 • www.tetratech.com

PITT-2-5-050

February 25, 2005

Project Numbers N1245, N6878, and 00042

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: William Gates (Code ES31)
P.O. Box 190010
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order Numbers 0331, 0357, and 0376

Subject: Personnel Clearance for Site Visit

Dear Mr. Gates:

The purpose of this letter is to inform you of upcoming site activities to be performed by Tetra Tech NUS, Inc. employees under the CLEAN contract, and to attest that the individuals identified herein are in compliance with applicable OSHA regulations. This information is being submitted as specified in Section H.14 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62467-94-D-0888. The specific OSHA regulations involved for this project pertain to employee health and safety training and medical surveillance requirements, as identified in OSHA 29 CFR 1910.120.

The subject project and planned activities include staking locations of intrusive sampling; installation/development and sampling of monitoring wells; surface water, seep and sediment sampling; and soil sampling using DPT and hand augering techniques at the NSWC Crane site in Indiana. This is scheduled to be conducted from February 28 through March 16, 2005. The individuals that will perform these tasks are employees of Tetra Tech NUS. They will follow these listed health and safety plans.

- Health and Safety Plan for RCRA Facility Investigation at Building 106 Pond (SWMU 8) and Roads and Grounds Area (SWMU 15), dated November 2004, prepared under CTO 0331.
- Health and Safety Plan for Environmental Indicator Investigation for SWMUs 18, 19, 20, and the Old Gun Tub Storage Lot, dated November 2004, prepared under CTO 0331.
- Health and Safety Plan for Cast High Explosives Fill and B-146 Incinerator, dated August 2004, prepared under CTO 0343.
- Health and Safety Plan for Mine Fill A (SWMU 12), Revision 1, dated August 2004, prepared under CTO 0357.
- Health and Safety Plan for Risk Assessment and CMS at Solid Waste Management Unit (SWMU) 9, dated February 2005, prepared under CTO 0376.

These individuals are as follows:

Jim Goerdt
Terry Rojahn

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220
Tel 412.921.7090 • Fax 412.921.4040 • www.tetratech.com

PITT-12-4-053

December 30, 2004

Project Numbers 3961, 1245, 7448, and 6878

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: William Gates (Code ES31)
P.O. Box 190010
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order Numbers 0160, 0331, 0343, an[redacted]

Subject: Personnel Clearance for Site Visit

Dear Mr. Gates:

The purpose of this letter is to inform you of upcoming site activities to be performed by Tetra Tech NUS, Inc. employees under the CLEAN contract, and to attest that the individuals identified herein are in compliance with applicable OSHA regulations. This information is being submitted as specified in Section H.14 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62467-94-D-0888. The specific OSHA regulations involved for this project pertain to employee health and safety training and medical surveillance requirements, as identified in OSHA 29 CFR 1910.120.

The subject project and planned activities include staking locations of intrusive sampling; installation/development and sampling of monitoring wells; surface water, seep and sediment sampling; and soil sampling using DPT and hand augering techniques at the NSWC Crane site in Indiana. This is scheduled to be conducted from January 4-28, 2005. The individuals that will perform these tasks are employees of Tetra Tech NUS. They will follow these listed health and safety plans.

- Health and Safety Plan for Solid Waste Management Unit 7, dated December 2004, prepared under CTO 0160.
- Health and Safety Plan for RCRA Facility Investigation at Building 106 Pond (SWMU 8) and Roads and Grounds Area (SWMU 15), dated November 2004, prepared under CTO 0331.
- Health and Safety Plan for Environmental Indicator Investigation for SWMUs 18, 19, 20, and the Old Gun Tub Storage Lot, dated November 2004, prepared under CTO 0331.
- Health and Safety Plan for Cast High Explosives Fill and B-146 Incinerator, dated August 2004, prepared under CTO 0343.
- Health and Safety Plan for Mine Fill A (SWMU 12), Revision 1, dated August 2004, prepared under CTO 0357.

These individuals are as follows:

Stan Conti
Colin Doolan
Jim Goerdt
Terry Rojahn

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220
Tel 412.921.7090 • Fax 412.921.4040 • www.tetratech.com

PITT-12-4-003

December 3, 2004

Project Number N6878

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: William Gates (Code ES31)
P.O. Box 190010
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order Numbers 0160, 0331, 0343, and [redacted]

Subject: Personnel Clearance for Site Visit

Dear Mr. Gates:

The purpose of this letter is to inform you of upcoming site activities to be performed by Tetra Tech NUS, Inc. employees under the CLEAN contract, and to attest that the individuals identified herein are in compliance with applicable OSHA regulations. This information is being submitted as specified in Section H.14 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62467-94-D-0888. The specific OSHA regulations involved for this project pertain to employee health and safety training and medical surveillance requirements, as identified in OSHA 29 CFR 1910.120.

The subject project and planned activities include staking locations of intrusive sampling; installation/development and sampling of monitoring wells; surface water, seep and sediment sampling; and soil sampling using DPT and hand augering techniques at the NSWC Crane site in Indiana. This is scheduled to be conducted from December 6, 2004 through December 17, 2004. The individuals that will perform these tasks are employees of Tetra Tech NUS. They will follow these listed health and safety plans.

- Health and Safety Plan for Solid Waste Management Unit 7, dated December 2004, prepared under CTO 0160.
- Health and Safety Plan for RCRA Facility Investigation at Building 106 Pond (SWMU 8) and Roads and Grounds Area (SWMU 15), dated November 2004, prepared under CTO 0331.
- Health and Safety Plan for Environmental Indicator Investigation for SWMUs 18, 19, 20, and the Old Gun Tub Storage Lot, dated November 2004, prepared under CTO 0331.
- Health and Safety Plan for Cast High Explosives Fill and B-146 Incinerator, dated August 2004, prepared under CTO 0343.
- Health and Safety Plan for Mine Fill A (SWMU 12), Revision 1, dated August 2004, prepared under CTO 0357.

These individuals are as follows:

Stan Conti
Jim Goerdt
Terry Rojahn
Donald Westerhoff

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Colin A. Doolan

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER

REFRESHER TRAINING

prepared and instructed by Tetra Tech NUS, Inc.

Pittsburgh, Pennsylvania

December 23, 2004

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Baseline Examination **UPDATE**

EMPLOYEE:	Doolan, Colin	**COMPANY:**	TT/NUS
SSN:	XXX-XX-8351	**POSITION:**	Earth Scientist
DATE OF EXAM:	12/02/2004	**LOCATION:**	TT/NUS-Pittsburgh
EXPIRATION DATE:	12/02/2006	**SITE:**	Pittsburgh

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☑	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☑	☐

STATUS

1. ☑ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS: ***Status changed to Biennial.***

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 12/07/04

Signature: Peter P Greaney MD

WorkCare
333 S. Anita Drive, Suite 630, Orange, CA 92868
(714) 978-7488 - (800) 455-6155 - FAX (714) 456-2154

APPLIED EDUCATIONAL SERIES

James D. Goerdt

APPLIED ASSOCIATES INTERNATIONAL INC.

CERTIFICATE

OSHA, 1910.120
Hazardous Waste Operations and Emergency Response 40 Hour Course

ISSUE DATE: December 13, 1991

EXPIRATION: December 13, 1992

CERTIFICATE: HAZ9112001058

STEVEN L. WILLIAMS
President

THOMAS O. MURRAY
Certified Industrial Hygenist

P. O. Box 300068
Fern Park, Florida 32730-0068

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Jim Goerdt

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

October 22, 2004

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Goerdt, James	**COMPANY:**	TT/NUS
SSN:	481-86-2691	**POSITION:**	Environmental Scientist
DATE OF EXAM:	11/07/2003	**LOCATION:**	TT/NUS-Pittsburgh
EXPIRATION DATE:	11/07/2005	**SITE:**	Pittsburgh

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☑	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☑	☐

STATUS

1. ☑ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Scott Hardy, M.D. Date: 11/11/03

Signature: Scott Hardy MD

WorkCare
333 S. Anita Drive, Suite 630, Orange, CA 92868
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

March 11, 2003

Mr. Stanley Conti
Tetra Tech NUS, Inc.
Foster Plaza 7
661 Andersen Drive
Pittsburgh, PA 15220

Whom It May Concern:

This letter is to certify that Mr. Stanley Conti successfully completed a course of instruction in Hazardous Materials Handling for Hazardous Waste Site Workers which meets the criteria established in 29 CFR 1910.120(e)(3)(i). This course was prepared and conducted by Tetra Tech NUS (formerly Brown and Root Environmental, a division of HALLIBURTON NUS Corporation) in September 1983. If you have any questions, please feel free to contact me.

Very truly yours,

James K. Lafley
Manager, Training Resources

JKL:lld

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Stan Conti

has successfully completed an 8-hour course of instruction in OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER
AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

May 14, 2004
Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORKCARE™
A Trademark of WorkCare, Inc.

RELEASE TO DUTY

CLINIC INSTRUCTIONS: Complete and give to employee before they leave the facility. This is a requirement of Tetra-Tech.

Employee Name: Stanley J. Conti

Office Location: PIT

Yes	No	
☑	☐	To work with hazardous materials in accordance with 29 CFR 1910.120.
☑	☐	To use respiratory protective equipment in accordance with 29 CFR 1910.134.

Based on the limited information available to me at this time, I find no necessity for immediate restrictions and I release this employee for duty. It is understood and agreed upon by the employer or potential employer of this examinee that subsequent comprehensive review of all laboratory and other test data by WorkCare may detect health conditions not apparent to me. It is further agreed and understood that such health conditions may necessitate the need for workplace restrictions. Examination has been performed in compliance with 1910.120 and 1910.134.

Signed: [illegible] M.D.

Date: 12-6-04

Employee

Bring this form back to the office and fax it to:
Matt Soltis, Corporate Health & Safety (412) 921-4040

333 S. Anita Drive, Suite 630, Orange, CA 92868 • (714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154
E-mail: info@workcare.com • Website: www.workcare.com

NUS CORPORATION

Certificate of Training

THIS CERTIFIES THAT

TERRY ROJAHN

has successfully completed a course of instruction on

SUPERFUND TRAINING CLASS

prepared and conducted by the
NUS Corporation, Pittsburgh, Pennsylvania

SEPT. 30 - OCT. 4, 1985
Date of Award

Gary F. Smith, C.S.P.
Director; Health, Safety Training

E. Dennis Escher, P.E.
Vice President

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Terry R. Rojahn

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 25, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Terry Rojahn

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER
AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

January 30, 2004

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Rojahn, Terry	**COMPANY:**	TT/NUS
SSN:	XXX-XX-8670	**POSITION:**	Environmental Sampling
DATE OF EXAM:	11/05/2004	**LOCATION:**	TT/NUS-Pittsburgh
EXPIRATION DATE:	11/05/2006	**SITE:**	Pittsburgh

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☑	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☑	☐

STATUS

1. ☑ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 11/10/04

Signature: Peter P Greaney MD

WorkCare
333 S. Anita Drive, Suite 630, Orange, CA 92868
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

Compliance Environmental Resources, Inc.
7002 Graham Road
Suite 202
Indianapolis, IN 46220
317-863-0008

Jay McFall

Has completed the 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course in compliance with 29 CFR 1910.120 (e). He will have met the criteria for certification upon completion of 24 hours of supervised training.

Christopher A. Kinsey, CHMM, CET
Instructor
Completion Date: 02/19/04

MEDICAL APPROVAL FORM
For Employees of Environmental Field Services, Inc.

Participant Name: Jay McFall Date & Time of Examination: July 30, 2004

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA 29 CFR 1910.120, and found to be medically
   (✓) qualified to perform work at hazardous work sites.
   ( ) not qualified to perform work at hazardous work sites.

- and -

2. Undergone a physical examination as per OSHA 29 CFR 1910.134, and found to be medically
   (✓) qualified to wear respiratory protection.
   ( ) not qualified to wear respirator protection.

My evaluation has been based on the following, as provided to me by the employer.

( ) A Copy of OSHA Standards 29 CFR 1910.120 and appendices.
( ) A description of the employee's duties as they relate to the employee's exposure.
( ) A list of known/suspected contaminants and their concentrations (if known)
( ) A description of any personal protective equipment used or to be used.
( ) Information from previous medical examinations of the employee which is used not readily available to the examining physician.

I, T Perri, have examined Jay McFall
Physician's Name (Print) Participant's Name (Print)

and have determined the following information:

1. Results of medical examination and test (excluding finding or diagnoses unrelated to occupational exposure):

   (N)

2. Any detected medical conditions which place the employee at increase risk of material impairment of the employee's health :

   none

3. Recommended limitations upon the employee's assigned work :

   none

I have informed this participant of the results of this medical examination and any medical conditions which require further examination of treatment.

Based on this information provided to me, and in view of the activities and hazardous potentials involved at hazardous work sites, ~~his~~ participant
(✓) may
( ) may not
perform his/her assigned tasks.

Physician's Signature : TP
Address: 5604 W. 74th
Indpls
Phone Number: 317 290 1558

FIGURE 8-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing investigation activities at NSWC Crane, and that I have received site-specific training that included the elements presented below:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- The contents of the health and safety plan including Table 5-1 and 6-1
- Emergency response procedures (evacuation and assembly points)
- Review contents of relevant Material Safety Data Sheets
- Review of Safe Work Permits

I have been given the opportunity to ask questions and that my questions have been answered to my satisfaction. The dates of my training and my medical surveillance requirements are accurate and correct to the best of my knowledge.

	Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam	
1245	Jay McFall / Jay McFall	12/7/04	2/19/04	N/A	N/A	7/30/04	
SWMU 9	DOU OOSTERHOFF / [illegible]	"	1/93	8/04	8/04	2/12/03	
	TERRY RUAHAN / [illegible]	"	10/85	1/04	1/04	11/10/04	ALSO SWMU 9
1245 6870 7448	[illegible] / [illegible]	12/8/04	12/91	10/04	NA	11/7/04	
	Stan Conti / S Conti	12/8/04	8/83	5/04	8/84	12/6/04	
	Colin Doolan / Colin Doolan	1/6/05	5/99	12/04	NA	12/04	

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220
Tel 412.921.7090 • Fax 412.921.4040 • www.tetratech.com

PITT-04-5-067

April 29, 2005

Project Nos. 1245, 7448, 6878, 00042

Mr. William Gates (Code ES31)
Commander, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29119-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order Nos. 0331, 0343, 0357, 0376

Subject: Personnel Clearance for Site Visit

Dear Mr. Gates:

The purpose of this letter is to inform you of upcoming site activities to be performed by Tetra Tech NUS, Inc. (TtNUS) employees under the CLEAN contract, and to attest that the individuals identified herein are in compliance with applicable OSHA regulations. This information is being submitted as specified in Section H.14 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62467-94-D-0888. The specific OSHA regulations involved for this project pertain to employee health and safety training and medical surveillance requirements, as identified in OSHA 29 CFR 1910.120.

The subject project and planned activities include staking locations of intrusive sampling; installation/development and sampling of monitoring wells; surface water, seep and sediment sampling; and soil sampling using DPT and hand augering techniques at the NSWC Crane site in Indiana. This is scheduled to be conducted from May 2, 2005 through June 8, 2005. The individuals that will perform these tasks are employees of TtNUS. In performing these activities, the field team will adhere to the following Health and Safety Plans (HASPs):

- HASP for RCRA Facility Investigation at Building 106 Pond (SWMU 8) and Roads and Grounds Area (SWMU 15), dated November 2004, prepared under CTO 0331.
- HASP for Cast High Explosives Fill and B-146 Incinerator, dated August 2004, prepared under CTO 0343.
- HASP for Mine Fill A (SWMU 12), Revision 1, dated August 2004, prepared under CTO 0357.
- HASP for Risk Assessment and Corrective Measures Study (SWMU 9), dated February 2005, prepared under CTO 0376.

The following individuals will participate in the planned activities described above:

Jim Goerdt
Terry Rojahn
John Wright
Jeff Schubert

TETRA TECH NUS, INC.

In addition, Roger Clark will also visit Tetra Tech NUS, Inc. work sites at NWSC Crane during this period. However, he will be not participating in any intrusive activities (e.g., drilling, sampling, etc.) and will be restricted from approaching work areas while any intrusive activities are performed.

If you have any questions, concerns, or if I can be of further assistance, please do not hesitate to contact me.

Very truly yours,

Matthew M. Soltis, CIH, CSP
CLEAN Health and Safety Manager

MMS/mlg

cc: Mr. B. Gorman (Code ES34)
Ms. Debra Humbert, TtNUS, Inc.
Mr. Mark Perry, TtNUS, Inc.
Mr. Keith Henn, TtNUS, Inc.
Mr. Terry Rojahn, TtNUS, Inc.
Mr. Roger Clark, TtNUS, Inc.
File copy CTO 0331, 0343, 0357, 0376

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220
Tel 412.921.7090 • Fax 412.921.4040 • www.tetratech.com

PITT-5-5-042

May 27, 2005

Project Numbers N1245, N7448, N6878, and 00042

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: William Gates (Code ES31)
P.O. Box 190010
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order Numbers 0331, 0343, 0357, and 0376

Subject: Personnel Clearance for Site Visit

Dear Mr. Gates:

The purpose of this letter is to add personnel conducting the field activities at the NAS Dallas site from May 31 through June 8, 2005. Mr. Colin Doolan has been added to the field crew performing this work. All other information in our letter dated April 29, 2005 remains the same.

If you have any questions, concerns, or if I can be of further assistance, please do not hesitate to contact me.

Very truly yours,

Matthew M. Soltis

Matthew M. Soltis, CIH, CSP
CLEAN Health and Safety Manager

MMS:lld

c: B. Gorman (Code ES 42)
D. Humbert
M. Perry
K. Henn
R. Basinski

NUS CORPORATION

Certificate of Training

THIS CERTIFIES THAT

TERRY ROJAHN

has successfully completed a course of instruction on

SUPERFUND TRAINING CLASS

prepared and conducted by the
NUS Corporation, Pittsburgh, Pennsylvania

SEPT. 30 - OCT. 4, 1985
Date of Award

Gary F. Smith, C.S.P.
Director; Health, Safety Training

E. Dennis Escher, P.E.
Vice President

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Terry R. Rojahn

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 25, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

Basinski, Ralph

From: Soltis, Matthew

Sent: Tuesday, August 31, 2004 3:18 PM

To: Basinski, Ralph

Cc: Rojahn, Terry; Diano, Linda

Subject: Training Certificate

Ralph:

As I mentioned earlier, one of the action items from my recent H&S audit at NSWC Crane was to follow up on the matter of an 8-hour training certificate for Management/Supervisor H&S training for our FOL on this field effort (Terry Rojahn). This was the only mandatory training element that I could not find documentation for during my audit.

In checking our corporate training database, I have confirmed that Terry did satisfactorily complete this training with us on March 31, 1988. We do not maintain copies of every training certificate that we issue. Please have Terry use this message as interim confirmation of his satisfying this training requirement. The next time that we prepare training certificates, Linda Diano will prepare a replacement certificate for Terry and provide it to him for his records/use.

If there are any questions, let me know.

Matt

Matthew M. Soltis, CIH, CSP
Corporate Health and Safety Manager
Tetra Tech NUS, Inc.
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, PA 15220-2745
Telephone: (412) 921-8912
FAX: (412) 921-4040
soltism@ttnus.com
http://www.ttnus.com
http://www.tetratech.com

NOTICE OF CONFIDENTIALITY

This e-mail message and its attachments (if any) are intended solely for the use of the addressees hereof. In addition, this message and the attachments (if any) may contain information that is confidential, privileged and exempt from disclosure under applicable law. If you are not the intended recipient of this message, you are prohibited from reading, disclosing, reproducing, distributing, disseminating or otherwise using this transmission. Delivery of this message to any person other than the intended recipient is not intended to waive any right or privilege. If you have received this message in error, please promptly notify the sender by reply e-mail and immediately delete this message from your system.

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Rojahn, Terry	**COMPANY:**	TT/NUS
SSN:	XXX-XX-8670	**POSITION:**	Environmental Sampling
DATE OF EXAM:	11/05/2004	**LOCATION:**	TT/NUS-Pittsburgh
EXPIRATION DATE:	11/05/2006	**SITE:**	Pittsburgh

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☑	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☑	☐

STATUS

1. ☑ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.
2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:
3. ☐ **NOT QUALIFIED**
4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 11/10/04

Signature: Peter P Greaney MD

WorkCare
333 S. Anita Drive, Suite 630, Orange, CA 92868
(714) 978-7488 - (800) 455-6155 - FAX (714) 456-2154

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Colin A. Doolan

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER
REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

December 23, 2004

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Baseline Examination **UPDATE**

EMPLOYEE:	Doolan, Colin	**COMPANY:**	TT/NUS
SSN:	XXX-XX-8351	**POSITION:**	Earth Scientist
DATE OF EXAM:	12/02/2004	**LOCATION:**	TT/NUS-Pittsburgh
EXPIRATION DATE:	12/02/2006	**SITE:**	Pittsburgh

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☑	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☑	☐

STATUS

1. ☑ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS: ***Status changed to Biennial.***

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 12/07/04

Signature: Peter P. Greaney MD

WorkCare
333 S. Anita Drive, Suite 630, Orange, CA 92868
(714) 978-7488 - (800) 455-6155 - FAX (714) 456-2154

ARGONNE NATIONAL LABORATORY

RECOGNIZES

Jeffrey P. Schubert

ON THE COMPLETION OF THE COURSES OF STUDY
PRESCRIBED BY 29 CFR 1910.120 AND DOE ORDER 5480.11

HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (40 HOURS) AND GENERAL EMPLOYEE RADIATION SAFETY

COMPLETED ON THIS DATE January 12, 1990

ISSUED AND ATTESTED BY

Robert A. Wymer
MANAGER
ENVIRONMENT, SAFETY & HEALTH

Dean R. Larson
COURSE MANAGER

FINDLAY

THE UNIVERSITY OF FINDLAY

Certificate of Achievement

awarded by

THE NATIONAL CENTER OF EXCELLENCE FOR ENVIRONMENTAL MANAGEMENT

ENVIRONMENTAL RESOURCE TRAINING CENTER

to

JOSHUA DEAN

for Successful Completion of

OSHA 40-HOUR SAFETY TRAINING WORKSHOP
(FULFILLS THE REQUIREMENTS OF 29 CFR 1910.120 COVERING HAZARDOUS WASTE OPERATIONS)
4.0 CEU'S
APRIL 27, 2002

EXECUTIVE DIRECTOR

INSTRUCTOR

Certificate

OF

Completion

This is to certify that

Josh Dean

Has successfully completed the

MSHA30 CFR Part 46.8
8-Hour Annual Refresher Training
Given at
Bowser-Morner, Inc.
4518 Taylorsville Road, Dayton, Ohio

December 28, 2004

1228040005
Certificatee Identification Number

Henry M. Butcher, REM, CEA

Certificate of Completion

This is to certify that

Joshua Dean

has successfully completed the
OSHA 29 CFR 1910.120 -- Hazardous Waste
Operations and Emergency Response
8 Hour Annual Refresher Training Course
given at
Bowser-Morner, Inc.
4518 Taylorsville Road, Dayton, Ohio

28 Dec 2004

2095-04
Certificate Identification Number

Level B
Personal Protective Equipment Level

Steven L. Curtis PE, CSP, CHMM
Trainer

OCCUPATIONAL CARE CONSULTANTS

OCC - East • 3028 Navarre Ave • Oregon, OH 43616
(419) 697-6850 • Fax (419) 697-6861

TOXIC AND HAZARDOUS SUBSTANCES – HCP WRITTEN OPINION

NAME: Josh Dean **DATE:** 9-17-04

Examiner to select A or B

A. ✓ **I have detected no medical conditions** that would place this individual at an increased risk of material health impairment from exposure to asbestos.

B. ____ **I have detected medical conditions** that would place this individual at an increased risk of material health impairment from exposure to asbestos.

Examiner to select all that apply:

C. ____ Restrictions are placed on this individual for respirator use related to a medical condition or to the workplace conditions in which the respirator will be used. Restrictions are as follows:

_____

_____

D. ✓ The above named individual has been provided a copy of this Licensed Health Care Professional's written opinion, and of any medical conditions resulting from asbestos exposure that require further explanation or treatment.

E. ____ This individual has been informed of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

B.C. Russell

T.E. Lieser, MD; P.J. Eby, MD; G. J. Jabaly, MD; B.C. Russell, PA-C, G. Myak, RN, CNP

INTERNATIONAL TECHNOLOGY CORPORATION

CERTIFICATE OF COMPLETION

PRESENTED TO

Jeffrey P. Schubert

IN RECOGNITION OF HAVING SUCCESSFULLY COMPLETED

THE PRESCRIBED COURSE OF STUDY FOR

Hazardous Waste Supervisor

8 Hours

In compliance with 29 CFR 1910.120

August 15, 1992
Effective Date

Certified Environmental Trainer

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Jeffrey P. Schubert

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 25, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: **Periodic Examination**

EMPLOYEE:	**Schubert, Jeffrey P**	**COMPANY:**	**TT/NUS**
SSN:	**XXX-XX-9663**	**POSITION:**	**Hydrogeologist**
DATE OF EXAM:	**04/26/2005**	**LOCATION:**	**TT/NUS-Pittsburgh**
EXPIRATION DATE:	**04/26/2007**	**SITE:**	**Pittsburgh**

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☑	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☑	☐

STATUS

1. ☑ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 05/02/05

Signature: Peter P Greaney MD

WorkCare
333 S. Anita Drive, Suite 630, Orange, CA 92868
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

1203

Certificate Of Completion

This Certifies That

James R. Walsh

has completed the 40 hour course

OSHA 40 Hour Personnel Protection & Safety Course

Presented by

HAZCO

Spanning the Hazardous Materials
Health and Safety Horizons

May 1-11, 19[illegible]

Date

Training Director

INDIANA WATER WELL DRILLING LICENSE
Department of Natural Resources
Issued by the Division of Water

James R. Walsh

is entitled to operate water well drilling equipment and engage in the drilling of water wells, pursuant to Indiana Code 25-39.

License Number	Expiration Date
852	December 31, 2005
DNR Receipt Number	Signature
1011074	

Certificate of Completion

This is to certify that

James Walsh

has successfully completed the
OSHA 29 CFR 1910.120 -- Hazardous Waste
Operations and Emergency Response
8 Hour Annual Refresher Training Course
given at
Bowser-Morner, Inc.
4518 Taylorsville Road, Dayton, Ohio

28 Dec 2004

9195-04
Certificate Identification Number

Level B
Personal Protective Equipment Level

Steven L. Curtis PE, CSP, CHMM
Trainer

Certificate

OF

Completion

This is to certify that

Jim Walsh

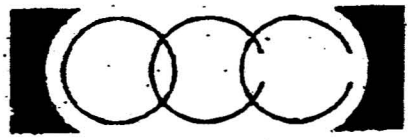
Has successfully completed the

MSHA30 CFR Part 46.8
8-Hour Annual Refresher Training
Given at
Bowser-Morner, Inc.
4518 Taylorsville Road, Dayton, Ohio

December, 28 2004

1228040013
Certificatee Identification Number

Henry M. Butcher, REM, CEA



OCCUPATIONAL CARE CONSULTANTS

OCC - East • 3028 Navarre Ave • Oregon, OH 43616
(419) 697-6850 • Fax (419) 697-6861

TOXIC AND HAZARDOUS SUBSTANCES – HCP WRITTEN OPINION

NAME: James Walsh **DATE:** 1/31/05

Examiner to select A or B

A. ✓ **I have detected no medical conditions** that would place this individual at an increased risk of material health impairment from exposure to asbestos.

B. ____ **I have detected medical conditions** that would place this individual at an increased risk of material health impairment from exposure to asbestos.

Examiner to select all that apply:

C. ____ Restrictions are placed on this individual for respirator use related to a medical condition or to the workplace conditions in which the respirator will be used. Restrictions are as follows:

D. ✓ The above named individual has been provided a copy of this Licensed Health Care Professional's written opinion, and of any medical conditions resulting from asbestos exposure that require further explanation or treatment.

E. ____ This individual has been informed of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

T.E. Lieser, MD; P.J. Eby, MD; G. J. Jabaly, MD; B.C. Russell, PA-C, G. Myak, RN, CNP

OCCUPATIONAL HAZARD MANAGEMENT

SCOTT BERNDT, CHMM
14655 COUNTY ROAD 308
FINDLAY, OHIO 45840

CERTIFIES
THAT

CHAD R. MAHAFFY

HAS
SUCCESSFULLY
COMPLETED

40 HOUR SITE WORKER & OPERATIONS TRAINING

IN ACCORDANCE WITH
29CFR1910.120
CERTIFICATE NO: 020CT02 02

ON THE

2ND DAY OF OCTOBER 2002

SCOTT BERNDT, CHMM

2 Oct 02
DATE

Certificate of Completion

This is to certify that

Chad Mahaffy

has successfully completed the
OSHA 29 CFR 1910.120 -- Hazardous Waste
Operations and Emergency Response
8 Hour Annual Refresher Training Course
given at
Bowser-Morner, Inc.
4518 Taylorsville Road, Dayton, Ohio

28 Dec 2004

5590-04
Certificate Identification Number

Level B
Personal Protective Equipment Level

Steven L. Curtis PE, CSP, CHMM
Trainer

Certificate

OF

Completion

This is to certify that

Chad Mahaffey

Has successfully completed the

MSHA30 CFR Part 46.8
8-Hour Annual Refresher Training
Given at
Bowser-Morner, Inc.
4518 Taylorsville Road, Dayton, Ohio

December 28, 2004

1228040007
Certificatee Identification Number

Henry M. Butcher, REM, CEA

MedWork
Occupational Health Care

725 S. Ludlow Street, Dayton, Ohio 45402

Date: 9-17-04

To: Bowser Morner

From: _____

Re: Chad R. McBeffy

THE ABOVE EMPLOYEE HAS BEEN EXAMINED AT MEDWORK, INC. ON 9-17-04. I HAVE REVIEWED THEIR MEDICAL HISTORY, THERIF ~~CHEST X-RAY~~, PULMONARY FUNCTION AND LABORTORY STUDIES (BLOOD AND URINE TESTS) AND FOUND THEM IN GOOD HEALTH, EXCEPT FOR THOSE COMMENTS NOTED ON THE PHYSICAL EXAMINATION. THIS PHYSICAL EXAMINATION MEETS THE MEDICAL SURVEILLANCE REQUIREMENTS FOR THE HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE STANDARDS 1910.120. IT IS MY OPINION THEY ARE ABLE TO WORK IN THIS TYPE OF ENVIRONMENT USING PROPER SAFETY MEASURES AND WEARING A RESPIRATOR.

IF YOU HAVE ANY FURTHER QUESTIONS, PLEASE CONTACT OUR OFFICE.

PHYSICIAN SIGNATURE

F:\2Forms\BOWSERRECERT03-00.doc

APPENDIX G

ANALYTICAL DATA

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
Volatile Organics (ug/kg)						
1,1,1,2-TETRACHLOROETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
1,1,1-TRICHLOROETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
1,1,2,2-TETRACHLOROETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
1,1,2-TRICHLOROETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
1,1-DICHLOROETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 6 08SB0110206
1,1-DICHLOROETHENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 7 08SB0110206
1,2,3-TRICHLOROPROPANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
1,2-DIBROMO-3-CHLOROPROPANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
1,2-DIBROMOETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
1,2-DICHLOROETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
1,2-DICHLOROPROPANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
2-BUTANONE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 5 J 08SB0100610 7 J 08SB0101013	0.951 U 08SS0110002 2 J 08SB0110206
2-HEXANONE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
3-CHLOROPROPENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
4-METHYL-2-PENTANONE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
ACETONE	0.953 U 08SS0010002	0.932 UJ 08SS0020002	0.999 UJ 08SS0030002	0.924 UJ 08SS0050002 1 J 08SB0050206	1 J 08SS0100002 6 J 08SB0100206 42 J 08SB0100610 42 J 08SB0101013	7 J 08SS0110002 15 J 08SB0110206
ACETONITRILE	38.1 UR 08SS0010002	37.3 UR 08SS0020002	40 UR 08SS0030002	37 UR 08SS0050002 38.6 UR 08SB0050206	36.5 UR 08SS0100002 37.9 UR 08SB0100206 41.9 UR 08SB0100610 39.5 UR 08SB0101013	38 UR 08SS0110002 39.2 UR 08SB0110206
ACROLEIN	0.953 UR 08SS0010002	0.932 UR 08SS0020002	0.999 UR 08SS0030002	0.924 UR 08SS0050002 0.965 UR 08SB0050206	0.912 UR 08SS0100002 0.947 UR 08SB0100206 1.05 UR 08SB0100610 0.988 UR 08SB0101013	0.951 UR 08SS0110002 0.979 UR 08SB0110206
ACRYLONITRILE	0.953 UJ 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
BENZENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
BROMODICHLOROMETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
BROMOFORM	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
BROMOMETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CARBON DISULFIDE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CARBON TETRACHLORIDE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CHLOROBENZENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CHLORODIBROMOMETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CHLOROETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CHLOROFORM	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CHLOROMETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
CHLOROPRENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CIS-1,2-DICHLOROETHENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 2 J 08SB0100610 6 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
CIS-1,3-DICHLOROPROPENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
DIBROMOMETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
DICHLORODIFLUOROMETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 UR 08SB0100610 0.988 UR 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
ETHYL METHACRYLATE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
ETHYLBENZENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
ISOBUTANOL	38.1 UR 08SS0010002	37.3 UR 08SS0020002	40 UR 08SS0030002	37 UR 08SS0050002 38.6 UR 08SB0050206	36.5 UR 08SS0100002 37.9 UR 08SB0100206 41.9 UR 08SB0100610 39.5 UR 08SB0101013	38 UR 08SS0110002 39.2 UR 08SB0110206
METHACRYLONITRILE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
METHYL IODIDE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
METHYL METHACRYLATE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
METHYL TERT-BUTYL ETHER	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
METHYLENE CHLORIDE	0.953 UJ 08SS0010002	0.932 UJ 08SS0020002	0.999 UJ 08SS0030002	0.924 UJ 08SS0050002 0.965 UJ 08SB0050206	0.912 UJ 08SS0100002 0.947 UJ 08SB0100206 12 J 08SB0100610 15 J 08SB0101013	0.951 UJ 08SS0110002 0.979 UJ 08SB0110206
PROPIONITRILE	38.1 UR 08SS0010002	37.3 UR 08SS0020002	40 UR 08SS0030002	37 UR 08SS0050002 38.6 UR 08SB0050206	36.5 UR 08SS0100002 37.9 UR 08SB0100206 41.9 UR 08SB0100610 39.5 UR 08SB0101013	38 UR 08SS0110002 39.2 UR 08SB0110206
STYRENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
TETRACHLOROETHENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
TOLUENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
TOTAL XYLENES	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 1 J 08SB0110206
TRANS-1,2-DICHLOROETHENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206
TRANS-1,3-DICHLOROPROPENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002 0.965 U 08SB0050206	0.912 U 08SS0100002 0.947 U 08SB0100206 1.05 U 08SB0100610 0.988 U 08SB0101013	0.951 U 08SS0110002 0.979 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
TRANS-1,4-DICHLORO-2-BUTENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002	0.912 U 08SS0100002	0.951 U 08SS0110002
				0.965 U 08SB0050206	0.947 U 08SB0100206	0.979 U 08SB0110206
					1.05 U 08SB0100610	
					0.988 U 08SB0101013	
TRICHLOROETHENE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002	0.912 U 08SS0100002	0.951 U 08SS0110002
				0.965 U 08SB0050206	0.947 U 08SB0100206	0.979 U 08SB0110206
					1.05 U 08SB0100610	
					0.988 U 08SB0101013	
TRICHLOROFLUOROMETHANE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002	0.912 U 08SS0100002	0.951 U 08SS0110002
				0.965 U 08SB0050206	0.947 U 08SB0100206	0.979 U 08SB0110206
					2 J 08SB0100610	
					1 J 08SB0101013	
VINYL ACETATE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002	0.912 U 08SS0100002	0.951 U 08SS0110002
				0.965 U 08SB0050206	0.947 U 08SB0100206	0.979 U 08SB0110206
					1.05 U 08SB0100610	
					0.988 U 08SB0101013	
VINYL CHLORIDE	0.953 U 08SS0010002	0.932 U 08SS0020002	0.999 U 08SS0030002	0.924 U 08SS0050002	0.912 U 08SS0100002	0.951 U 08SS0110002
				0.965 U 08SB0050206	0.947 U 08SB0100206	0.979 U 08SB0110206
					2 J 08SB0100610	
					2 J 08SB0101013	
Semivolatile Organics (ug/kg)						
1,2,4,5-TETRACHLOROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
1,2,4-TRICHLOROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
1,2-DICHLOROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
1,3-DICHLOROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
1,4-DICHLOROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
1,4-DIOXANE	121 U 08SS0010002	118 U 08SS0020002	120 U 08SS0030002	117 U 08SS0050002	115 U 08SS0100002	115 U 08SS0110002
				116 U 08SB0050206	118 U 08SB0100206	122 U 08SB0110206
1,4-NAPHTHOQUINONE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
1,4-PHENYLENEDIAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
1-NAPHTHYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2,2'-OXYBIS(1-CHLOROPROPANE)	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
2,3,4,6-TETRACHLOROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2,4,5-TRICHLOROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2,4,6-TRICHLOROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2,4-DICHLOROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2,4-DIMETHYLPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2,4-DINITROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2,6-DICHLOROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-ACETYLAMINOFLUORENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-CHLORONAPHTHALENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-CHLOROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-METHYLNAPHTHALENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	3.86 U 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	7 J 08SB0110206
2-METHYLPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-NAPHTHYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-NITROANILINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-NITROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
2-PICOLINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
3&4-METHYLPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
3,3'-DICHLOROBENZIDINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
3,3'-DIMETHYLBENZIDINE	80.8 UJ 08SS0010002	79 UJ 08SS0020002	80.6 U 08SS0030002	78.4 UJ 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 UJ 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
3-METHYLCHOLANTHRENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
3-NITROANILINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
4,6-DINITRO-2-METHYLPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-AMINOBIPHENYL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-BROMOPHENYL PHENYL ETHER	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-CHLORO-3-METHYLPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-CHLOROANILINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-CHLOROPHENYL PHENYL ETHER	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-NITROANILINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-NITROPHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
4-NITROQUINOLINE-1-OXIDE	80.8 UR 08SS0010002	79 UR 08SS0020002	80.6 UR 08SS0030002	78.4 UR 08SS0050002	77.4 UR 08SS0100002	76.7 UR 08SS0110002
				77.9 UR 08SB0050206	79.3 UR 08SB0100206	82 UR 08SB0110206
5-NITRO-O-TOLUIDINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
7,12-DIMETHYLBENZ(A)ANTHRACENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
A,A-DIMETHYLPHENETHYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
ACENAPHTHENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	3.86 U 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
ACENAPHTHYLENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	100 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
ACETOPHENONE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
ANILINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
ANTHRACENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	33 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
ARAMITE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
BENZO(A)ANTHRACENE	3.98 U 08SS0010002	3.89 U 08SS0020002	4 J 08SS0030002	480 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
BENZO(A)PYRENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	560 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
BENZO(B)FLUORANTHENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	640 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
BENZO(G,H,I)PERYLENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	560 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
BENZO(K)FLUORANTHENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	430 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
BENZYL ALCOHOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
BIS(2-CHLOROETHOXY)METHANE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
BIS(2-CHLOROETHYL)ETHER	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
BIS(2-ETHYLHEXYL)PHTHALATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
BUTYL BENZYL PHTHALATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
CHLOROBENZILATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
CHRYSENE	3.98 U 08SS0010002	3.89 U 08SS0020002	5 J 08SS0030002	640 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
DIALLATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
DIBENZO(A,H)ANTHRACENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	170 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
DIBENZOFURAN	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
DIETHYL PHTHALATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
DIMETHYL PHTHALATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
DI-N-BUTYL PHTHALATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
DI-N-OCTYL PHTHALATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
DIPHENYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
ETHYL METHANE SULFONATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
FLUORANTHENE	3.98 U 08SS0010002	3.89 U 08SS0020002	6 J 08SS0030002	540 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
FLUORENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	3.86 U 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
HEXACHLOROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
HEXACHLOROBUTADIENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
HEXACHLOROCYCLOPENTADIENE	80.8 UJ 08SS0010002	79 UJ 08SS0020002	80.6 UJ 08SS0030002	78.4 UJ 08SS0050002	77.4 UJ 08SS0100002	76.7 UJ 08SS0110002
				77.9 UJ 08SB0050206	79.3 UJ 08SB0100206	82 UJ 08SB0110206
HEXACHLOROETHANE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
HEXACHLOROPROPENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
INDENO(1,2,3-CD)PYRENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	430 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
ISODRIN	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
ISOPHORONE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
ISOSAFROLE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
KEPONE	80.8 UJ 08SS0010002	79 UJ 08SS0020002	80.6 UJ 08SS0030002	78.4 UJ 08SS0050002	77.4 UJ 08SS0100002	76.7 UJ 08SS0110002
				77.9 UR 08SB0050206	79.3 UJ 08SB0100206	82 UJ 08SB0110206
METHAPYRILENE	80.8 UJ 08SS0010002	79 UJ 08SS0020002	80.6 UJ 08SS0030002	78.4 UJ 08SS0050002	77.4 UJ 08SS0100002	76.7 UJ 08SS0110002
				77.9 UJ 08SB0050206	79.3 UJ 08SB0100206	82 UJ 08SB0110206
METHYL METHANE SULFONATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
NAPHTHALENE	3.98 U 08SS0010002	3.89 U 08SS0020002	3.97 U 08SS0030002	9 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	38 08SB0110206
N-NITROSODIETHYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSODIMETHYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSO-DI-N-BUTYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSO-DI-N-PROPYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSODIPHENYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSOMETHYLETHYLAMINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSOMORPHOLINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSOPIPERIDINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
N-NITROSOPYRROLIDINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
O,O,O-TRIETHYL PHOSPHOROTHIOATE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
O-TOLUIDINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
P-(DIMETHYLAMINO)AZOBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
PENTACHLOROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
PENTACHLOROETHANE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
PENTACHLORONITROBENZENE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
PHENACETIN	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
PHENANTHRENE	3.98 U 08SS0010002	3.89 U 08SS0020002	18 08SS0030002	91 08SS0050002	3.81 U 08SS0100002	3.78 U 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
PHENOL	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
PRONAMIDE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
PYRENE	3.98 U 08SS0010002	3.89 U 08SS0020002	5 J 08SS0030002	690 08SS0050002	3.81 U 08SS0100002	11 08SS0110002
				3.84 U 08SB0050206	3.91 U 08SB0100206	4.04 U 08SB0110206
PYRIDINE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
SAFROLE	80.8 U 08SS0010002	79 U 08SS0020002	80.6 U 08SS0030002	78.4 U 08SS0050002	77.4 U 08SS0100002	76.7 U 08SS0110002
				77.9 U 08SB0050206	79.3 U 08SB0100206	82 U 08SB0110206
Pesticides/PCBs (ug/kg)						
4,4'-DDD					1.56 U 08SS0100002	1.55 UJ 08SS0110002
					1.6 U 08SB0100206	1.65 UJ 08SB0110206
4,4'-DDE					1.56 U 08SS0100002	1.55 U 08SS0110002
					1.6 U 08SB0100206	1.65 U 08SB0110206
4,4'-DDT					1.56 U 08SS0100002	1.55 U 08SS0110002
					1.6 U 08SB0100206	1.65 U 08SB0110206
ALDRIN					0.751 U 08SS0100002	0.745 U 08SS0110002
					0.769 U 08SB0100206	0.796 U 08SB0110206
ALPHA-BHC					0.751 U 08SS0100002	0.745 U 08SS0110002
					0.769 U 08SB0100206	0.796 U 08SB0110206
ALPHA-CHLORDANE					0.751 U 08SS0100002	0.745 U 08SS0110002
					0.769 U 08SB0100206	0.796 U 08SB0110206
AROCLOR-1016			10.8 U 08SS0030002		10.4 U 08SS0100002	10.3 U 08SS0110002
					10.7 U 08SB0100206	11 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
AROCLOR-1221			10.8 U 08SS0030002		10.4 U 08SS0100002 10.7 U 08SB0100206	10.3 U 08SS0110002 11 U 08SB0110206
AROCLOR-1232			10.8 U 08SS0030002		10.4 U 08SS0100002 10.7 U 08SB0100206	10.3 U 08SS0110002 11 U 08SB0110206
AROCLOR-1242			10.8 U 08SS0030002		10.4 U 08SS0100002 10.7 U 08SB0100206	10.3 U 08SS0110002 11 U 08SB0110206
AROCLOR-1248			10.8 U 08SS0030002		10.4 U 08SS0100002 10.7 U 08SB0100206	10.3 U 08SS0110002 11 U 08SB0110206
AROCLOR-1254			10.8 U 08SS0030002		10.4 U 08SS0100002 10.7 U 08SB0100206	10.3 U 08SS0110002 11 U 08SB0110206
AROCLOR-1260			10.8 U 08SS0030002		10.4 U 08SS0100002 10.7 U 08SB0100206	10.3 U 08SS0110002 11 U 08SB0110206
BETA-BHC					0.751 U 08SS0100002 0.769 U 08SB0100206	0.745 U 08SS0110002 0.796 U 08SB0110206
DELTA-BHC					0.751 U 08SS0100002 0.769 U 08SB0100206	0.745 U 08SS0110002 0.796 U 08SB0110206
DIELDRIN					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
ENDOSULFAN I					0.751 U 08SS0100002 0.769 U 08SB0100206	0.745 U 08SS0110002 0.796 U 08SB0110206
ENDOSULFAN II					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
ENDOSULFAN SULFATE					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
ENDRIN					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
ENDRIN ALDEHYDE					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
ENDRIN KETONE					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
GAMMA-BHC (LINDANE)					0.751 U 08SS0100002 0.769 U 08SB0100206	0.745 U 08SS0110002 0.796 U 08SB0110206
GAMMA-CHLORDANE					0.751 U 08SS0100002 0.769 U 08SB0100206	0.745 U 08SS0110002 0.796 U 08SB0110206
HEPTACHLOR					0.751 U 08SS0100002 0.769 U 08SB0100206	0.745 U 08SS0110002 0.796 U 08SB0110206
HEPTACHLOR EPOXIDE					0.751 U 08SS0100002 0.769 U 08SB0100206	0.745 U 08SS0110002 0.796 U 08SB0110206
METHOXYCHLOR					7.51 U 08SS0100002 7.69 U 08SB0100206	7.45 U 08SS0110002 7.96 U 08SB0110206
TOXAPHENE					19.6 U 08SS0100002 20.1 U 08SB0100206	19.5 U 08SS0110002 20.8 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
Energetics (mg/kg)						
1,3,5-TRINITROBENZENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
1,3-DINITROBENZENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
2,4,6-TRINITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
2,4-DINITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
2,6-DINITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
2-AMINO-4,6-DINITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
2-NITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
3-NITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
4-AMINO-2,6-DINITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
4-NITROTOLUENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
HMX	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
NITROBENZENE	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
RDX	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
TETRYL	0.25 U 08SS0010002	0.25 U 08SS0020002		0.25 U 08SS0050002 0.25 U 08SB0050206		
Herbicides (ug/kg)						
2,4,5-T					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
2,4,5-TP (SILVEX)					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
2,4-D					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
DINOSEB					1.56 U 08SS0100002 1.6 U 08SB0100206	1.55 U 08SS0110002 1.65 U 08SB0110206
HEXACHLOROPHENE					0.982 U 08SS0100002 1.01 U 08SB0100206	0.974 U 08SS0110002 1.04 U 08SB0110206
PENTACHLOROPHENOL					0.52 U 08SS0100002 0.533 U 08SB0100206	0.515 U 08SS0110002 0.551 U 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
Inorganics (mg/kg)						
ALUMINUM	23000 J 08SS0010002	20800 J 08SS0020002	24300 J 08SS0030002	19200 J 08SS0050002	21200 J 08SS0100002	28200 J 08SS0110002
				31500 J 08SB0050206	24000 J 08SB0100206	24600 J 08SB0110206
ANTIMONY	0.31 U 08SS0010002	0.64 U 08SS0020002	0.3 U 08SS0030002	0.23 U 08SS0050002	0.24 U 08SS0100002	0.12 U 08SS0110002
				0.23 U 08SB0050206	0.24 U 08SB0100206	0.37 U 08SB0110206
ARSENIC	5.5 J 08SS0010002	6.4 J 08SS0020002	7.9 J 08SS0030002	7.4 J 08SS0050002	5.4 J 08SS0100002	3.8 J 08SS0110002
				5.4 J 08SB0050206	5.4 J 08SB0100206	8.2 J 08SB0110206
BARIUM	87.6 J 08SS0010002	88.2 J 08SS0020002	91.4 J 08SS0030002	56.9 J 08SS0050002	99.4 J 08SS0100002	103 J 08SS0110002
				49.3 J 08SB0050206	102 J 08SB0100206	97.6 J 08SB0110206
BERYLLIUM	0.52 U 08SS0010002	0.61 J 08SS0020002	0.78 J 08SS0030002	0.46 U 08SS0050002	0.55 J 08SS0100002	0.59 J 08SS0110002
				0.49 U 08SB0050206	0.89 J 08SB0100206	0.66 J 08SB0110206
CADMIUM	0.47 J 08SS0010002	0.25 U 08SS0020002	0.55 J 08SS0030002	0.29 U 08SS0050002	0.19 U 08SS0100002	0.19 U 08SS0110002
				0.21 U 08SB0050206	0.26 U 08SB0100206	0.33 U 08SB0110206
CALCIUM	1980 J 08SS0010002	2310 J 08SS0020002	2030 J 08SS0030002	5090 J 08SS0050002	1200 J 08SS0100002	1970 J 08SS0110002
				778 J 08SB0050206	670 J 08SB0100206	22600 J 08SB0110206
CHROMIUM	21.6 J 08SS0010002	19.4 J 08SS0020002	24.7 J 08SS0030002	21.7 J 08SS0050002	19 J 08SS0100002	21.5 J 08SS0110002
				25 J 08SB0050206	21.9 J 08SB0100206	23.3 J 08SB0110206
COBALT	5.6 J 08SS0010002	7.7 J 08SS0020002	5.4 J 08SS0030002	7.7 J 08SS0050002	4.4 J 08SS0100002	6.3 J 08SS0110002
				3.4 J 08SB0050206	5.1 J 08SB0100206	6.7 J 08SB0110206
COPPER	11.3 J 08SS0010002	9.1 J 08SS0020002	11.1 J 08SS0030002	9.1 J 08SS0050002	9.8 J 08SS0100002	5.9 J 08SS0110002
				8.1 J 08SB0050206	8.5 J 08SB0100206	14.4 J 08SB0110206
IRON	23200 J 08SS0010002	19000 J 08SS0020002	32400 J 08SS0030002	22600 J 08SS0050002	19100 J 08SS0100002	15700 J 08SS0110002
				20000 J 08SB0050206	19200 J 08SB0100206	23600 J 08SB0110206
LEAD	31.1 J 08SS0010002	11.9 J 08SS0020002	16.8 J 08SS0030002	18.4 J 08SS0050002	12.1 J 08SS0100002	8.5 J 08SS0110002
				8.3 J 08SB0050206	11.9 J 08SB0100206	14.7 J 08SB0110206
MAGNESIUM	1800 J 08SS0010002	1890 J 08SS0020002	2150 J 08SS0030002	1690 J 08SS0050002	2140 J 08SS0100002	1950 J 08SS0110002
				1590 J 08SB0050206	2110 J 08SB0100206	3710 J 08SB0110206
MANGANESE	166 J 08SS0010002	522 J 08SS0020002	153 J 08SS0030002	466 J 08SS0050002	179 J 08SS0100002	148 J 08SS0110002
				33.5 J 08SB0050206	316 J 08SB0100206	389 J 08SB0110206
MERCURY	0.008 J 08SS0010002	0.022 J 08SS0020002	0.01 J 08SS0030002	0.01 J 08SS0050002	0.007 U 08SS0100002	0.007 U 08SS0110002
				0.007 U 08SB0050206	0.007 U 08SB0100206	0.037 J 08SB0110206
NICKEL	7.6 J 08SS0010002	9.7 J 08SS0020002	11.3 J 08SS0030002	8 J 08SS0050002	9.7 J 08SS0100002	8.5 J 08SS0110002
				8.6 J 08SB0050206	10.8 J 08SB0100206	12.4 J 08SB0110206
POTASSIUM	1230 J 08SS0010002	1530 J 08SS0020002	1340 J 08SS0030002	1180 J 08SS0050002	1140 J 08SS0100002	1020 J 08SS0110002
				1260 J 08SB0050206	1290 J 08SB0100206	2010 J 08SB0110206
SELENIUM	0.21 U 08SS0010002	0.27 U 08SS0020002	0.26 U 08SS0030002	0.24 U 08SS0050002	0.13 U 08SS0100002	0.12 U 08SS0110002
				0.19 U 08SB0050206	0.2 U 08SB0100206	0.49 U 08SB0110206
SILVER	0.05 U 08SS0010002	0.046 U 08SS0020002	0.045 U 08SS0030002	0.043 U 08SS0050002	0.1 U 08SS0100002	0.043 U 08SS0110002
				0.045 U 08SB0050206	0.044 U 08SB0100206	0.048 U 08SB0110206
SODIUM	56.8 U 08SS0010002	109 J 08SS0020002	60.8 U 08SS0030002	61.1 J 08SS0050002	84.1 J 08SS0100002	102 J 08SS0110002
				60.9 U 08SB0050206	104 J 08SB0100206	129 J 08SB0110206

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	01	01	01
Location	08SB001	08SB002	08SB003	08SB005	08SB010/TW003	08SB011
Sample Date	12/11/2004	12/11/2004	12/11/2004	12/11/2004	12/12/2004	12/12/2004
THALLIUM	0.27 U 08SS0010002	0.25 U 08SS0020002	0.27 U 08SS0030002	0.24 U 08SS0050002	0.27 U 08SS0100002	0.21 U 08SS0110002
				0.3 U 08SB0050206	0.29 U 08SB0100206	0.4 J 08SB0110206
TIN	0.92 U 08SS0010002	0.43 U 08SS0020002	0.44 J 08SS0030002	0.35 U 08SS0050002	0.41 J 08SS0100002	0.23 J 08SS0110002
				0.39 U 08SB0050206	0.34 J 08SB0100206	0.5 J 08SB0110206
VANADIUM	34.7 J 08SS0010002	33.7 J 08SS0020002	39.2 J 08SS0030002	34.1 J 08SS0050002	31.2 J 08SS0100002	29.4 J 08SS0110002
				36.2 J 08SB0050206	36.4 J 08SB0100206	42.3 J 08SB0110206
ZINC	128 J 08SS0010002	33.9 J 08SS0020002	38.3 J 08SS0030002	31.2 J 08SS0050002	32.2 J 08SS0100002	21.2 J 08SS0110002
				20.5 J 08SB0050206	29.7 J 08SB0100206	55.2 J 08SB0110206
Miscellaneous Parameters						
PERCHLORATE (MG/KG)	0.048 U 08SS0010002	0.047 U 08SS0020002		0.044 U 08SS0050002		
				0.046 U 08SB0050206		

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
Volatile Organics (ug/kg)						
1,1,1,2-TETRACHLOROETHANE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 1.07 U 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002
1,1,1-TRICHLOROETHANE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 1.07 U 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002
1,1,2,2-TETRACHLOROETHANE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 1.07 U 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002
1,1,2-TRICHLOROETHANE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 1.07 U 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002
1,1-DICHLOROETHANE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 1.07 U 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002
1,1-DICHLOROETHENE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 15 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002
1,2,3-TRICHLOROPROPANE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 1.07 U 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002
1,2-DIBROMO-3-CHLOROPROPANE	0.899 U 08SS0120002 1.01 U 08SB0120206 1.03 U 08SB0120206-D 0.985 U 08SB0120610 1.09 U 08SB0121018	0.947 U 08SS0130002 0.983 U 08SB0130206 1.04 U 08SB0130610 1.07 U 08SB0131013		1.07 U 08SS0150002 0.907 U 08SB0150406	1.05 U 08SS0160002 1.19 U 08SB0160203	1.16 U 08SS0170002

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
1,2-DIBROMOETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
1,2-DICHLOROETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
1,2-DICHLOROPROPANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
2-BUTANONE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	6 J 08SB0120206	2 J 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	2 J 08SB0120206-D	10 J 08SB0130610				
	9 J 08SB0120610	31 08SB0131013				
	7 J 08SB0121018					
2-HEXANONE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
3-CHLOROPROPENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
4-METHYL-2-PENTANONE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 UJ 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
ACETONE	0.899 UJ 08SS0120002	0.947 UJ 08SS0130002		2 J 08SS0150002	1.05 UR 08SS0160002	1.16 UR 08SS0170002
	26 J 08SB0120206	6 J 08SB0130206		3 J 08SB0150406	1.19 UR 08SB0160203	
	14 U 08SB0120206-D	51 J 08SB0130610				
	45 J 08SB0120610	130 J 08SB0131013				
	65 J 08SB0121018					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
ACETONITRILE	35.9 UR 08SS0120002	37.9 UR 08SS0130002		10.7 UR 08SS0150002	10.5 UR 08SS0160002	11.6 UR 08SS0170002
	40.4 UR 08SB0120206	39.3 UR 08SB0130206		9.1 UR 08SB0150406	11.9 UR 08SB0160203	
	41.1 UR 08SB0120206-D	41.7 UR 08SB0130610				
	39.4 UR 08SB0120610	42.9 UR 08SB0131013				
	43.6 UR 08SB0121018					
ACROLEIN	0.899 UR 08SS0120002	0.947 UR 08SS0130002		1.07 UR 08SS0150002	1.05 UR 08SS0160002	1.16 UR 08SS0170002
	1.01 UR 08SB0120206	0.983 UR 08SB0130206		0.907 UR 08SB0150406	1.19 UR 08SB0160203	
	1.03 UR 08SB0120206-D	1.04 UR 08SB0130610				
	0.985 UR 08SB0120610	1.07 UR 08SB0131013				
	1.09 UR 08SB0121018					
ACRYLONITRILE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
BENZENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	2 J 08SB0131013				
	1.09 U 08SB0121018					
BROMODICHLOROMETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
BROMOFORM	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 UJ 08SS0150002	1.05 UJ 08SS0160002	1.16 UJ 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 UJ 08SB0150406	1.19 UJ 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
BROMOMETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
CARBON DISULFIDE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 UJ 08SB0120206-D	1.04 U 08SB0130610				
	1 J 08SB0120610	1.07 UJ 08SB0131013				
	1.09 U 08SB0121018					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
CARBON TETRACHLORIDE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
CHLOROBENZENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
CHLORODIBROMOMETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
CHLOROETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	7 08SB0131013				
	1.09 U 08SB0121018					
CHLOROFORM	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
CHLOROMETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
CHLOROPRENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
CIS-1,2-DICHLOROETHENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	2 J 08SB0131013				
	2 J 08SB0121018					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
CIS-1,3-DICHLOROPROPENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
DIBROMOMETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
DICHLORODIFLUOROMETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 UR 08SB0130610				
	0.985 UR 08SB0120610	1.07 U 08SB0131013				
	1.09 UR 08SB0121018					
ETHYL METHACRYLATE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
ETHYLBENZENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	3 J 08SB0131013				
	1.09 U 08SB0121018					
ISOBUTANOL	35.9 UR 08SS0120002	37.9 UR 08SS0130002		42.7 UR 08SS0150002	42.2 UR 08SS0160002	46.5 UR 08SS0170002
	40.4 UR 08SB0120206	39.3 UR 08SB0130206		36.3 UR 08SB0150406	47.8 UR 08SB0160203	
	41.1 UR 08SB0120206-D	41.7 UR 08SB0130610				
	39.4 UR 08SB0120610	42.9 UR 08SB0131013				
	43.6 UR 08SB0121018					
METHACRYLONITRILE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 UJ 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
METHYL IODIDE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
METHYL METHACRYLATE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 UJ 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
METHYL TERT-BUTYL ETHER	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
METHYLENE CHLORIDE	0.899 UJ 08SS0120002	0.947 UJ 08SS0130002		1.07 UJ 08SS0150002	1.05 UJ 08SS0160002	1.16 UJ 08SS0170002
	1.01 UJ 08SB0120206	0.983 UJ 08SB0130206		0.907 UJ 08SB0150406	1.19 UJ 08SB0160203	
	5 J 08SB0120206-D	28 J 08SB0130610				
	0.985 UJ 08SB0120610	44 J 08SB0131013				
	15 J 08SB0121018					
PROPIONITRILE	35.9 UR 08SS0120002	37.9 UR 08SS0130002		10.7 UR 08SS0150002	10.5 UR 08SS0160002	11.6 UR 08SS0170002
	40.4 UR 08SB0120206	39.3 UR 08SB0130206		9.1 UR 08SB0150406	11.9 UR 08SB0160203	
	41.1 UR 08SB0120206-D	41.7 UR 08SB0130610				
	39.4 UR 08SB0120610	42.9 UR 08SB0131013				
	43.6 UR 08SB0121018					
STYRENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
TETRACHLOROETHENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
TOLUENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	19 08SB0131013				
	1.09 U 08SB0121018					
TOTAL XYLENES	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	2 J 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
TRANS-1,2-DICHLOROETHENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
TRANS-1,3-DICHLOROPROPENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
TRANS-1,4-DICHLORO-2-BUTENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
TRICHLOROETHENE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	2 J 08SB0131013				
	1.09 U 08SB0121018					
TRICHLOROFLUOROMETHANE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 J 08SB0120206-D	2 J 08SB0130610				
	0.985 U 08SB0120610	4 08SB0131013				
	2 J 08SB0121018					
VINYL ACETATE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 UJ 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 UJ 08SB0131013				
	1.09 U 08SB0121018					
VINYL CHLORIDE	0.899 U 08SS0120002	0.947 U 08SS0130002		1.07 U 08SS0150002	1.05 U 08SS0160002	1.16 U 08SS0170002
	1.01 U 08SB0120206	0.983 U 08SB0130206		0.907 U 08SB0150406	1.19 U 08SB0160203	
	1.03 U 08SB0120206-D	1.04 U 08SB0130610				
	0.985 U 08SB0120610	1.07 U 08SB0131013				
	1.09 U 08SB0121018					
Semivolatile Organics (ug/kg)						
1,2,4,5-TETRACHLOROBENZENE	77.2 U 08SS0120002	79.3 U 08SS0130002				
	80.6 U 08SB0120206	82.3 U 08SB0130206				
	82 U 08SB0120206-D					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
1,2,4-TRICHLOROBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
1,2-DICHLOROBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
1,3-DICHLOROBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
1,4-DICHLOROBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
1,4-DIOXANE	115 U 08SS0120002 120 U 08SB0120206 122 U 08SB0120206-D	118 U 08SS0130002 123 U 08SB0130206				
1,4-NAPHTHOQUINONE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
1,4-PHENYLENEDIAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
1-NAPHTHYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2,2'-OXYBIS(1-CHLOROPROPANE)	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2,3,4,6-TETRACHLOROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2,4,5-TRICHLOROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2,4,6-TRICHLOROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2,4-DICHLOROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2,4-DIMETHYLPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2,4-DINITROPHENOL	77.2 U 08SS0120002	79.3 U 08SS0130002				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
	80.6 U 08SB0120206 82 U 08SB0120206-D	82.3 U 08SB0130206				
2,6-DICHLOROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-ACETYLAMINOFLUORENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-CHLORONAPHTHALENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-CHLOROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-METHYLNAPHTHALENE	3.8 U 08SS0120002 7 J 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
2-METHYLPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-NAPHTHYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-NITROANILINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-NITROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
2-PICOLINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
3&4-METHYLPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
3,3'-DICHLOROBENZIDINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
3,3'-DIMETHYLBENZIDINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
3-METHYLCHOLANTHRENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
3-NITROANILINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4,6-DINITRO-2-METHYLPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-AMINOBIPHENYL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-BROMOPHENYL PHENYL ETHER	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-CHLORO-3-METHYLPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-CHLOROANILINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-CHLOROPHENYL PHENYL ETHER	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-NITROANILINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-NITROPHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
4-NITROQUINOLINE-1-OXIDE	77.2 UR 08SS0120002 80.6 UR 08SB0120206 82 UR 08SB0120206-D	79.3 UR 08SS0130002 82.3 UR 08SB0130206				
5-NITRO-O-TOLUIDINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
7,12-DIMETHYLBENZ(A)ANTHRACENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
A,A-DIMETHYLPHENETHYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
ACENAPHTHENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
ACENAPHTHYLENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
ACETOPHENONE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
ANILINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
ANTHRACENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
ARAMITE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
BENZO(A)ANTHRACENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
BENZO(A)PYRENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
BENZO(B)FLUORANTHENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
BENZO(G,H,I)PERYLENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 UJ 08SB0130206				
BENZO(K)FLUORANTHENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
BENZYL ALCOHOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
BIS(2-CHLOROETHOXY)METHANE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
BIS(2-CHLOROETHYL)ETHER	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
BIS(2-ETHYLHEXYL)PHTHALATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
BUTYL BENZYL PHTHALATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
CHLOROBENZILATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
CHRYSENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
DIALLATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
DIBENZO(A,H)ANTHRACENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 UJ 08SB0130206				
DIBENZOFURAN	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
DIETHYL PHTHALATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
DIMETHYL PHTHALATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
DI-N-BUTYL PHTHALATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
DI-N-OCTYL PHTHALATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
DIPHENYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
ETHYL METHANE SULFONATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
FLUORANTHENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
FLUORENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
HEXACHLOROBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
HEXACHLOROBUTADIENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
HEXACHLOROCYCLOPENTADIENE	77.2 UJ 08SS0120002 80.6 UJ 08SB0120206 82 UJ 08SB0120206-D	79.3 UJ 08SS0130002 82.3 UJ 08SB0130206				
HEXACHLOROETHANE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
HEXACHLOROPROPENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
INDENO(1,2,3-CD)PYRENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 UJ 08SB0130206				
ISODRIN	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
ISOPHORONE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
ISOSAFROLE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
KEPONE	77.2 UJ 08SS0120002 80.6 UJ 08SB0120206 82 UJ 08SB0120206-D	79.3 UJ 08SS0130002 82.3 UJ 08SB0130206				
METHAPYRILENE	77.2 UJ 08SS0120002 80.6 UJ 08SB0120206 82 U 08SB0120206-D	79.3 UJ 08SS0130002 82.3 UJ 08SB0130206				
METHYL METHANE SULFONATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
NAPHTHALENE	3.8 U 08SS0120002 12 08SB0120206 5 J 08SB0120206-D	3.91 U 08SS0130002 10 08SB0130206				
N-NITROSODIETHYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
N-NITROSODIMETHYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
N-NITROSO-DI-N-BUTYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
N-NITROSO-DI-N-PROPYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
N-NITROSODIPHENYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
N-NITROSOMETHYLETHYLAMINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
N-NITROSOMORPHOLINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
N-NITROSOPIPERIDINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
N-NITROSOPYRROLIDINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
O,O,O-TRIETHYL PHOSPHOROTHIOATE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
O-TOLUIDINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
P-(DIMETHYLAMINO)AZOBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
PENTACHLOROBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
PENTACHLOROETHANE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
PENTACHLORONITROBENZENE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
PHENACETIN	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
PHENANTHRENE	3.8 U 08SS0120002 5 J 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
PHENOL	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
PRONAMIDE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
PYRENE	3.8 U 08SS0120002 3.97 U 08SB0120206 4.04 U 08SB0120206-D	3.91 U 08SS0130002 4.05 U 08SB0130206				
PYRIDINE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				
SAFROLE	77.2 U 08SS0120002 80.6 U 08SB0120206 82 U 08SB0120206-D	79.3 U 08SS0130002 82.3 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
Pesticides/PCBs (ug/kg)						
4,4'-DDD	1.56 UJ 08SS0120002 1.62 UJ 08SB0120206 1.65 U 08SB0120206-D	1.6 UJ 08SS0130002 1.66 UJ 08SB0130206				
4,4'-DDE	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
4,4'-DDT	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
ALDRIN	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
ALPHA-BHC	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
ALPHA-CHLORDANE	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
AROCLOR-1016	10.4 U 08SS0120002 10.8 U 08SB0120206 11 U 08SB0120206-D	10.7 U 08SS0130002 11.1 U 08SB0130206				
AROCLOR-1221	10.4 U 08SS0120002 10.8 U 08SB0120206 11 U 08SB0120206-D	10.7 U 08SS0130002 11.1 U 08SB0130206				
AROCLOR-1232	10.4 U 08SS0120002 10.8 U 08SB0120206 11 U 08SB0120206-D	10.7 U 08SS0130002 11.1 U 08SB0130206				
AROCLOR-1242	10.4 U 08SS0120002 10.8 U 08SB0120206 11 U 08SB0120206-D	10.7 U 08SS0130002 11.1 U 08SB0130206				
AROCLOR-1248	10.4 U 08SS0120002 10.8 U 08SB0120206 11 U 08SB0120206-D	10.7 U 08SS0130002 11.1 U 08SB0130206				
AROCLOR-1254	10.4 U 08SS0120002 10.8 U 08SB0120206 11 U 08SB0120206-D	10.7 U 08SS0130002 11.1 U 08SB0130206				
AROCLOR-1260	10.4 U 08SS0120002 10.8 U 08SB0120206 11 U 08SB0120206-D	10.7 U 08SS0130002 11.1 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
BETA-BHC	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
DELTA-BHC	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
DIELDRIN	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
ENDOSULFAN I	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
ENDOSULFAN II	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
ENDOSULFAN SULFATE	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
ENDRIN	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
ENDRIN ALDEHYDE	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
ENDRIN KETONE	1.56 U 08SS0120002 1.62 U 08SB0120206 1.65 U 08SB0120206-D	1.6 U 08SS0130002 1.66 U 08SB0130206				
GAMMA-BHC (LINDANE)	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
GAMMA-CHLORDANE	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
HEPTACHLOR	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				
HEPTACHLOR EPOXIDE	0.749 U 08SS0120002 0.782 U 08SB0120206 0.796 U 08SB0120206-D	0.769 U 08SS0130002 0.799 U 08SB0130206				

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
METHOXYCHLOR	7.49 U 08SS0120002	7.69 U 08SS0130002				
	7.82 U 08SB0120206	7.99 U 08SB0130206				
	7.96 U 08SB0120206-D					
TOXAPHENE	19.6 U 08SS0120002	20.1 U 08SS0130002				
	20.5 U 08SB0120206	20.9 U 08SB0130206				
	20.8 U 08SB0120206-D					
Herbicides (ug/kg)						
2,4,5-T	1.56 U 08SS0120002	1.6 U 08SS0130002				
	1.62 U 08SB0120206	1.66 U 08SB0130206				
	1.65 U 08SB0120206-D					
2,4,5-TP (SILVEX)	1.56 U 08SS0120002	1.6 U 08SS0130002				
	1.62 U 08SB0120206	1.66 U 08SB0130206				
	1.65 U 08SB0120206-D					
2,4-D	1.56 U 08SS0120002	1.6 U 08SS0130002				
	1.62 U 08SB0120206	1.66 U 08SB0130206				
	1.65 U 08SB0120206-D					
DINOSEB	1.56 U 08SS0120002	1.6 U 08SS0130002				
	1.62 U 08SB0120206	1.66 U 08SB0130206				
	1.65 U 08SB0120206-D					
HEXACHLOROPHENE	0.979 U 08SS0120002	1.01 U 08SS0130002				
	1.02 U 08SB0120206	1.04 U 08SB0130206				
	1.04 U 08SB0120206-D					
PENTACHLOROPHENOL	0.518 U 08SS0120002	0.533 U 08SS0130002				
	0.542 U 08SB0120206	0.553 U 08SB0130206				
	0.551 U 08SB0120206-D					
Inorganics (mg/kg)						
ALUMINUM	27100 J 08SS0120002	26100 J 08SS0130002				
	24400 J 08SB0120206	22500 J 08SB0130206				
	23200 J 08SB0120206-D					
ANTIMONY	0.09 U 08SS0120002	0.36 U 08SS0130002				
	0.38 U 08SB0120206	0.52 U 08SB0130206				
	0.28 U 08SB0120206-D					
ARSENIC	4 J 08SS0120002	7.7 J 08SS0130002				
	9.7 J 08SB0120206	9.6 J 08SB0130206				
	10.4 J 08SB0120206-D					
BARIUM	123 J 08SS0120002	85.7 J 08SS0130002				
	102 J 08SB0120206	125 J 08SB0130206				
	100 J 08SB0120206-D					
BERYLLIUM	0.75 J 08SS0120002	0.76 J 08SS0130002				
	0.87 J 08SB0120206	0.88 J 08SB0130206				
	0.75 J 08SB0120206-D					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
CADMIUM	0.2 U 08SS0120002	0.41 U 08SS0130002				
	0.3 U 08SB0120206	0.25 U 08SB0130206				
	0.32 J 08SB0120206-D					
CALCIUM	1180 J 08SS0120002	2080 J 08SS0130002				
	633 J 08SB0120206	677 J 08SB0130206				
	600 J 08SB0120206-D					
CHROMIUM	21.4 J 08SS0120002	23.5 J 08SS0130002				
	23.4 J 08SB0120206	22.2 J 08SB0130206				
	23.1 J 08SB0120206-D					
COBALT	4.2 J 08SS0120002	3.9 J 08SS0130002				
	6.9 J 08SB0120206	7.4 J 08SB0130206				
	7.6 08SB0120206-D					
COPPER	5.5 J 08SS0120002	13.2 J 08SS0130002				
	11.6 J 08SB0120206	10.4 J 08SB0130206				
	13.7 J 08SB0120206-D					
IRON	19100 J 08SS0120002	25300 J 08SS0130002				
	24000 J 08SB0120206	25400 J 08SB0130206				
	25700 J 08SB0120206-D					
LEAD	11 J 08SS0120002	12.7 J 08SS0130002				
	33.3 J 08SB0120206	15.2 J 08SB0130206				
	20.5 J 08SB0120206-D					
MAGNESIUM	1850 J 08SS0120002	2970 J 08SS0130002				
	2530 J 08SB0120206	2320 J 08SB0130206				
	2580 J 08SB0120206-D					
MANGANESE	64.1 J 08SS0120002	164 J 08SS0130002				
	570 J 08SB0120206	616 J 08SB0130206				
	564 J 08SB0120206-D					
MERCURY	0.007 J 08SS0120002	0.033 J 08SS0130002				
	0.035 J 08SB0120206	0.039 J 08SB0130206				
	0.038 J 08SB0120206-D					
NICKEL	9.6 J 08SS0120002	10.6 J 08SS0130002				
	12.6 J 08SB0120206	12 J 08SB0130206				
	15.1 J 08SB0120206-D					
POTASSIUM	985 J 08SS0120002	1990 J 08SS0130002				
	1960 J 08SB0120206	1670 J 08SB0130206				
	1590 J 08SB0120206-D					
SELENIUM	0.16 U 08SS0120002	0.42 U 08SS0130002				
	0.42 U 08SB0120206	0.52 U 08SB0130206				
	0.43 J 08SB0120206-D					

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	01	01	01	03	03	03
Location	08SB012	08SB013/TW004	08SB014	08SB015	08SB016	08SB017
Sample Date	12/12/2004	12/12/2004	12/12/2004	10/3/2005	10/4/2005	10/3/2005
SILVER	0.044 U 08SS0120002	0.2 U 08SS0130002				
	0.051 U 08SB0120206	0.05 U 08SB0130206				
	0.049 U 08SB0120206-D					
SODIUM	91.9 J 08SS0120002	124 J 08SS0130002				
	104 J 08SB0120206	101 J 08SB0130206				
	97.6 U 08SB0120206-D					
THALLIUM	0.25 U 08SS0120002	0.36 U 08SS0130002				
	0.76 J 08SB0120206	0.32 U 08SB0130206				
	0.41 J 08SB0120206-D					
TIN	0.2 J 08SS0120002	0.45 J 08SS0130002				
	0.35 J 08SB0120206	0.33 J 08SB0130206				
	0.45 U 08SB0120206-D					
VANADIUM	31.1 J 08SS0120002	40.5 J 08SS0130002				
	44.8 J 08SB0120206	41 J 08SB0130206				
	44.3 08SB0120206-D					
ZINC	19.4 J 08SS0120002	47.5 J 08SS0130002				
	46 J 08SB0120206	45.2 J 08SB0130206				
	46.2 J 08SB0120206-D					
Miscellaneous Parameters						
CATION EXCHANGE CAPACITY (MEQ/100)			12 08SS0140002			
PH (S.U.)			7.7 08SS0140002			
TOTAL ORGANIC CARBON (MG/KG)			2200 08SS0140002			

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	03	03	03	03	03	03
Location	08SB018	08SB020	08SB021	08SB024	08SB032	08SB033
Sample Date	10/3/2005	10/3/2005	10/3/2005	10/3/2005	10/4/2005	10/4/2005
Volatile Organics (ug/kg)						
1,1,1,2-TETRACHLOROETHANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,1,1-TRICHLOROETHANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,1,2,2-TETRACHLOROETHANE	1.11 UJ 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 UJ 08SS0210002 1 U 08SB0210204	1.32 UJ 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,1,2-TRICHLOROETHANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,1-DICHLOROETHANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,1-DICHLOROETHENE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,2,3-TRICHLOROPROPANE	1.11 UJ 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 UJ 08SS0210002 1 U 08SB0210204	1.32 UJ 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,2-DIBROMO-3-CHLOROPROPANE	1.11 UJ 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 UJ 08SS0210002 1 U 08SB0210204	1.32 UJ 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,2-DIBROMOETHANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,2-DICHLOROETHANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
1,2-DICHLOROPROPANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
2-BUTANONE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	3 J 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 5 J 08SB0330406-D
2-HEXANONE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	03	03	03	03	03	03
Location	08SB018	08SB020	08SB021	08SB024	08SB032	08SB033
Sample Date	10/3/2005	10/3/2005	10/3/2005	10/3/2005	10/4/2005	10/4/2005
3-CHLOROPROPENE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
4-METHYL-2-PENTANONE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
ACETONE	1.11 UR 08SS0180002	1.09 UR 08SS0200002	1 UR 08SS0210002	1.32 UR 08SS0240002	64 J 08SS0320002	5 J 08SS0330002
	0.968 UR 08SB0180204	0.964 UJ 08SB0200204	7 J 08SB0210204	1.2 UR 08SB0240203	0.926 UR 08SB0320607	15 J 08SB0330406
						52 J 08SB0330406-D
ACETONITRILE	11.1 UR 08SS0180002	10.9 UR 08SS0200002	10.0 UR 08SS0210002	13.2 UR 08SS0240002	11.4 UR 08SS0320002	9.3 UR 08SS0330002
	9.7 UR 08SB0180204	9.6 UR 08SB0200204	10.0 UR 08SB0210204	12.0 UR 08SB0240203	9.3 UR 08SB0320607	9.8 UR 08SB0330406
						10.5 UR 08SB0330406-D
ACROLEIN	1.11 UR 08SS0180002	1.09 UR 08SS0200002	1 UR 08SS0210002	1.32 UR 08SS0240002	1.14 UR 08SS0320002	0.93 UR 08SS0330002
	0.968 UR 08SB0180204	0.964 UR 08SB0200204	1 UR 08SB0210204	1.2 UR 08SB0240203	0.926 UR 08SB0320607	0.98 UR 08SB0330406
						1.05 UR 08SB0330406-D
ACRYLONITRILE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
BENZENE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
BROMODICHLOROMETHANE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
BROMOFORM	1.11 UJ 08SS0180002	1.09 UJ 08SS0200002	1 UJ 08SS0210002	1.32 UJ 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 UJ 08SB0180204	0.964 UJ 08SB0200204	1 UJ 08SB0210204	1.2 UJ 08SB0240203	0.926 UJ 08SB0320607	0.98 U 08SB0330406
						1.05 UJ 08SB0330406-D
BROMOMETHANE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CARBON DISULFIDE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CARBON TETRACHLORIDE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CHLOROBENZENE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CHLORODIBROMOMETHANE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	03	03	03	03	03	03
Location	08SB018	08SB020	08SB021	08SB024	08SB032	08SB033
Sample Date	10/3/2005	10/3/2005	10/3/2005	10/3/2005	10/4/2005	10/4/2005
CHLOROETHANE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CHLOROFORM	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CHLOROMETHANE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CHLOROPRENE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CIS-1,2-DICHLOROETHENE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
CIS-1,3-DICHLOROPROPENE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
DIBROMOMETHANE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
DICHLORODIFLUOROMETHANE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
ETHYL METHACRYLATE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
ETHYLBENZENE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
ISOBUTANOL	44.2 UR 08SS0180002	43.8 UR 08SS0200002	40 UR 08SS0210002	52.8 UR 08SS0240002	45.7 UR 08SS0320002	37.2 UR 08SS0330002
	38.7 UR 08SB0180204	38.5 UR 08SB0200204	40 UR 08SB0210204	47.8 UR 08SB0240203	37.1 UR 08SB0320607	39.2 UR 08SB0330406
						42.1 UR 08SB0330406-D
METHACRYLONITRILE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
METHYL IODIDE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D
METHYL METHACRYLATE	1.11 U 08SS0180002	1.09 U 08SS0200002	1 U 08SS0210002	1.32 U 08SS0240002	1.14 U 08SS0320002	0.93 U 08SS0330002
	0.968 U 08SB0180204	0.964 UJ 08SB0200204	1 U 08SB0210204	1.2 U 08SB0240203	0.926 U 08SB0320607	0.98 U 08SB0330406
						1.05 U 08SB0330406-D

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	03	03	03	03	03	03
Location	08SB018	08SB020	08SB021	08SB024	08SB032	08SB033
Sample Date	10/3/2005	10/3/2005	10/3/2005	10/3/2005	10/4/2005	10/4/2005
METHYL TERT-BUTYL ETHER	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
METHYLENE CHLORIDE	4 J 08SS0180002 0.968 UJ 08SB0180204	1.09 UJ 08SS0200002 0.964 UJ 08SB0200204	1 UJ 08SS0210002 1 UJ 08SB0210204	1.32 UJ 08SS0240002 1.2 UJ 08SB0240203	1.14 UJ 08SS0320002 0.926 UJ 08SB0320607	2 J 08SS0330002 0.98 UJ 08SB0330406 1.05 UJ 08SB0330406-D
PROPIONITRILE	11.1 UR 08SS0180002 9.7 UR 08SB0180204	10.9 UR 08SS0200002 9.6 UR 08SB0200204	10.0 UR 08SS0210002 10.0 UR 08SB0210204	13.2 UR 08SS0240002 12.0 UR 08SB0240203	11.4 UR 08SS0320002 9.3 UR 08SB0320607	9.3 UR 08SS0330002 9.8 UR 08SB0330406 10.5 UR 08SB0330406-D
STYRENE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TETRACHLOROETHENE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TOLUENE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TOTAL XYLENES	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TRANS-1,2-DICHLOROETHENE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TRANS-1,3-DICHLOROPROPENE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TRANS-1,4-DICHLORO-2-BUTENE	1.11 UJ 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 UJ 08SS0210002 1 U 08SB0210204	1.32 UJ 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TRICHLOROETHENE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
TRICHLOROFLUOROMETHANE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
VINYL ACETATE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D
VINYL CHLORIDE	1.11 U 08SS0180002 0.968 U 08SB0180204	1.09 U 08SS0200002 0.964 UJ 08SB0200204	1 U 08SS0210002 1 U 08SB0210204	1.32 U 08SS0240002 1.2 U 08SB0240203	1.14 U 08SS0320002 0.926 U 08SB0320607	0.93 U 08SS0330002 0.98 U 08SB0330406 1.05 U 08SB0330406-D

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	03	03	03	03	03	03
Location	08SB035	08SB036	08SB037	08SB038	08SB039	08SB040
Sample Date	10/2/2005	9/27/2005	9/27/2005	9/27/2005	9/27/2005	10/4/2005
Volatile Organics (ug/kg)						
1,1,1,2-TETRACHLOROETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,1,1-TRICHLOROETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,1,2,2-TETRACHLOROETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,1,2-TRICHLOROETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,1-DICHLOROETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,1-DICHLOROETHENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,2,3-TRICHLOROPROPANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,2-DIBROMO-3-CHLOROPROPANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,2-DIBROMOETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,2-DICHLOROETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
1,2-DICHLOROPROPANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
2-BUTANONE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	3 J 08SS037000	2 J 08SS0380002	4 J 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
2-HEXANONE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
3-CHLOROPROPENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
4-METHYL-2-PENTANONE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
ACETONE	0.979 UJ 08SS0350002 4 J 08SB0350305	3 U 08SS0360002	17 U 08SS037000	14 U 08SS0380002	27 U 08SS0390002	0.943 UR 08SS0400002 0.977 UR 08SB0400204
ACETONITRILE	9.8 UR 08SS0350002 9.8 UR 08SB0350305	39 UR 08SS0360002	42.8 UR 08SS037000	47.8 UR 08SS0380002	41.5 UR 08SS0390002	9.4 UR 08SS0400002 9.8 UR 08SB0400204
ACROLEIN	0.979 UR 08SS0350002 0.984 UR 08SB0350305	0.974 UR 08SS0360002	1.07 UR 08SS037000	1.2 UR 08SS0380002	1.04 UR 08SS0390002	0.943 UR 08SS0400002 0.977 UR 08SB0400204
ACRYLONITRILE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
BENZENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	03	03	03	03	03	03
Location	08SB035	08SB036	08SB037	08SB038	08SB039	08SB040
Sample Date	10/2/2005	9/27/2005	9/27/2005	9/27/2005	9/27/2005	10/4/2005
BROMODICHLOROMETHANE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
BROMOFORM	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 UJ 08SB0400204
BROMOMETHANE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CARBON DISULFIDE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CARBON TETRACHLORIDE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CHLOROBENZENE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CHLORODIBROMOMETHANE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CHLOROETHANE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CHLOROFORM	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CHLOROMETHANE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CHLOROPRENE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
CIS-1,2-DICHLOROETHENE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					1 J 08SB0400204
CIS-1,3-DICHLOROPROPENE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
DIBROMOMETHANE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
DICHLORODIFLUOROMETHANE	0.979 U 08SS0350002	0.974 UJ 08SS0360002	1.07 UJ 08SS037000	1.2 UJ 08SS0380002	1.04 UJ 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
ETHYL METHACRYLATE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
ETHYLBENZENE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
ISOBUTANOL	39.2 UR 08SS0350002	39 UR 08SS0360002	42.8 UR 08SS037000	47.8 UR 08SS0380002	41.5 UR 08SS0390002	37.7 UR 08SS0400002
	39.4 UR 08SB0350305					39.1 UR 08SB0400204
METHACRYLONITRILE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
METHYL IODIDE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
METHYL METHACRYLATE	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002
	0.984 U 08SB0350305					0.977 U 08SB0400204
METHYL TERT-BUTYL ETHER	0.979 U 08SS0350002	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	03	03	03	03	03	03
Location	08SB035	08SB036	08SB037	08SB038	08SB039	08SB040
Sample Date	10/2/2005	9/27/2005	9/27/2005	9/27/2005	9/27/2005	10/4/2005
	0.984 U 08SB0350305					0.977 U 08SB0400204
METHYLENE CHLORIDE	0.979 UJ 08SS0350002 0.984 UJ 08SB0350305	0.974 UJ 08SS0360002	1.07 UJ 08SS037000	1.2 UJ 08SS0380002	1.04 UJ 08SS0390002	1 J 08SS0400002 0.977 UJ 08SB0400204
PROPIONITRILE	9.79 UR 08SS0350002 9.84 UR 08SB0350305	39 UR 08SS0360002	42.8 UR 08SS037000	47.8 UR 08SS0380002	41.5 UR 08SS0390002	9.4 UR 08SS0400002 9.8 UR 08SB0400204
STYRENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TETRACHLOROETHENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TOLUENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TOTAL XYLENES	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TRANS-1,2-DICHLOROETHENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TRANS-1,3-DICHLOROPROPENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TRANS-1,4-DICHLORO-2-BUTENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TRICHLOROETHENE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
TRICHLOROFLUOROMETHANE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
VINYL ACETATE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204
VINYL CHLORIDE	0.979 U 08SS0350002 0.984 U 08SB0350305	0.974 U 08SS0360002	1.07 U 08SS037000	1.2 U 08SS0380002	1.04 U 08SS0390002	0.943 U 08SS0400002 0.977 U 08SB0400204

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	04	04	04	04	04	04
Location	08SB046	08SB047/TW018	08SB048/TW008	08SB049	08SB050	08SB051
Sample Date	10/24/2006	10/24/2006	10/24/2006	10/24/2006	10/24/2006	10/24/2006
Volatile Organics (ug/kg)						
1,1,1,2-TETRACHLOROETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,1,1-TRICHLOROETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,1,2,2-TETRACHLOROETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,1,2-TRICHLOROETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,1-DICHLOROETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,1-DICHLOROETHENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,2,3-TRICHLOROPROPANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,2-DIBROMO-3-CHLOROPROPANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,2-DIBROMOETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,2-DICHLOROETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
1,2-DICHLOROPROPANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
2-BUTANONE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
2-HEXANONE	0.93 U 08SB0460608	0.94 UJ 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
3-CHLOROPROPENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
4-METHYL-2-PENTANONE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
ACETONE	1.9 U 08SB0460608	4.8 U 08SB0470608	29 U 08SB0480507	100 J 08SB0490507	25 J 08SB0500608	55 J 08SB0510204 62 J 08SB0510204-D
ACROLEIN	0.93 UR 08SB0460608	0.94 UR 08SB0470608	0.88 UR 08SB0480507	1.0 UR 08SB0490507	1.1 UR 08SB0500608	0.95 UR 08SB0510204 1.0 UR 08SB0510204-D
ACRYLONITRILE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
BENZENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	1.5 J 08SB0510204 1.0 U 08SB0510204-D
BROMODICHLOROMETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	04	04	04	04	04	04
Location	08SB046	08SB047/TW018	08SB048/TW008	08SB049	08SB050	08SB051
Sample Date	10/24/2006	10/24/2006	10/24/2006	10/24/2006	10/24/2006	10/24/2006
BROMOFORM	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
BROMOMETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CARBON DISULFIDE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CARBON TETRACHLORIDE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CHLOROBENZENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CHLORODIBROMOMETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CHLOROETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CHLOROFORM	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CHLOROMETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CHLOROPRENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
CIS-1,2-DICHLOROETHENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	1.9 J 08SB0510204 1.0 U 08SB0510204-D
CIS-1,3-DICHLOROPROPENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
DIBROMOMETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
DICHLORODIFLUOROMETHANE	0.93 UJ 08SB0460608	0.94 U 08SB0470608	0.88 UJ 08SB0480507	1.0 UJ 08SB0490507	1.1 UJ 08SB0500608	0.95 UJ 08SB0510204 1.0 UJ 08SB0510204-D
ETHYL METHACRYLATE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
ETHYLBENZENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	440 J 08SB0510204 2.9 J 08SB0510204-D
METHACRYLONITRILE	9.3 U 08SB0460608	9.4 U 08SB0470608	8.8 U 08SB0480507	10 U 08SB0490507	11 U 08SB0500608	9.5 U 08SB0510204 10 U 08SB0510204-D
METHYL IODIDE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
METHYL METHACRYLATE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
METHYL TERT-BUTYL ETHER	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
METHYLENE CHLORIDE	2.0 U 08SB0460608	9.3 U 08SB0470608	12 U 08SB0480507	2.0 U 08SB0490507	5.0 U 08SB0500608	2.4 U 08SB0510204 5.3 U 08SB0510204-D
STYRENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	GRASS/GRAVEL 04 08SB046 10/24/2006	GRASS/GRAVEL 04 08SB047/TW018 10/24/2006	GRASS/GRAVEL 04 08SB048/TW008 10/24/2006	GRASS/GRAVEL 04 08SB049 10/24/2006	GRASS/GRAVEL 04 08SB050 10/24/2006	GRASS/GRAVEL 04 08SB051 10/24/2006
						1.0 U 08SB0510204-D
TETRACHLOROETHENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
TOLUENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	23 J 08SB0510204 5.4 J 08SB0510204-D
TOTAL XYLENES	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	3900 J 08SB0510204 91 J 08SB0510204-D
TRANS-1,2-DICHLOROETHENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
TRANS-1,3-DICHLOROPROPENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
TRANS-1,4-DICHLORO-2-BUTENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
TRICHLOROETHENE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
TRICHLOROFLUOROMETHANE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
VINYL ACETATE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D
VINYL CHLORIDE	0.93 U 08SB0460608	0.94 U 08SB0470608	0.88 U 08SB0480507	1.0 U 08SB0490507	1.1 U 08SB0500608	0.95 U 08SB0510204 1.0 U 08SB0510204-D

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	04	04	04	04	04	04
Location	08SB052	08SB053/TW009	08SB054	08SB055/TW011	08SB056/TW012	08SB057/TW013
Sample Date	10/24/2006	10/23/2006	10/23/2006	10/23/2006	10/23/2006	10/23/2006
Volatile Organics (ug/kg)						GRASS/GRAVEL
1,1,1,2-TETRACHLOROETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,1,1-TRICHLOROETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,1,2,2-TETRACHLOROETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,1,2-TRICHLOROETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,1-DICHLOROETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	21 08SB0550709	3.2 08SB0560709	0.95 U 08SB0570608
1,1-DICHLOROETHENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	2.6 J 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,2,3-TRICHLOROPROPANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,2-DIBROMO-3-CHLOROPROPANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,2-DIBROMOETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,2-DICHLOROETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
1,2-DICHLOROPROPANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
2-BUTANONE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
2-HEXANONE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
3-CHLOROPROPENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
4-METHYL-2-PENTANONE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
ACETONE	19 J 08SB0520103	71 J 08SB0530507	20 J 08SB0540204	55 J 08SB0550709	13 U 08SB0560709	46 J 08SB0570608
ACROLEIN	0.97 UR 08SB0520103	0.99 UR 08SB0530507	0.96 UR 08SB0540204	1.1 UR 08SB0550709	0.92 UR 08SB0560709	0.95 UR 08SB0570608
ACRYLONITRILE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
BENZENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
BROMODICHLOROMETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
BROMOFORM	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
BROMOMETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CARBON DISULFIDE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CARBON TETRACHLORIDE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CHLOROBENZENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CHLORODIBROMOMETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CHLOROETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CHLOROFORM	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CHLOROMETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CHLOROPRENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CIS-1,2-DICHLOROETHENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
CIS-1,3-DICHLOROPROPENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
DIBROMOMETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
DICHLORODIFLUOROMETHANE	0.97 UJ 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
ETHYL METHACRYLATE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
ETHYLBENZENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
METHACRYLONITRILE	9.7 U 08SB0520103	9.9 U 08SB0530507	9.6 U 08SB0540204	11 U 08SB0550709	9.2 U 08SB0560709	9.5 U 08SB0570608
METHYL IODIDE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
METHYL METHACRYLATE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
METHYL TERT-BUTYL ETHER	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
METHYLENE CHLORIDE	5.3 U 08SB0520103	0.99 U 08SB0530507	1.3 U 08SB0540204	1.3 U 08SB0550709	5.4 U 08SB0560709	0.95 U 08SB0570608
STYRENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	04	04	04	04	04	04
Location	08SB052	08SB053/TW009	08SB054	08SB055/TW011	08SB056/TW012	08SB057/TW013
Sample Date	10/24/2006	10/23/2006	10/23/2006	10/23/2006	10/23/2006	10/23/2006
TETRACHLOROETHENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
TOLUENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
TOTAL XYLENES	4.2 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
TRANS-1,2-DICHLOROETHENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
TRANS-1,3-DICHLOROPROPENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
TRANS-1,4-DICHLORO-2-BUTENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
TRICHLOROETHENE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
TRICHLOROFLUOROMETHANE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
VINYL ACETATE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608
VINYL CHLORIDE	0.97 U 08SB0520103	0.99 U 08SB0530507	0.96 U 08SB0540204	1.1 U 08SB0550709	0.92 U 08SB0560709	0.95 U 08SB0570608

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	04	04	04	04	04
Location	08SB058	08SB059/TW014	08SB060/TW015	08SB061/TW016	08SB062/TW017
Sample Date	10/24/2006	10/23/2006	10/23/2006	10/23/2006	10/23/2006
Volatile Organics (ug/kg)					
1,1,1,2-TETRACHLOROETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
1,1,1-TRICHLOROETHANE	0.93 U 08SB0580709	1.8 J 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
1,1,2,2-TETRACHLOROETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
1,1,2-TRICHLOROETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
1,1-DICHLOROETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
1,1-DICHLOROETHENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
1,2,3-TRICHLOROPROPANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
1,2-DIBROMO-3-CHLOROPROPANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
1,2-DIBROMOETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
1,2-DICHLOROETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
1,2-DICHLOROPROPANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
2-BUTANONE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
2-HEXANONE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
3-CHLOROPROPENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
4-METHYL-2-PENTANONE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
ACETONE	18 J 08SB0580709	80 J 08SB0590709	89 J 08SB0600709	13 U 08SB0610507	78 J 08SB0620406
ACROLEIN	0.93 UR 08SB0580709	0.89 UR 08SB0590709	0.92 UR 08SB0600709	0.98 UR 08SB0610507	0.98 UR 08SB0620406
ACRYLONITRILE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
BENZENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
BROMODICHLOROMETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
BROMOFORM	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
BROMOMETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CARBON DISULFIDE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CARBON TETRACHLORIDE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CHLOROBENZENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
CHLORODIBROMOMETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CHLOROETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CHLOROFORM	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CHLOROMETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CHLOROPRENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CIS-1,2-DICHLOROETHENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
CIS-1,3-DICHLOROPROPENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
DIBROMOMETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
DICHLORODIFLUOROMETHANE	0.93 UJ 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
ETHYL METHACRYLATE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
ETHYLBENZENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
METHACRYLONITRILE	9.3 U 08SB0580709	8.9 U 08SB0590709	9.2 U 08SB0600709	9.8 U 08SB0610507	9.8 U 08SB0620406
METHYL IODIDE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
METHYL METHACRYLATE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
METHYL TERT-BUTYL ETHER	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
METHYLENE CHLORIDE	0.93 U 08SB0580709	2.2 U 08SB0590709	1.5 U 08SB0600709	3.1 U 08SB0610507	1.5 U 08SB0620406
STYRENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406

APPENDIX TABLE G-1a
RESULTS FOR CHEMICALS ANALYZED IN GRASS AND GRAVEL SOIL SAMPLES
SWMU 08 - BUILDING 106 POND
NSWC CRANE
CRANE, INDIANA

Area of Concern	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL	GRASS/GRAVEL
Sampling Round	04	04	04	04	04
Location	08SB058	08SB059/TW014	08SB060/TW015	08SB061/TW016	08SB062/TW017
Sample Date	10/24/2006	10/23/2006	10/23/2006	10/23/2006	10/23/2006
TETRACHLOROETHENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
TOLUENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
TOTAL XYLENES	1.2 J 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
TRANS-1,2-DICHLOROETHENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
TRANS-1,3-DICHLOROPROPENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
TRANS-1,4-DICHLORO-2-BUTENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
TRICHLOROETHENE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 UJ 08SB0620406
TRICHLOROFLUOROMETHANE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
VINYL ACETATE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406
VINYL CHLORIDE	0.93 U 08SB0580709	0.89 U 08SB0590709	0.92 U 08SB0600709	0.98 U 08SB0610507	0.98 U 08SB0620406

µg/kg = micrigram per killogram
µg/L = microgram per liter
mg/kg = milligram per kilogram
MEQ/100 = milliequivalents per 100 mL
mL = milliliter
S.U. = Standard units

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
Volatile Organics (ug/kg)						
1,1,1,2-TETRACHLOROETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,1,1-TRICHLOROETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,1,2,2-TETRACHLOROETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,1,2-TRICHLOROETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,1-DICHLOROETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,1-DICHLOROETHENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,2,3-TRICHLOROPROPANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,2-DIBROMO-3-CHLOROPROPANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,2-DIBROMOETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,2-DICHLOROETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
1,2-DICHLOROPROPANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
2-BUTANONE	2 J 08SS0040002 3 J 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 6 J 08SB0220608	0.918 U 08SS0230002	3 J 08SS0250002 1.18 U 08SB0250206 11 J 08SB0250608	3 J 08SS0260002 3 J 08SB0260406
2-HEXANONE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
3-CHLOROPROPENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
4-METHYL-2-PENTANONE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
ACETONE	18 J 08SS0040002 19 J 08SB0040206	5 J 08SS0190002	5 U 08SS0220002 43 J 08SB0220608	5 J 08SS0230002	5 U 08SS0250002 6 U 08SB0250206 19 U 08SB0250608	7 U 08SS0260002 6 U 08SB0260406
ACETONITRILE	37.7 UR 08SS0040002 44 UR 08SB0040206	9.1 UR 08SS0190002	40.8 UR 08SS0220002 41.5 UR 08SB0220608	9.2 UR 08SS0230002	41.8 UR 08SS0250002 47.3 UR 08SB0250206 43.1 UR 08SB0250608	44.6 UR 08SS0260002 41.3 UR 08SB0260406
ACROLEIN	0.943 UR 08SS0040002 1.1 UR 08SB0040206	0.913 UR 08SS0190002	1.02 UR 08SS0220002 1.04 UR 08SB0220608	0.918 UR 08SS0230002	1.04 UR 08SS0250002 1.18 UR 08SB0250206 1.08 UR 08SB0250608	1.12 UR 08SS0260002 1.03 UR 08SB0260406
ACRYLONITRILE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
BENZENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
BROMODICHLOROMETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
BROMOFORM	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 UJ 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
BROMOMETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CARBON DISULFIDE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 J 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CARBON TETRACHLORIDE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CHLOROBENZENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CHLORODIBROMOMETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CHLOROETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CHLOROFORM	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CHLOROMETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
CHLOROPRENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CIS-1,2-DICHLOROETHENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
CIS-1,3-DICHLOROPROPENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
DIBROMOMETHANE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
DICHLORODIFLUOROMETHANE	0.943 U 08SS0040002 1.1 UR 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
ETHYL METHACRYLATE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
ETHYLBENZENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
ISOBUTANOL	37.7 UR 08SS0040002 44 UR 08SB0040206	36.5 UR 08SS0190002	40.8 UR 08SS0220002 41.5 UR 08SB0220608	36.7 UR 08SS0230002	41.8 UR 08SS0250002 47.3 UR 08SB0250206 43.1 UR 08SB0250608	44.6 UR 08SS0260002 41.3 UR 08SB0260406
METHACRYLONITRILE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
METHYL IODIDE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
METHYL METHACRYLATE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
METHYL TERT-BUTYL ETHER	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
METHYLENE CHLORIDE	6 J 08SS0040002 21 J 08SB0040206	0.913 UJ 08SS0190002	1.02 UJ 08SS0220002 1.04 UJ 08SB0220608	0.918 UJ 08SS0230002	1.04 UJ 08SS0250002 1.18 UJ 08SB0250206 1.08 UJ 08SB0250608	1.12 UJ 08SS0260002 1.03 UJ 08SB0260406
PROPIONITRILE	37.7 UR 08SS0040002 44 UR 08SB0040206	9.1 UR 08SS0190002	40.8 UR 08SS0220002 41.5 UR 08SB0220608	9.2 UR 08SS0230002	41.8 UR 08SS0250002 47.3 UR 08SB0250206 43.1 UR 08SB0250608	44.6 UR 08SS0260002 41.3 UR 08SB0260406
STYRENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
TETRACHLOROETHENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
TOLUENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
TOTAL XYLENES	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
TRANS-1,2-DICHLOROETHENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
TRANS-1,3-DICHLOROPROPENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
TRANS-1,4-DICHLORO-2-BUTENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
TRICHLOROETHENE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	20 08SS0220002 5 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
TRICHLOROFLUOROMETHANE	0.943 U 08SS0040002 1.1 J 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
VINYL ACETATE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
VINYL CHLORIDE	0.943 U 08SS0040002 1.1 U 08SB0040206	0.913 U 08SS0190002	1.02 U 08SS0220002 1.04 U 08SB0220608	0.918 U 08SS0230002	1.04 U 08SS0250002 1.18 U 08SB0250206 1.08 U 08SB0250608	1.12 U 08SS0260002 1.03 U 08SB0260406
Semivolatile Organics (ug/kg)						
1,2,4,5-TETRACHLOROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
1,2,4-TRICHLOROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
1,2-DICHLOROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
1,3-DICHLOROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
1,4-DICHLOROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
1,4-DIOXANE	112 U 08SS0040002 122 U 08SB0040206					
1,4-NAPHTHOQUINONE	75.2 U 08SS0040002 81.8 U 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
1,4-PHENYLENEDIAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
1-NAPHTHYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,2'-OXYBIS(1-CHLOROPROPANE)	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,3,4,6-TETRACHLOROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,4,5-TRICHLOROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,4,6-TRICHLOROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,4-DICHLOROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,4-DIMETHYLPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,4-DINITROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2,6-DICHLOROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-ACETYLAMINOFLUORENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-CHLORONAPHTHALENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-CHLOROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-METHYLNAPHTHALENE	3.7 U 08SS0040002 4.03 U 08SB0040206					
2-METHYLPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-NAPHTHYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-NITROANILINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-NITROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
2-PICOLINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
3&4-METHYLPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
3,3'-DICHLOROBENZIDINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
3,3'-DIMETHYLBENZIDINE	75.2 UJ 08SS0040002 81.8 UJ 08SB0040206					
3-METHYLCHOLANTHRENE	75.2 U 08SS0040002 81.8 U 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
3-NITROANILINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
4,6-DINITRO-2-METHYLPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-AMINOBIPHENYL	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-BROMOPHENYL PHENYL ETHER	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-CHLORO-3-METHYLPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-CHLOROANILINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-CHLOROPHENYL PHENYL ETHER	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-NITROANILINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-NITROPHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
4-NITROQUINOLINE-1-OXIDE	75.2 UR 08SS0040002 81.8 UR 08SB0040206					
5-NITRO-O-TOLUIDINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
7,12-DIMETHYLBENZ(A)ANTHRACENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
A,A-DIMETHYLPHENETHYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
ACENAPHTHENE	3.7 U 08SS0040002 4.03 U 08SB0040206					
ACENAPHTHYLENE	31 08SS0040002 4.03 U 08SB0040206					
ACETOPHENONE	75.2 U 08SS0040002 81.8 U 08SB0040206					
ANILINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
ANTHRACENE	14 08SS0040002 4.03 U 08SB0040206					
ARAMITE	75.2 U 08SS0040002 81.8 U 08SB0040206					
BENZO(A)ANTHRACENE	170 08SS0040002 5 J 08SB0040206					
BENZO(A)PYRENE	230 08SS0040002 4.03 U 08SB0040206					
BENZO(B)FLUORANTHENE	280 08SS0040002 4.03 U 08SB0040206					
BENZO(G,H,I)PERYLENE	230 J 08SS0040002 4.03 UJ 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
BENZO(K)FLUORANTHENE	120 08SS0040002 4.03 U 08SB0040206					
BENZYL ALCOHOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
BIS(2-CHLOROETHOXY)METHANE	75.2 U 08SS0040002 81.8 U 08SB0040206					
BIS(2-CHLOROETHYL)ETHER	75.2 U 08SS0040002 81.8 U 08SB0040206					
BIS(2-ETHYLHEXYL)PHTHALATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
BUTYL BENZYL PHTHALATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
CHLOROBENZILATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
CHRYSENE	230 08SS0040002 6 J 08SB0040206					
DI-N-BUTYL PHTHALATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
DI-N-OCTYL PHTHALATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
DIALLATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
DIBENZO(A,H)ANTHRACENE	69 J 08SS0040002 4.03 UJ 08SB0040206					
DIBENZOFURAN	75.2 U 08SS0040002 81.8 U 08SB0040206					
DIETHYL PHTHALATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
DIMETHYL PHTHALATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
DIPHENYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
ETHYL METHANE SULFONATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
FLUORANTHENE	130 08SS0040002 4.03 U 08SB0040206					
FLUORENE	3.7 U 08SS0040002 4.03 U 08SB0040206					
HEXACHLOROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
HEXACHLOROBUTADIENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
HEXACHLOROCYCLOPENTADIENE	75.2 UJ 08SS0040002 81.8 UJ 08SB0040206					
HEXACHLOROETHANE	75.2 U 08SS0040002 81.8 U 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
HEXACHLOROPROPENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
INDENO(1,2,3-CD)PYRENE	180 J 08SS0040002 4.03 UJ 08SB0040206					
ISODRIN	75.2 U 08SS0040002 81.8 U 08SB0040206					
ISOPHORONE	75.2 U 08SS0040002 81.8 U 08SB0040206					
ISOSAFROLE	75.2 U 08SS0040002 81.8 U 08SB0040206					
KEPONE	75.2 UR 08SS0040002 81.8 UR 08SB0040206					
METHAPYRILENE	75.2 UJ 08SS0040002 81.8 UJ 08SB0040206					
METHYL METHANE SULFONATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSO-DI-N-BUTYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSO-DI-N-PROPYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSODIETHYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSODIMETHYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSODIPHENYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSOMETHYLETHYLAMINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSOMORPHOLINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSOPIPERIDINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
N-NITROSOPYRROLIDINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
NAPHTHALENE	4 J 08SS0040002 4.03 U 08SB0040206					
O,O,O-TRIETHYL PHOSPHOROTHIOATE	75.2 U 08SS0040002 81.8 U 08SB0040206					
O-TOLUIDINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
P-(DIMETHYLAMINO)AZOBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
PENTACHLOROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
PENTACHLOROETHANE	75.2 U 08SS0040002 81.8 U 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
PENTACHLORONITROBENZENE	75.2 U 08SS0040002 81.8 U 08SB0040206					
PHENACETIN	75.2 U 08SS0040002 81.8 U 08SB0040206					
PHENANTHRENE	18 08SS0040002 7 J 08SB0040206					
PHENOL	75.2 U 08SS0040002 81.8 U 08SB0040206					
PRONAMIDE	75.2 U 08SS0040002 81.8 U 08SB0040206					
PYRENE	210 08SS0040002 20 08SB0040206					
PYRIDINE	75.2 U 08SS0040002 81.8 U 08SB0040206					
SAFROLE	75.2 U 08SS0040002 81.8 U 08SB0040206					
Energetics (mg/kg)						
1,3,5-TRINITROBENZENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
1,3-DINITROBENZENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
2,4,6-TRINITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
2,4-DINITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
2,6-DINITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
2-AMINO-4,6-DINITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
2-NITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
3-NITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
4-AMINO-2,6-DINITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
4-NITROTOLUENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
HMX	0.25 U 08SS0040002 0.25 U 08SB0040206					
NITROBENZENE	0.25 U 08SS0040002 0.25 U 08SB0040206					
RDX	0.25 U 08SS0040002 0.25 U 08SB0040206					
TETRYL	0.25 U 08SS0040002 0.25 U 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
Inorganics (mg/kg)						
ALUMINUM	20900 J 08SS0040002 22100 J 08SB0040206					
ANTIMONY	0.12 U 08SS0040002 0.26 U 08SB0040206					
ARSENIC	4.9 J 08SS0040002 5.5 J 08SB0040206					
BARIUM	86.1 J 08SS0040002 85.3 J 08SB0040206					
BERYLLIUM	0.53 J 08SS0040002 0.49 U 08SB0040206					
CADMIUM	0.17 U 08SS0040002 0.18 U 08SB0040206					
CALCIUM	2070 J 08SS0040002 1420 J 08SB0040206					
CHROMIUM	17.9 J 08SS0040002 20.1 J 08SB0040206					
COBALT	7.1 J 08SS0040002 6.6 J 08SB0040206					
COPPER	6.1 J 08SS0040002 7.9 J 08SB0040206					
IRON	18300 J 08SS0040002 20000 J 08SB0040206					
LEAD	11.7 J 08SS0040002 12.3 J 08SB0040206					
MAGNESIUM	1730 J 08SS0040002 1770 J 08SB0040206					
MANGANESE	130 J 08SS0040002 146 J 08SB0040206					
MERCURY	0.007 U 08SS0040002 0.018 J 08SB0040206					
NICKEL	8.5 J 08SS0040002 9.2 J 08SB0040206					
POTASSIUM	975 J 08SS0040002 1200 J 08SB0040206					
SELENIUM	0.08 U 08SS0040002 0.25 U 08SB0040206					
SILVER	0.045 U 08SS0040002 0.044 U 08SB0040206					
SODIUM	201 J 08SS0040002 143 J 08SB0040206					
THALLIUM	0.22 U 08SS0040002 0.28 U 08SB0040206					
TIN	0.26 U 08SS0040002 0.38 U 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 01 08SB004 12/11/2004	BLDG106 03 08SB019 10/3/2005	BLDG106 03 08SB022 9/29/2005	BLDG106 03 08SB023 10/4/2005	BLDG106 03 08SB025 9/29/2005	BLDG106 03 08SB026 9/30/2005
VANADIUM	29.4 J 08SS0040002 33.5 J 08SB0040206					
ZINC	21.7 J 08SS0040002 22.9 J 08SB0040206					
Miscellaneous Parameters (mg/kg)						
PERCHLORATE	0.044 U 08SS0040002 0.048 U 08SB0040206					

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 03 08SB027 9/29/2005	BLDG106 03 08SB028 9/29/2005	BLDG106 03 08SB029 9/29/2005	BLDG106 03 08SB030 10/2/2005	BLDG106 03 08SB031 9/29/2005
Volatile Organics (ug/kg)					
1,1,1,2-TETRACHLOROETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,1,1-TRICHLOROETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	2 J 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,1,2,2-TETRACHLOROETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,1,2-TRICHLOROETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,1-DICHLOROETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,1-DICHLOROETHENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406
1,2,3-TRICHLOROPROPANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,2-DIBROMO-3-CHLOROPROPANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,2-DIBROMOETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,2-DICHLOROETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
1,2-DICHLOROPROPANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
2-BUTANONE	1.02 U 08SS0270002 1.14 J 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	3 J 08SS0290002 1.13 U 08SB0290406	5 J 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
2-HEXANONE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
3-CHLOROPROPENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
4-METHYL-2-PENTANONE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 03 08SB027 9/29/2005	BLDG106 03 08SB028 9/29/2005	BLDG106 03 08SB029 9/29/2005	BLDG106 03 08SB030 10/2/2005	BLDG106 03 08SB031 9/29/2005
ACETONE	3 U 08SS0270002 6 U 08SB0270406	5 U 08SS0280002 7 U 08SB0280406	5 U 08SS0290002 9 U 08SB0290406	48 J 08SS0300002	4 U 08SS0310002 5 U 08SB0310406 4 U 08SB0310406-D
ACETONITRILE	40.6 UR 08SS0270002 45.4 UR 08SB0270406	46 UR 08SS0280002 40.3 UR 08SB0280406	38.4 UR 08SS0290002 45.3 UR 08SB0290406	12.2 UR 08SS0300002	41.5 UR 08SS0310002 38.6 UR 08SB0310406 40.3 UR 08SB0310406-D
ACROLEIN	1.02 UR 08SS0270002 1.14 UR 08SB0270406	1.15 UR 08SS0280002 1.01 UR 08SB0280406	0.96 UR 08SS0290002 1.13 UR 08SB0290406	1.22 UR 08SS0300002	1.04 UR 08SS0310002 0.965 UR 08SB0310406 1.01 UR 08SB0310406-D
ACRYLONITRILE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
BENZENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
BROMODICHLOROMETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
BROMOFORM	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 UJ 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
BROMOMETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CARBON DISULFIDE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 2 J 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CARBON TETRACHLORIDE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CHLOROBENZENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CHLORODIBROMOMETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CHLOROETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CHLOROFORM	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CHLOROMETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 03 08SB027 9/29/2005	BLDG106 03 08SB028 9/29/2005	BLDG106 03 08SB029 9/29/2005	BLDG106 03 08SB030 10/2/2005	BLDG106 03 08SB031 9/29/2005
CHLOROPRENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CIS-1,2-DICHLOROETHENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
CIS-1,3-DICHLOROPROPENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
DIBROMOMETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
DICHLORODIFLUOROMETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
ETHYL METHACRYLATE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
ETHYLBENZENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
ISOBUTANOL	40.6 UR 08SS0270002 45.4 UR 08SB0270406	46 UR 08SS0280002 40.3 UR 08SB0280406	38.4 UR 08SS0290002 45.3 UR 08SB0290406	48.8 UR 08SS0300002	41.5 UR 08SS0310002 38.6 UR 08SB0310406 40.3 UR 08SB0310406-D
METHACRYLONITRILE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
METHYL IODIDE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
METHYL METHACRYLATE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
METHYL TERT-BUTYL ETHER	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
METHYLENE CHLORIDE	1.02 UJ 08SS0270002 1.14 UJ 08SB0270406	1.15 UJ 08SS0280002 1.01 UJ 08SB0280406	0.96 UJ 08SS0290002 1.13 UJ 08SB0290406	1.22 UJ 08SS0300002	1.04 UJ 08SS0310002 0.965 UJ 08SB0310406 1.01 UJ 08SB0310406-D
PROPIONITRILE	40.6 UR 08SS0270002 45.4 UR 08SB0270406	46 UR 08SS0280002 40.3 UR 08SB0280406	38.4 UR 08SS0290002 45.3 UR 08SB0290406	12.2 UR 08SS0300002	41.5 UR 08SS0310002 38.6 UR 08SB0310406 40.3 UR 08SB0310406-D
STYRENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D

APPENDIX TABLE G-1b
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG106 03 08SB027 9/29/2005	BLDG106 03 08SB028 9/29/2005	BLDG106 03 08SB029 9/29/2005	BLDG106 03 08SB030 10/2/2005	BLDG106 03 08SB031 9/29/2005
TETRACHLOROETHENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
TOLUENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
TOTAL XYLENES	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
TRANS-1,2-DICHLOROETHENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
TRANS-1,3-DICHLOROPROPENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
TRANS-1,4-DICHLORO-2-BUTENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
TRICHLOROETHENE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	6 08SS0290002 36 08SB0290406	26 08SS0300002	9 08SS0310002 8 08SB0310406 11 08SB0310406-D
TRICHLOROFLUOROMETHANE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
VINYL ACETATE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D
VINYL CHLORIDE	1.02 U 08SS0270002 1.14 U 08SB0270406	1.15 U 08SS0280002 1.01 U 08SB0280406	0.96 U 08SS0290002 1.13 U 08SB0290406	1.22 U 08SS0300002	1.04 U 08SS0310002 0.965 U 08SB0310406 1.01 U 08SB0310406-D

BLDG106 - Soil under building 106 and asphalt pavement around the building
Data qualifiers (e.g., U, J) are defined in section 3 of the text.
mg/kg - milligrams per kilogram
ug/kg - micrograms per kilogram

APPENDIX [illegible]LE G-1c
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG107 03 08SB034 10/2/2005	BLDG107 03 08SB041 10/2/2005	BLDG107 03 08SB042 10/2/2005	BLDG107 03 08SB043 10/2/2005	BLDG107 03 08SB044 10/2/2005	BLDG107 03 08SB045 10/2/2005
Volatile Organics (ug/kg)						
1,1,1,2-TETRACHLOROETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,1,1-TRICHLOROETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	5 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,1,2,2-TETRACHLOROETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,1,2-TRICHLOROETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	2 J 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,1-DICHLOROETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,1-DICHLOROETHENE	1.01 U 08SS0340002 1.11 U 08SB0340406	4 08SS0410002 1.11 U 08SB0410406	1 J 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,2,3-TRICHLOROPROPANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,2-DIBROMO-3-CHLOROPROPANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,2-DIBROMOETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,2-DICHLOROETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
1,2-DICHLOROPROPANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
2-BUTANONE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
2-HEXANONE	1.01 U 08SS0340002 1.11 J 08SB0340406	0.943 U 08SS0410002 1.11 J 08SB0410406	1 J 08SS0420002 1.05 U 08SB0420406	1 J 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 J 08SB0450204
3-CHLOROPROPENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
4-METHYL-2-PENTANONE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204

APPENDIX TABLE G-1c
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG107 03 08SB034 10/2/2005	BLDG107 03 08SB041 10/2/2005	BLDG107 03 08SB042 10/2/2005	BLDG107 03 08SB043 10/2/2005	BLDG107 03 08SB044 10/2/2005	BLDG107 03 08SB045 10/2/2005
ACETONE	1.01 UJ 08SS0340002 1.11 UJ 08SB0340406	0.943 UJ 08SS0410002 7 J 08SB0410406	2 J 08SS0420002 6 J 08SB0420406	2 J 08SS0430002 1 J 08SB0430305	4 J 08SS0440002 6 J 08SB0440204	3 J 08SS0450002 0.91 UJ 08SS0450002-D 1.01 UJ 08SB0450204
ACETONITRILE	10.1 UR 08SS0340002 11.1 UR 08SB0340406	9.4 UR 08SS0410002 11.1 UR 08SB0410406	9.7 UR 08SS0420002 10.5 UR 08SB0420406	9.7 UR 08SS0430002 9.8 UR 08SB0430305	10 UR 08SS0440002 12 UR 08SB0440204	9.1 UR 08SS0450002 9.1 UR 08SS0450002-D 10.1 UR 08SB0450204
ACROLEIN	1.01 UR 08SS0340002 1.11 UR 08SB0340406	0.943 UR 08SS0410002 1.11 UR 08SB0410406	0.967 UR 08SS0420002 1.05 UR 08SB0420406	0.974 UR 08SS0430002 0.982 UR 08SB0430305	1 UR 08SS0440002 1.2 UR 08SB0440204	0.915 UR 08SS0450002 0.91 UR 08SS0450002-D 1.01 UR 08SB0450204
ACRYLONITRILE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
BENZENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
BROMODICHLOROMETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
BROMOFORM	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
BROMOMETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 UJ 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 UJ 08SS0440002 1.2 U 08SB0440204	0.915 UJ 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CARBON DISULFIDE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CARBON TETRACHLORIDE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CHLOROBENZENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CHLORODIBROMOMETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CHLOROETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CHLOROFORM	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CHLOROMETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204

APPENDIX TABLE G-1c
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG107 03 08SB034 10/2/2005	BLDG107 03 08SB041 10/2/2005	BLDG107 03 08SB042 10/2/2005	BLDG107 03 08SB043 10/2/2005	BLDG107 03 08SB044 10/2/2005	BLDG107 03 08SB045 10/2/2005
CHLOROPRENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CIS-1,2-DICHLOROETHENE	1.01 U 08SS0340002 1.11 U 08SB0340406	4 08SS0410002 1.11 J 08SB0410406	3 J 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
CIS-1,3-DICHLOROPROPENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
DIBROMOMETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
DICHLORODIFLUOROMETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
ETHYL METHACRYLATE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
ETHYLBENZENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
ISOBUTANOL	40.2 UR 08SS0340002 44.3 UR 08SB0340406	37.7 UR 08SS0410002 44.3 UR 08SB0410406	38.7 UR 08SS0420002 41.8 UR 08SB0420406	39 UR 08SS0430002 39.3 UR 08SB0430305	40 UR 08SS0440002 48.2 UR 08SB0440204	36.6 UR 08SS0450002 36.4 UR 08SS0450002-D 40.6 UR 08SB0450204
METHACRYLONITRILE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
METHYL IODIDE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
METHYL METHACRYLATE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
METHYL TERT-BUTYL ETHER	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
METHYLENE CHLORIDE	1.01 UJ 08SS0340002 1.11 UJ 08SB0340406	0.943 UJ 08SS0410002 1.11 UJ 08SB0410406	0.967 UJ 08SS0420002 2 J 08SB0420406	0.974 UJ 08SS0430002 0.982 UJ 08SB0430305	1 UJ 08SS0440002 1.2 UJ 08SB0440204	0.915 UJ 08SS0450002 0.91 UJ 08SS0450002-D 1.01 UJ 08SB0450204
PROPIONITRILE	10.1 UR 08SS0340002 11.1 UR 08SB0340406	9.43 UR 08SS0410002 11.1 UR 08SB0410406	9.67 UR 08SS0420002 10.5 UR 08SB0420406	9.74 UR 08SS0430002 9.82 UR 08SB0430305	10 UR 08SS0440002 12 UR 08SB0440204	9.15 UR 08SS0450002 9.1 UR 08SS0450002-D 10.1 UR 08SB0450204
STYRENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204

APPENDIX TABLE G-1c
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	BLDG107 03 08SB034 10/2/2005	BLDG107 03 08SB041 10/2/2005	BLDG107 03 08SB042 10/2/2005	BLDG107 03 08SB043 10/2/2005	BLDG107 03 08SB044 10/2/2005	BLDG107 03 08SB045 10/2/2005
TETRACHLOROETHENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
TOLUENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
TOTAL XYLENES	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
TRANS-1,2-DICHLOROETHENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
TRANS-1,3-DICHLOROPROPENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
TRANS-1,4-DICHLORO-2-BUTENE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
TRICHLOROETHENE	1.01 U 08SS0340002 1.11 U 08SB0340406	430 J 08SS0410002 71 08SB0410406	55 08SS0420002 19 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
TRICHLOROFLUOROMETHANE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
VINYL ACETATE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204
VINYL CHLORIDE	1.01 U 08SS0340002 1.11 U 08SB0340406	0.943 U 08SS0410002 1.11 U 08SB0410406	0.967 U 08SS0420002 1.05 U 08SB0420406	0.974 U 08SS0430002 0.982 U 08SB0430305	1 U 08SS0440002 1.2 U 08SB0440204	0.915 U 08SS0450002 0.91 U 08SS0450002-D 1.01 U 08SB0450204

BLDG107 - Soil under building 107 and asphalt pavement around the building
Data qualifiers (e.g., U, J) are defined in section 3 of the text.
ug/kg - micrograms per kilogram

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
Volatile Organics (ug/kg)				
1,1,1,2-TETRACHLOROETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,1,1-TRICHLOROETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 15 08SB0070610 23 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,1,2,2-TETRACHLOROETHANE	1.06 U 08SS0060002 0.89 U 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,1,2-TRICHLOROETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,1-DICHLOROETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 35 08SB0070610 210 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,1-DICHLOROETHENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,2,3-TRICHLOROPROPANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,2-DIBROMO-3-CHLOROPROPANE	1.06 U 08SS0060002 0.89 U 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,2-DIBROMOETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,2-DICHLOROETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 6 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
1,2-DICHLOROPROPANE	1.06 U 08SS0060002 0.89 U 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
2-BUTANONE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 100 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
2-HEXANONE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
3-CHLOROPROPENE	1.06 U 08SS0060002 0.89 U 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
4-METHYL-2-PENTANONE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
ACETONE	1.06 UJ 08SS0060002 9 J 08SB0060206 3 J 08SB0060610	2 J 08SS0070002 5 J 08SB0070206 2 J 08SB0070610 140 J 08SB0071013	5 J 08SS0080002 4 J 08SB0080206 31 J 08SB0080610	0.993 UJ 08SS0090002 26 J 08SB0090206 6 J 08SB0090610 4 J 08SB0090610-D
ACETONITRILE	42.3 UR 08SS0060002 35.6 UR 08SB0060206 37.6 UR 08SB0060610	34.7 UR 08SS0070002 35.4 UR 08SB0070206 37.6 UR 08SB0070610 48 UR 08SB0071013	38.9 UR 08SS0080002 37.9 UR 08SB0080206 38.9 UR 08SB0080610	39.7 UR 08SS0090002 37.3 UR 08SB0090206 35.8 UR 08SB0090610 37.3 UR 08SB0090610-D
ACROLEIN	1.06 UR 08SS0060002 0.89 UR 08SB0060206 0.939 UR 08SB0060610	0.867 UR 08SS0070002 0.886 UR 08SB0070206 0.94 UR 08SB0070610 1.2 UR 08SB0071013	0.972 UR 08SS0080002 0.947 UR 08SB0080206 0.974 UR 08SB0080610	0.993 UR 08SS0090002 0.931 UR 08SB0090206 0.894 UR 08SB0090610 0.934 UR 08SB0090610-D
ACRYLONITRILE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
BENZENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
BROMODICHLOROMETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
BROMOFORM	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
BROMOMETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CARBON DISULFIDE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 UJ 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CARBON TETRACHLORIDE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CHLOROBENZENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CHLORODIBROMOMETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CHLOROETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 380 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CHLOROFORM	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CHLOROMETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CHLOROPRENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CIS-1,2-DICHLOROETHENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 2 J 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 2 J 08SB0070610 3 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
CIS-1,3-DICHLOROPROPENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
DIBROMOMETHANE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
DICHLORODIFLUOROMETHANE	1.06 U 08SS0060002 0.89 UR 08SB0060206 0.939 UR 08SB0060610	0.867 U 08SS0070002 0.886 UR 08SB0070206 0.94 UR 08SB0070610 1.2 UR 08SB0071013	0.972 UR 08SS0080002 0.947 UR 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UR 08SB0090206 0.894 UR 08SB0090610 0.934 UR 08SB0090610-D
ETHYL METHACRYLATE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
ETHYLBENZENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 2 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
ISOBUTANOL	42.3 UR 08SS0060002 35.6 UR 08SB0060206 37.6 UR 08SB0060610	34.7 UR 08SS0070002 35.4 UR 08SB0070206 37.6 UR 08SB0070610 48 UR 08SB0071013	38.9 UR 08SS0080002 37.9 UR 08SB0080206 38.9 UR 08SB0080610	39.7 UR 08SS0090002 37.3 UR 08SB0090206 35.8 UR 08SB0090610 37.3 UR 08SB0090610-D
METHACRYLONITRILE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
METHYL IODIDE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
METHYL METHACRYLATE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 U 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
METHYL TERT-BUTYL ETHER	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 U 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
METHYLENE CHLORIDE	1.06 UJ 08SS0060002 22 J 08SB0060206 3 J 08SB0060610	0.867 UJ 08SS0070002 13 J 08SB0070206 0.94 UJ 08SB0070610 67 J 08SB0071013	0.972 UJ 08SS0080002 9 J 08SB0080206 61 J 08SB0080610	0.993 UJ 08SS0090002 23 08SB0090206 2 J 08SB0090610 36 J 08SB0090610-D
PROPIONITRILE	42.3 UR 08SS0060002 35.6 UR 08SB0060206 37.6 UR 08SB0060610	34.7 UR 08SS0070002 35.4 UR 08SB0070206 37.6 UR 08SB0070610 48 UR 08SB0071013	38.9 UR 08SS0080002 37.9 UR 08SB0080206 38.9 UR 08SB0080610	39.7 UR 08SS0090002 37.3 UR 08SB0090206 35.8 UR 08SB0090610 37.3 UR 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
STYRENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TETRACHLOROETHENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TOLUENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 120 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TOTAL XYLENES	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 13 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TRANS-1,2-DICHLOROETHENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 5 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TRANS-1,3-DICHLOROPROPENE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TRANS-1,4-DICHLORO-2-BUTENE	1.06 U 08SS0060002 0.89 U 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TRICHLOROETHENE	1.06 U 08SS0060002 1 J 08SB0060206 36 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 2 J 08SB0070610 3 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
TRICHLOROFLUOROMETHANE	1.06 U 08SS0060002 2 J 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 1 J 08SB0070206 0.94 U 08SB0070610 4 J 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 3 08SB0080610	0.993 U 08SS0090002 2 J 08SB0090206 0.894 U 08SB0090610 2 J 08SB0090610-D
VINYL ACETATE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 UJ 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D
VINYL CHLORIDE	1.06 U 08SS0060002 0.89 UJ 08SB0060206 0.939 U 08SB0060610	0.867 U 08SS0070002 0.886 U 08SB0070206 0.94 U 08SB0070610 1.2 UJ 08SB0071013	0.972 U 08SS0080002 0.947 U 08SB0080206 0.974 U 08SB0080610	0.993 U 08SS0090002 0.931 UJ 08SB0090206 0.894 U 08SB0090610 0.934 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
Semivolatile Organics (ug/kg)				
1,2,4,5-TETRACHLOROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
1,2,4-TRICHLOROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
1,2-DICHLOROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
1,3-DICHLOROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
1,4-DICHLOROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
1,4-DIOXANE	122 U 08SS0060002 114 U 08SB0060206 115 U 08SB0060610	114 U 08SS0070002 117 U 08SB0070206 118 U 08SB0070610 122 UJ 08SB0071013	118 U 08SS0080002 121 U 08SB0080206 109 U 08SB0080610	114 U 08SS0090002 111 U 08SB0090206 112 U 08SB0090610 112 UJ 08SB0090610-D
1,4-NAPHTHOQUINONE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
1,4-PHENYLENEDIAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
1-NAPHTHYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
2,2'-OXYBIS(1-CHLOROPROPANE)	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
2,3,4,6-TETRACHLOROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
2,4,5-TRICHLOROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2,4,6-TRICHLOROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2,4-DICHLOROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2,4-DIMETHYLPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2,4-DINITROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2,6-DICHLOROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2-ACETYLAMINOFLUORENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
2-CHLORONAPHTHALENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
2-CHLOROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2-METHYLNAPHTHALENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	3.76 U 08SS0070002 4 J 08SB0070206 3.88 U 08SB0070610 4.04 U 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	3.77 U 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
2-METHYLPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
2-NAPHTHYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
2-NITROANILINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
2-NITROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
2-PICOLINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
3&4-METHYLPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
3,3'-DICHLOROBENZIDINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
3,3'-DIMETHYLBENZIDINE	81.4 UJ 08SS0060002 76.5 UJ 08SB0060206 76.7 UJ 08SB0060610	76.4 UJ 08SS0070002 78.1 UJ 08SB0070206 78.7 UJ 08SB0070610 82 UJ 08SB0071013	79.4 UJ 08SS0080002 81.3 UJ 08SB0080206 73.3 UJ 08SB0080610	76.5 UJ 08SS0090002 74.3 UJ 08SB0090206 74.9 UJ 08SB0090610 75.4 UJ 08SB0090610-D
3-METHYLCHOLANTHRENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
3-NITROANILINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
4,6-DINITRO-2-METHYLPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
4-AMINOBIPHENYL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
4-BROMOPHENYL PHENYL ETHER	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
4-CHLORO-3-METHYLPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
4-CHLOROANILINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
4-CHLOROPHENYL PHENYL ETHER	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
4-NITROANILINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
4-NITROPHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 U 08SB0090610-D
4-NITROQUINOLINE-1-OXIDE	81.4 UR 08SS0060002 76.5 UR 08SB0060206 76.7 UR 08SB0060610	76.4 UR 08SS0070002 78.1 UR 08SB0070206 78.7 UR 08SB0070610 82 UR 08SB0071013	79.4 UR 08SS0080002 81.3 UR 08SB0080206 73.3 UR 08SB0080610	76.5 UR 08SS0090002 74.3 UR 08SB0090206 74.9 UR 08SB0090610 75.4 UR 08SB0090610-D
5-NITRO-O-TOLUIDINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
7,12-DIMETHYLBENZ(A)ANTHRACENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
A,A-DIMETHYLPHENETHYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
ACENAPHTHENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	3.76 U 08SS0070002 3.85 U 08SB0070206 3.88 U 08SB0070610 4.04 U 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	3.77 U 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
ACENAPHTHYLENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	3.76 U 08SS0070002 17 08SB0070206 3.88 U 08SB0070610 23 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	22 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
ACETOPHENONE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
ANILINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
ANTHRACENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	3.76 U 08SS0070002 15 08SB0070206 3.88 U 08SB0070610 12 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	7 J 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
ARAMITE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
BENZO(A)ANTHRACENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	8 08SS0070002 44 08SB0070206 10 08SB0070610 89 08SB0071013	4 J 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	44 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
BENZO(A)PYRENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	6 J 08SS0070002 110 08SB0070206 8 08SB0070610 110 08SB0071013	9 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	91 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
BENZO(B)FLUORANTHENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	8 08SS0070002 100 08SB0070206 11 08SB0070610 200 08SB0071013	7 J 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	94 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
BENZO(G,H,I)PERYLENE	4.01 UJ 08SS0060002 3.77 UJ 08SB0060206 3.78 UJ 08SB0060610	3.76 UJ 08SS0070002 98 J 08SB0070206 13 J 08SB0070610 170 J 08SB0071013	16 J 08SS0080002 4 UJ 08SB0080206 3.61 UJ 08SB0080610	140 J 08SS0090002 3.66 UJ 08SB0090206 3.69 UJ 08SB0090610 3.71 UJ 08SB0090610-D
BENZO(K)FLUORANTHENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	3.76 U 08SS0070002 52 08SB0070206 7 J 08SB0070610 88 08SB0071013	8 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	55 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
BENZYL ALCOHOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
BIS(2-CHLOROETHOXY)METHANE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
BIS(2-CHLOROETHYL)ETHER	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
BIS(2-ETHYLHEXYL)PHTHALATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 180 J 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
BUTYL BENZYL PHTHALATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
CHLOROBENZILATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
CHRYSENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	6 J 08SS0070002 69 08SB0070206 12 08SB0070610 190 08SB0071013	6 J 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	65 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
DI-N-BUTYL PHTHALATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
DI-N-OCTYL PHTHALATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
DIALLATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
DIBENZO(A,H)ANTHRACENE	4.01 UJ 08SS0060002 3.77 UJ 08SB0060206 3.78 UJ 08SB0060610	3.76 UJ 08SS0070002 29 J 08SB0070206 3.88 UJ 08SB0070610 60 J 08SB0071013	3.91 UJ 08SS0080002 4 UJ 08SB0080206 3.61 UJ 08SB0080610	37 J 08SS0090002 3.66 UJ 08SB0090206 3.69 UJ 08SB0090610 3.71 UJ 08SB0090610-D
DIBENZOFURAN	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
DIETHYL PHTHALATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
DIMETHYL PHTHALATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
DIPHENYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
ETHYL METHANE SULFONATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
FLUORANTHENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	9 08SS0070002 83 08SB0070206 11 08SB0070610 57 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	29 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
FLUORENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	3.76 U 08SS0070002 6 J 08SB0070206 3.88 U 08SB0070610 8 J 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	3.77 U 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
HEXACHLOROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
HEXACHLOROBUTADIENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
HEXACHLOROCYCLOPENTADIENE	81.4 UJ 08SS0060002 76.5 UJ 08SB0060206 76.7 UJ 08SB0060610	76.4 UJ 08SS0070002 78.1 UJ 08SB0070206 78.7 UJ 08SB0070610 82 UJ 08SB0071013	79.4 UJ 08SS0080002 81.3 UJ 08SB0080206 73.3 UJ 08SB0080610	76.5 UJ 08SS0090002 74.3 UJ 08SB0090206 74.9 UJ 08SB0090610 75.4 UJ 08SB0090610-D
HEXACHLOROETHANE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
HEXACHLOROPROPENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
INDENO(1,2,3-CD)PYRENE	4.01 UJ 08SS0060002 3.77 UJ 08SB0060206 3.78 UJ 08SB0060610	3.76 UJ 08SS0070002 74 J 08SB0070206 9 J 08SB0070610 120 J 08SB0071013	10 J 08SS0080002 4 UJ 08SB0080206 3.61 UJ 08SB0080610	91 J 08SS0090002 3.66 UJ 08SB0090206 3.69 UJ 08SB0090610 3.71 UJ 08SB0090610-D
ISODRIN	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
ISOPHORONE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
ISOSAFROLE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
KEPONE	81.4 UR 08SS0060002 76.5 UR 08SB0060206 76.7 UR 08SB0060610	76.4 UR 08SS0070002 78.1 UR 08SB0070206 78.7 UR 08SB0070610 82 UR 08SB0071013	79.4 UR 08SS0080002 81.3 UR 08SB0080206 73.3 UR 08SB0080610	76.5 UR 08SS0090002 74.3 UR 08SB0090206 74.9 UR 08SB0090610 75.4 UJ 08SB0090610-D
METHAPYRILENE	81.4 UJ 08SS0060002 76.5 UJ 08SB0060206 76.7 UJ 08SB0060610	76.4 UJ 08SS0070002 78.1 UJ 08SB0070206 78.7 UJ 08SB0070610 82 UJ 08SB0071013	79.4 UJ 08SS0080002 81.3 UJ 08SB0080206 73.3 UJ 08SB0080610	76.5 UJ 08SS0090002 74.3 UJ 08SB0090206 74.9 UJ 08SB0090610 75.4 UJ 08SB0090610-D
METHYL METHANE SULFONATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSO-DI-N-BUTYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSO-DI-N-PROPYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSODIETHYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSODIMETHYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
N-NITROSODIPHENYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSOMETHYLETHYLAMINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSOMORPHOLINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSOPIPERIDINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
N-NITROSOPYRROLIDINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
NAPHTHALENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	3.76 U 08SS0070002 8 08SB0070206 4 J 08SB0070610 4.04 J 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	3.77 U 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
O,O,O-TRIETHYL PHOSPHOROTHIOATE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
O-TOLUIDINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
P-(DIMETHYLAMINO)AZOBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
PENTACHLOROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
PENTACHLOROETHANE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
PENTACHLORONITROBENZENE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
PHENACETIN	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
PHENANTHRENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	8 08SS0070002 57 08SB0070206 37 08SB0070610 67 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	16 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
PHENOL	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 U 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
PRONAMIDE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
PYRENE	4.01 U 08SS0060002 3.77 U 08SB0060206 3.78 U 08SB0060610	8 08SS0070002 120 08SB0070206 11 08SB0070610 83 08SB0071013	3.91 U 08SS0080002 4 U 08SB0080206 3.61 U 08SB0080610	42 08SS0090002 3.66 U 08SB0090206 3.69 U 08SB0090610 3.71 U 08SB0090610-D
PYRIDINE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
SAFROLE	81.4 U 08SS0060002 76.5 U 08SB0060206 76.7 U 08SB0060610	76.4 U 08SS0070002 78.1 U 08SB0070206 78.7 U 08SB0070610 82 UJ 08SB0071013	79.4 U 08SS0080002 81.3 U 08SB0080206 73.3 U 08SB0080610	76.5 U 08SS0090002 74.3 U 08SB0090206 74.9 U 08SB0090610 75.4 UJ 08SB0090610-D
Pesticides PCBs (ug/kg)				
AROCLOR-1016	10.9 U 08SS0060002 10.3 U 08SB0060206 10.3 U 08SB0060610	10.3 U 08SS0070002 10.5 U 08SB0070206 10.6 U 08SB0070610 11 U 08SB0071013	10.7 U 08SS0080002 10.9 U 08SB0080206 9.85 U 08SB0080610	10.3 U 08SS0090002 9.98 U 08SB0090206 10.1 U 08SB0090610 10.1 U 08SB0090610-D
AROCLOR-1221	10.9 U 08SS0060002 10.3 U 08SB0060206 10.3 U 08SB0060610	10.3 U 08SS0070002 10.5 U 08SB0070206 10.6 U 08SB0070610 11 U 08SB0071013	10.7 U 08SS0080002 10.9 U 08SB0080206 9.85 U 08SB0080610	10.3 U 08SS0090002 9.98 U 08SB0090206 10.1 U 08SB0090610 10.1 U 08SB0090610-D
AROCLOR-1232	10.9 U 08SS0060002 10.3 U 08SB0060206 10.3 U 08SB0060610	10.3 U 08SS0070002 10.5 U 08SB0070206 10.6 U 08SB0070610 11 U 08SB0071013	10.7 U 08SS0080002 10.9 U 08SB0080206 9.85 U 08SB0080610	10.3 U 08SS0090002 9.98 U 08SB0090206 10.1 U 08SB0090610 10.1 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
AROCLOR-1242	10.9 U 08SS0060002 10.3 U 08SB0060206 10.3 U 08SB0060610	10.3 U 08SS0070002 10.5 U 08SB0070206 10.6 U 08SB0070610 11 U 08SB0071013	10.7 U 08SS0080002 10.9 U 08SB0080206 9.85 U 08SB0080610	10.3 U 08SS0090002 9.98 U 08SB0090206 10.1 U 08SB0090610 10.1 U 08SB0090610-D
AROCLOR-1248	10.9 U 08SS0060002 10.3 U 08SB0060206 10.3 U 08SB0060610	10.3 U 08SS0070002 10.5 U 08SB0070206 10.6 U 08SB0070610 11 U 08SB0071013	10.7 U 08SS0080002 10.9 U 08SB0080206 9.85 U 08SB0080610	10.3 U 08SS0090002 9.98 U 08SB0090206 10.1 U 08SB0090610 10.1 U 08SB0090610-D
AROCLOR-1254	10.9 U 08SS0060002 10.3 U 08SB0060206 10.3 U 08SB0060610	10.3 U 08SS0070002 10.5 U 08SB0070206 10.6 U 08SB0070610 11 U 08SB0071013	10.7 U 08SS0080002 10.9 U 08SB0080206 9.85 U 08SB0080610	10.3 U 08SS0090002 9.98 U 08SB0090206 10.1 U 08SB0090610 10.1 U 08SB0090610-D
AROCLOR-1260	10.9 U 08SS0060002 10.3 U 08SB0060206 10.3 U 08SB0060610	10.3 U 08SS0070002 10.5 U 08SB0070206 10.6 U 08SB0070610 11 U 08SB0071013	10.7 U 08SS0080002 10.9 U 08SB0080206 9.85 U 08SB0080610	10.3 U 08SS0090002 9.98 U 08SB0090206 10.1 U 08SB0090610 10.1 U 08SB0090610-D
Energetics (mg/kg)				
1,3,5-TRINITROBENZENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
1,3-DINITROBENZENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
2,4,6-TRINITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
2,4-DINITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
2,6-DINITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
2-AMINO-4,6-DINITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
2-NITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
3-NITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
4-AMINO-2,6-DINITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
4-NITROTOLUENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
HMX	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
NITROBENZENE	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
RDX	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
TETRYL	0.25 U 08SS0060002 0.25 U 08SB0060206 0.25 U 08SB0060610	0.25 U 08SS0070002 0.25 U 08SB0070206 0.25 U 08SB0070610 0.25 U 08SB0071013	0.25 U 08SS0080002 0.25 U 08SB0080206 0.25 U 08SB0080610	0.25 U 08SS0090002 0.25 U 08SB0090206 0.25 U 08SB0090610 0.25 U 08SB0090610-D
Inorganics (mg/kg)				
ALUMINUM	24500 J 08SS0060002 10100 J 08SB0060206 8530 J 08SB0060610	17600 J 08SS0070002 20900 J 08SB0070206 23700 J 08SB0070610 21800 J 08SB0071013	21200 J 08SS0080002 22600 J 08SB0080206 15300 J 08SB0080610	18100 J 08SS0090002 12800 J 08SB0090206 6140 J 08SB0090610 7830 J 08SB0090610-D
ANTIMONY	0.38 U 08SS0060002 0.12 U 08SB0060206 0.08 U 08SB0060610	0.35 U 08SS0070002 0.34 U 08SB0070206 13.3 J 08SB0070610 0.49 U 08SB0071013	0.29 U 08SS0080002 0.22 U 08SB0080206 0.07 U 08SB0080610	0.34 U 08SS0090002 0.14 U 08SB0090206 0.14 U 08SB0090610 0.12 U 08SB0090610-D
ARSENIC	8 J 08SS0060002 4.1 J 08SB0060206 3 J 08SB0060610	6 J 08SS0070002 7.5 J 08SB0070206 4.5 J 08SB0070610 8.4 J 08SB0071013	5.8 J 08SS0080002 6 J 08SB0080206 4.1 J 08SB0080610	5.9 J 08SS0090002 4.8 J 08SB0090206 4.7 J 08SB0090610 3.9 J 08SB0090610-D
BARIUM	130 J 08SS0060002 42.9 J 08SB0060206 29.2 J 08SB0060610	68.9 J 08SS0070002 96.7 J 08SB0070206 94.3 J 08SB0070610 90.2 J 08SB0071013	84.5 J 08SS0080002 88.2 J 08SB0080206 72.1 J 08SB0080610	65.3 J 08SS0090002 40.3 J 08SB0090206 20.9 J 08SB0090610 31 J 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
BERYLLIUM	0.89 J 08SS0060002 0.39 U 08SB0060206 0.34 U 08SB0060610	0.53 J 08SS0070002 0.75 J 08SB0070206 0.64 J 08SB0070610 0.61 J 08SB0071013	0.73 J 08SS0080002 0.57 J 08SB0080206 0.57 J 08SB0080610	0.54 J 08SS0090002 0.32 U 08SB0090206 0.36 U 08SB0090610 0.38 U 08SB0090610-D
CADMIUM	0.21 U 08SS0060002 0.1 U 08SB0060206 0.12 U 08SB0060610	0.46 J 08SS0070002 0.51 J 08SB0070206 0.79 J 08SB0070610 0.64 J 08SB0071013	0.35 U 08SS0080002 0.22 U 08SB0080206 0.15 U 08SB0080610	0.67 J 08SS0090002 0.13 U 08SB0090206 0.11 U 08SB0090610 0.11 U 08SB0090610-D
CALCIUM	1550 J 08SS0060002 415 J 08SB0060206 94.9 J 08SB0060610	2040 J 08SS0070002 2400 J 08SB0070206 21100 J 08SB0070610 16900 J 08SB0071013	2090 J 08SS0080002 1330 J 08SB0080206 207 J 08SB0080610	15700 J 08SS0090002 986 J 08SB0090206 218 J 08SB0090610 449 J 08SB0090610-D
CHROMIUM	18.8 J 08SS0060002 12.2 J 08SB0060206 13.9 J 08SB0060610	17.9 J 08SS0070002 20.5 J 08SB0070206 19.2 J 08SB0070610 43.4 J 08SB0071013	19.6 J 08SS0080002 19.7 J 08SB0080206 17 J 08SB0080610	21.4 J 08SS0090002 14.4 J 08SB0090206 12.3 J 08SB0090610 13.6 J 08SB0090610-D
COBALT	11.5 J 08SS0060002 2.3 J 08SB0060206 1.5 J 08SB0060610	6.8 J 08SS0070002 11.3 J 08SB0070206 7.6 J 08SB0070610 8 J 08SB0071013	7.4 J 08SS0080002 9 J 08SB0080206 6.8 J 08SB0080610	7.1 J 08SS0090002 2.7 J 08SB0090206 1 J 08SB0090610 1.4 J 08SB0090610-D
COPPER	11.7 J 08SS0060002 4 J 08SB0060206 5.4 J 08SB0060610	13.8 J 08SS0070002 17.1 J 08SB0070206 24.4 J 08SB0070610 20.6 J 08SB0071013	15.2 J 08SS0080002 14.7 J 08SB0080206 15.2 J 08SB0080610	27.9 J 08SS0090002 10.2 J 08SB0090206 6.3 J 08SB0090610 5 J 08SB0090610-D
IRON	24300 J 08SS0060002 10500 J 08SB0060206 4610 J 08SB0060610	16700 J 08SS0070002 20200 J 08SB0070206 18800 J 08SB0070610 21800 J 08SB0071013	18200 J 08SS0080002 20000 J 08SB0080206 13700 J 08SB0080610	18400 J 08SS0090002 15100 J 08SB0090206 11100 J 08SB0090610 12400 J 08SB0090610-D
LEAD	12.8 J 08SS0060002 6.7 J 08SB0060206 11.7 J 08SB0060610	28.8 J 08SS0070002 29.6 J 08SB0070206 234 J 08SB0070610 67.2 J 08SB0071013	17 J 08SS0080002 12 J 08SB0080206 7.6 J 08SB0080610	87.7 J 08SS0090002 7.2 J 08SB0090206 6.1 J 08SB0090610 6.8 J 08SB0090610-D
MAGNESIUM	2290 J 08SS0060002 769 J 08SB0060206 489 J 08SB0060610	1650 J 08SS0070002 2220 J 08SB0070206 2370 J 08SB0070610 2160 J 08SB0071013	2000 J 08SS0080002 2300 J 08SB0080206 1850 J 08SB0080610	2090 J 08SS0090002 1310 J 08SB0090206 344 J 08SB0090610 439 J 08SB0090610-D
MANGANESE	412 J 08SS0060002 27.4 J 08SB0060206 18.9 J 08SB0060610	228 J 08SS0070002 341 J 08SB0070206 171 J 08SB0070610 258 J 08SB0071013	201 J 08SS0080002 451 J 08SB0080206 68.9 J 08SB0080610	243 J 08SS0090002 75.6 J 08SB0090206 23.4 J 08SB0090610 34.2 J 08SB0090610-D
MERCURY	0.017 J 08SS0060002 0.024 J 08SB0060206 0.008 J 08SB0060610	0.029 J 08SS0070002 0.049 J 08SB0070206 0.021 J 08SB0070610 0.026 J 08SB0071013	0.025 J 08SS0080002 0.02 J 08SB0080206 0.006 U 08SB0080610	0.028 J 08SS0090002 0.041 J 08SB0090206 0.029 J 08SB0090610 0.014 J 08SB0090610-D

APPENDIX TABLE G-1d
RESULTS FOR CHEMICALS ANALYZED IN ALL SOIL SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Area of Concern Sampling Round Location Sample Date	POND 01 08SB006 12/12/2004	POND 01 08SB007 12/12/2004	POND 01 08SB008 12/12/2004	POND 01 08SB009 12/12/2004
NICKEL	15.1 J 08SS0060002 5.4 J 08SB0060206 4.1 J 08SB0060610	12.6 J 08SS0070002 17.6 J 08SB0070206 17 J 08SB0070610 17.4 J 08SB0071013	15.4 J 08SS0080002 13.6 J 08SB0080206 16.4 J 08SB0080610	14.9 J 08SS0090002 9.5 J 08SB0090206 3.2 J 08SB0090610 4.3 J 08SB0090610-D
POTASSIUM	1700 J 08SS0060002 1030 J 08SB0060206 1230 J 08SB0060610	1350 J 08SS0070002 1720 J 08SB0070206 1130 J 08SB0070610 1570 J 08SB0071013	1520 J 08SS0080002 1520 J 08SB0080206 1130 J 08SB0080610	1190 J 08SS0090002 918 J 08SB0090206 866 J 08SB0090610 1020 J 08SB0090610-D
SELENIUM	0.38 U 08SS0060002 0.25 U 08SB0060206 0.16 U 08SB0060610	0.27 U 08SS0070002 0.38 U 08SB0070206 0.25 U 08SB0070610 0.22 U 08SB0071013	0.28 U 08SS0080002 0.24 U 08SB0080206 0.2 U 08SB0080610	0.3 U 08SS0090002 0.16 U 08SB0090206 0.28 U 08SB0090610 0.15 U 08SB0090610-D
SILVER	0.046 U 08SS0060002 0.044 U 08SB0060206 0.044 U 08SB0060610	0.041 U 08SS0070002 0.044 U 08SB0070206 0.046 U 08SB0070610 0.049 U 08SB0071013	0.12 U 08SS0080002 0.05 U 08SB0080206 0.044 U 08SB0080610	0.043 U 08SS0090002 0.07 U 08SB0090206 0.042 U 08SB0090610 0.041 U 08SB0090610-D
SODIUM	49.3 U 08SS0060002 35.7 U 08SB0060206 42.5 U 08SB0060610	48.6 U 08SS0070002 58.3 U 08SB0070206 122 J 08SB0070610 1350 J 08SB0071013	81.3 J 08SS0080002 67.6 J 08SB0080206 100 J 08SB0080610	51.3 U 08SS0090002 49.9 U 08SB0090206 32.6 U 08SB0090610 34.5 U 08SB0090610-D
THALLIUM	0.36 U 08SS0060002 0.16 U 08SB0060206 0.14 U 08SB0060610	0.24 U 08SS0070002 0.35 U 08SB0070206 0.28 U 08SB0070610 0.28 U 08SB0071013	0.31 U 08SS0080002 0.34 U 08SB0080206 0.2 U 08SB0080610	0.24 U 08SS0090002 0.15 U 08SB0090206 0.07 U 08SB0090610 0.1 U 08SB0090610-D
TIN	0.43 U 08SS0060002 0.22 U 08SB0060206 0.22 U 08SB0060610	0.71 U 08SS0070002 3 U 08SB0070206 3010 J 08SB0070610 18.7 J 08SB0071013	0.68 U 08SS0080002 0.43 U 08SB0080206 0.32 U 08SB0080610	2.4 U 08SS0090002 0.26 U 08SB0090206 0.26 U 08SB0090610 1.5 U 08SB0090610-D
VANADIUM	36.8 J 08SS0060002 15.9 J 08SB0060206 20.4 J 08SB0060610	28.6 J 08SS0070002 37.1 J 08SB0070206 30.8 J 08SB0070610 36 J 08SB0071013	34.2 J 08SS0080002 35.7 J 08SB0080206 24.5 J 08SB0080610	29.2 J 08SS0090002 21.5 J 08SB0090206 13.5 J 08SB0090610 12.1 J 08SB0090610-D
ZINC	46.8 J 08SS0060002 16.8 J 08SB0060206 9.9 J 08SB0060610	38.7 J 08SS0070002 50.4 J 08SB0070206 43.3 J 08SB0070610 63.2 J 08SB0071013	36.9 J 08SS0080002 32.3 J 08SB0080206 28.4 J 08SB0080610	68.5 J 08SS0090002 19.9 J 08SB0090206 14.5 J 08SB0090610 15.1 J 08SB0090610-D
Miscellaneous Parameters (mg/kg)				
PERCHLORATE	0.048 U 08SS0060002 0.044 U 08SB0060206 0.044 U 08SB0060610	0.045 U 08SS0070002 0.046 U 08SB0070206 0.046 U 08SB0070610 0.05 U 08SB0071013	0.047 U 08SS0080002 0.049 U 08SB0080206 0.043 U 08SB0080610	0.045 U 08SS0090002 0.044 U 08SB0090206 0.044 U 08SB0090610 0.045 U 08SB0090610-D

Data qualifiers (e.g., U, J) are defined in section 3 of the text.
mg/kg - milligrams per kilogram
POND - Soil in immediate vicinity of building 106 pond
ug/kg - micrograms per kilogram

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	02	03	01	01	02	02
Location	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD003	08SW/SD003
Sample Number	08SW00101	08SW00101-F	---	08SW00102	---	---	08SW00201	08SW00301	08SW00301-F	08SW00302	08SW00302-F
Sample Code	NORMAL	NORMAL	DRY	NORMAL	DRY	DRY	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005
Volatile Organics (ug/L)											
1,1,1,2-TETRACHLOROETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,1,1-TRICHLOROETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,1,2,2-TETRACHLOROETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,1,2-TRICHLOROETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,1-DICHLOROETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,1-DICHLOROETHENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,2,3-TRICHLOROPROPANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,2-DIBROMOETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,2-DICHLOROETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
1,2-DICHLOROPROPANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
2-BUTANONE	0.5 U			0.5 U			3.3 J	0.5 U		10	
2-HEXANONE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
3-CHLOROPROPENE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
4-METHYL-2-PENTANONE	0.5 U			0.5 U			0.5 U	0.5 U		0.6 J	
ACETONE	0.5 UJ			0.5 U			7.5 J	0.5 UJ		52 J	
ACETONITRILE	20 UR			20 UR			20 UR	20 UR		20 UR	
ACROLEIN	0.5 UR			0.5 UR			0.5 UR	0.5 UR		0.5 UR	
ACRYLONITRILE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
BENZENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
BROMODICHLOROMETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
BROMOFORM	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
BROMOMETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 UJ	
CARBON DISULFIDE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
CARBON TETRACHLORIDE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
CHLOROBENZENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
CHLORODIBROMOMETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
CHLOROETHANE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
CHLOROFORM	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
CHLOROMETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
CHLOROPRENE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
CIS-1,2-DICHLOROETHENE	0.3 U			0.3 U			0.3 U	0.3 U		2.4	
CIS-1,3-DICHLOROPROPENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
DIBROMOMETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
DICHLORODIFLUOROMETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 UJ	
ETHYL METHACRYLATE	0.5 UJ			0.5 U			0.5 U	0.5 UJ		0.5 U	
ETHYLBENZENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
ISOBUTANOL	20 UR			20 UR			20 UR	20 UR		20 UR	
METHACRYLONITRILE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
METHYL IODIDE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
METHYL METHACRYLATE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
METHYL TERT-BUTYL ETHER	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
METHYLENE CHLORIDE	0.3 UJ			0.3 U			0.3 U	0.3 UJ		0.3 UJ	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	02	03	01	01	02	02
Location	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD003	08SW/SD003
Sample Number	08SW00101	08SW00101-F	---	08SW00102	---	---	08SW00201	08SW00301	08SW00301-F	08SW00302	08SW00302-F
Sample Code	NORMAL	NORMAL	DRY	NORMAL	DRY	DRY	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005
PROPIONITRILE	20 UR			20 UR			20 UR	20 UR		20 UR	
STYRENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
TETRACHLOROETHENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
TOLUENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
TOTAL XYLENES	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
TRANS-1,2-DICHLOROETHENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
TRANS-1,3-DICHLOROPROPENE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
TRICHLOROETHENE	0.3 U			0.3 U			0.6 J	0.3 U		1.4	
TRICHLOROFLUOROMETHANE	0.3 U			0.3 U			0.3 U	0.3 U		0.3 U	
VINYL ACETATE	0.5 U			0.5 U			0.5 U	0.5 U		0.5 U	
VINYL CHLORIDE	0.3 U			0.3 U			0.3 U	0.3 U		0.8 J	
Semivolatile Organics (ug/L)											
1,2,4,5-TETRACHLOROBENZENE	0.971 U							1.02 U		0.99 U	
1,2,4-TRICHLOROBENZENE	0.971 U							1.02 U		0.99 U	
1,2-DICHLOROBENZENE	0.971 U							1.02 U		0.99 U	
1,3-DICHLOROBENZENE	0.971 U							1.02 U		0.99 U	
1,4-DICHLOROBENZENE	0.971 U							1.02 U		0.99 U	
1,4-DIOXANE	0.972 U							1.02 U		6	
1,4-NAPHTHOQUINONE	0.971 U							1.02 U		0.99 U	
1,4-PHENYLENEDIAMINE	0.971 U							1.02 U		0.99 U	
1-NAPHTHYLAMINE	0.971 U							1.02 U		0.99 U	
2,2'-OXYBIS(1-CHLOROPROPANE)	0.971 U							1.02 U		0.99 U	
2,3,4,6-TETRACHLOROPHENOL	0.971 U							1.02 U		0.99 U	
2,4,5-TRICHLOROPHENOL	0.971 U							1.02 U		0.99 U	
2,4,6-TRICHLOROPHENOL	0.971 U							1.02 U		0.99 U	
2,4-DICHLOROPHENOL	0.971 U							1.02 U		0.99 U	
2,4-DIMETHYLPHENOL	0.971 U							1.02 U		0.99 U	
2,4-DINITROPHENOL	0.971 UJ							1.02 UJ		0.99 UR	
2,6-DICHLOROPHENOL	0.971 U							1.02 U		0.99 U	
2-ACETYLAMINOFLUORENE	0.971 U							1.02 U		0.99 U	
2-CHLORONAPHTHALENE	0.971 U							1.02 U		0.99 U	
2-CHLOROPHENOL	0.971 U							1.02 U		0.99 U	
2-METHYLNAPHTHALENE	0.049 U							0.053 U			
2-METHYLPHENOL	0.971 U							1.02 U		0.99 U	
2-NAPHTHYLAMINE	0.971 U							1.02 U		0.99 U	
2-NITROANILINE	0.971 U							1.02 U		0.99 U	
2-NITROPHENOL	0.971 U							1.02 U		0.99 U	
2-PICOLINE	0.971 U							1.02 U		0.99 U	
3&4-METHYLPHENOL	0.971 U							1.02 U		0.99 U	
3,3'-DICHLOROBENZIDINE	0.971 U							1.02 U		0.99 U	
3,3'-DIMETHYLBENZIDINE	0.971 U							1.02 U		0.99 U	
3-METHYLCHOLANTHRENE	0.971 U							1.02 U		0.99 U	
3-NITROANILINE	0.971 U							1.02 U		0.99 U	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	02	03	01	01	02	02
Location	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD003	08SW/SD003
Sample Number	08SW00101	08SW00101-F	---	08SW00102	---	---	08SW00201	08SW00301	08SW00301-F	08SW00302	08SW00302-F
Sample Code	NORMAL	NORMAL	DRY	NORMAL	DRY	DRY	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005
4,6-DINITRO-2-METHYLPHENOL	0.971 U							1.02 U		0.99 UJ	
4-AMINOBIPHENYL	0.971 U							1.02 U		0.99 U	
4-BROMOPHENYL PHENYL ETHER	0.971 U							1.02 U		0.99 U	
4-CHLORO-3-METHYLPHENOL	0.971 U							1.02 U		0.99 U	
4-CHLOROANILINE	0.971 U							1.02 U		0.99 U	
4-CHLOROPHENYL PHENYL ETHER	0.971 U							1.02 U		0.99 U	
4-NITROANILINE	0.971 U							1.02 U		0.99 U	
4-NITROPHENOL	0.971 UJ							1.02 UJ		0.99 U	
4-NITROQUINOLINE-1-OXIDE	0.971 UR							1.02 UR		0.99 UR	
5-NITRO-O-TOLUIDINE	0.971 U							1.02 U		0.99 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE	0.971 U							1.02 U		0.99 U	
A,A-DIMETHYLPHENETHYLAMINE	0.971 U							1.02 U		0.99 U	
ACENAPHTHENE	0.049 U							0.053 U			
ACENAPHTHYLENE	0.049 U							0.053 U			
ACETOPHENONE	0.971 U							1.02 U		0.99 U	
ANILINE	0.971 U							1.02 U		0.99 U	
ANTHRACENE	0.049 U							0.053 U			
ARAMITE	0.971 U							1.02 U		0.99 U	
BENZO(A)ANTHRACENE	0.049 U							0.053 U			
BENZO(A)PYRENE	0.049 U							0.053 U			
BENZO(B)FLUORANTHENE	0.049 U							0.053 U			
BENZO(G,H,I)PERYLENE	0.049 U							0.053 U			
BENZO(K)FLUORANTHENE	0.049 U							0.053 U			
BENZYL ALCOHOL	0.971 U							1.02 U		0.99 U	
BIS(2-CHLOROETHOXY)METHANE	0.971 U							1.02 U		0.99 U	
BIS(2-CHLOROETHYL)ETHER	0.971 U							1.02 U		0.99 U	
BIS(2-ETHYLHEXYL)PHTHALATE	0.971 U							1.02 U		0.99 U	
BUTYL BENZYL PHTHALATE	0.971 U							1.02 U		0.99 U	
CHLOROBENZILATE	0.971 U							1.02 U		0.99 U	
CHRYSENE	0.049 U							0.053 U			
DI-N-BUTYL PHTHALATE	0.971 U							1.02 U		0.99 U	
DI-N-OCTYL PHTHALATE	0.971 U							1.02 U		0.99 U	
DIALLATE	0.971 U							1.02 U		0.99 U	
DIBENZO(A,H)ANTHRACENE	0.049 U							0.053 U			
DIBENZOFURAN	0.971 U							1.02 U		0.99 U	
DIETHYL PHTHALATE	0.971 U							1.02 U		0.99 U	
DIMETHYL PHTHALATE	0.971 U							1.02 U		0.99 U	
DIPHENYLAMINE	0.97 U							1.02 U		0.99 U	
ETHYL METHANE SULFONATE	0.971 U							1.02 U		0.99 U	
FLUORANTHENE	0.049 U							0.053 U			
FLUORENE	0.049 U							0.053 U			
HEXACHLOROBENZENE	0.971 U							1.02 U		0.99 U	
HEXACHLOROBUTADIENE	0.971 U							1.02 U		0.99 U	
HEXACHLOROCYCLOPENTADIENE	0.971 UJ							1.02 UJ		0.99 UJ	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	02	03	01	01	02	02
Location	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD003	08SW/SD003
Sample Number	08SW00101	08SW00101-F	---	08SW00102	---	---	08SW00201	08SW00301	08SW00301-F	08SW00302	08SW00302-F
Sample Code	NORMAL	NORMAL	DRY	NORMAL	DRY	DRY	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005
HEXACHLOROETHANE	0.971 U							1.02 U		0.99 U	
HEXACHLOROPROPENE	0.971 U							1.02 U		0.99 U	
INDENO(1,2,3-CD)PYRENE	0.049 U							0.053 U			
ISODRIN	0.971 U							1.02 U		0.99 U	
ISOPHORONE	0.971 U							1.02 U		0.99 U	
ISOSAFROLE	0.971 U							1.02 U		0.99 U	
KEPONE	0.971 UJ							1.02 UJ		0.99 UR	
METHAPYRILENE	0.971 UJ							1.02 UJ		0.99 U	
METHYL METHANE SULFONATE	0.971 U							1.02 U		0.99 U	
N-NITROSO-DI-N-BUTYLAMINE	0.971 U							1.02 U		0.99 U	
N-NITROSO-DI-N-PROPYLAMINE	0.971 U							1.02 U		0.99 U	
N-NITROSODIETHYLAMINE	0.971 U							1.02 U		0.99 U	
N-NITROSODIMETHYLAMINE	0.971 UJ							1.02 UJ		0.99 U	
N-NITROSODIPHENYLAMINE	0.971 U							1.02 U		0.99 U	
N-NITROSOMETHYLETHYLAMINE	0.971 UJ							1.02 UJ		0.99 U	
N-NITROSOMORPHOLINE	0.971 U							1.02 U		0.99 U	
N-NITROSOPIPERIDINE	0.971 U							1.02 U		0.99 U	
N-NITROSOPYRROLIDINE	0.971 U							1.02 U		0.99 U	
NAPHTHALENE	0.049 U							0.053 U			
O,O,O-TRIETHYL PHOSPHOROTHIOATE	0.971 U							1.02 U		0.99 U	
O-TOLUIDINE	0.971 U							1.02 U		0.99 U	
P-(DIMETHYLAMINO)AZOBENZENE	0.971 U							1.02 U		0.99 U	
PENTACHLOROBENZENE	0.971 U							1.02 U		0.99 U	
PENTACHLOROETHANE	0.971 U							1.02 U		0.99 U	
PENTACHLORONITROBENZENE	0.971 U							1.02 U		0.99 U	
PHENACETIN	0.971 U							1.02 U		0.99 U	
PHENANTHRENE	0.049 U							0.053 U			
PHENOL	0.971 U							1.02 U		0.99 U	
PRONAMIDE	0.971 U							1.02 U		0.99 U	
PYRENE	0.049 U							0.053 U			
PYRIDINE	0.971 U							1.02 U		0.99 U	
SAFROLE	0.971 U							1.02 U		0.99 U	
Pesticides PCBs (ug/L)											
AROCLOR-1016											
AROCLOR-1221											
AROCLOR-1232											
AROCLOR-1242											
AROCLOR-1248											
AROCLOR-1254											
AROCLOR-1260											
Energetics (ug/L)											
1,3,5-TRINITROBENZENE	0.245 U							0.278 U			
1,3-DINITROBENZENE	0.245 U							0.278 U			
2,4,6-TRINITROTOLUENE	0.245 U							0.278 U			

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	02	03	01	01	02	02
Location	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD003	08SW/SD003
Sample Number	08SW00101	08SW00101-F	---	08SW00102	---	---	08SW00201	08SW00301	08SW00301-F	08SW00302	08SW00302-F
Sample Code	NORMAL	NORMAL	DRY	NORMAL	DRY	DRY	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005
2,4-DINITROTOLUENE	0.245 U							0.278 U			
2,6-DINITROTOLUENE	0.245 U							0.278 U			
2-AMINO-4,6-DINITROTOLUENE	0.245 U							0.278 U			
2-NITROTOLUENE	0.245 U							0.278 U			
3-NITROTOLUENE	0.245 U							0.278 U			
4-AMINO-2,6-DINITROTOLUENE	0.245 U							0.278 U			
4-NITROTOLUENE	0.245 U							0.278 U			
HMX	0.245 U							0.278 U			
NITROBENZENE	0.245 U							0.278 U			
RDX	0.245 U							0.278 U			
TETRYL	0.245 U							0.278 U			
Total Metals (ug/L)											
ALUMINUM	1380 J							524 J		964 J	
ANTIMONY	0.33 U							0.36 U		0.25 U	
ARSENIC	0.55 U							0.36 U		2.5 J	
BARIUM	109 J							54.7 J		136 J	
BERYLLIUM	0.04 U							0.04 U		0.04 U	
CADMIUM	0.17 U							0.19 U		0.21 J	
CALCIUM	62900 J							74700 J		94700 J	
CHROMIUM	2.6 J							1.1 J		1.8	
COBALT	0.38 J							0.99 J		2.2	
COPPER	2.6 J							2.3 J		4.8 U	
IRON	1140 J							433 J		3010	
LEAD	3.7 J							0.919 J		2.6	
MAGNESIUM	10400 J							12800 J		23600	
MANGANESE	10.2 J							18.8 J		827	
MERCURY	0.03 U							0.03 U		0.03 U	
NICKEL	2.6							13.4		5	
POTASSIUM	1290 J							1310 J		2100	
SELENIUM	0.27 U							0.48 U		0.2 J	
SILVER	0.028 U							0.028 U		0.028 U	
SODIUM	9520 J							19400 J		70200 J	
THALLIUM	0.043 U							0.07 U		0.24 U	
TIN										0.13 U	
VANADIUM	2.7							1.14 U		1.9 J	
ZINC	18.8 U							31.9 J		29.9 J	
Dissolved Metals (ug/L)											
ALUMINUM, FILTERED		62.7 U							9.4 U		186
ANTIMONY, FILTERED		0.39 U							0.42 U		0.24 U
ARSENIC, FILTERED		0.3 U							0.27 U		1.9 J
BARIUM, FILTERED		103 J							50.5 J		131 J
BERYLLIUM, FILTERED		0.02 U							0.02 U		0.02 U
CADMIUM, FILTERED		0.23 J							0.28 J		0.09 U
CALCIUM, FILTERED		62700							72800		98200 J

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	02	03	01	01	02	02
Location	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD003	08SW/SD003
Sample Number	08SW00101	08SW00101-F	---	08SW00102	---	---	08SW00201	08SW00301	08SW00301-F	08SW00302	08SW00302-F
Sample Code	NORMAL	NORMAL	DRY	NORMAL	DRY	DRY	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005
CHROMIUM, FILTERED		0.66 U							0.57 U		0.58 J
COBALT, FILTERED		0.25 J							1.1 J		1.9
COPPER, FILTERED		1.6 J							1.7 J		2 U
IRON, FILTERED		540 J							533 J		798
LEAD, FILTERED		0.453 J							0.223 J		0.66 J
MAGNESIUM, FILTERED		10300 J							12300 J		24500
MANGANESE, FILTERED		3.1 J							13.8 J		834
MERCURY, FILTERED		0.033 U							0.041 U		0.03 U
NICKEL, FILTERED		5.5 J							15.5 J		4.2
POTASSIUM, FILTERED		1030 J							1060 J		1920
SELENIUM, FILTERED		0.5 U							0.64 U		0.13 J
SILVER, FILTERED		0.028 U							0.028 U		0.05 U
SODIUM, FILTERED		8770 J							16900 J		73000 J
THALLIUM, FILTERED		0.05 J							0.16 J		0.27 U
TIN, FILTERED											0.048 U
VANADIUM, FILTERED		1.14 U							1.14 U		1.14 U
ZINC, FILTERED		8.7 J							22.6 J		9.8 J
Miscellaneous Parameters											
PERCHLORATE (ug/L)	4 U							4 U			
TOTAL COLIFORM (CFU/100 mL)											
Field Parameters (mg/L)											
DISSOLVED OXYGEN				11.37			15.81				
DISSOLVED OXYGEN - METER								12.2			
OXIDATION REDUCTION POTENTIAL (MV)	28.7			125			85	17.3			
PH (S.U.)	7.82			8.33			8.73	7.7			
SPECIFIC CONDUCTANCE (MS/CM)	0.53			0.15			0.109	0.609			
TEMPERATURE (C)	9.81			12.48			10.84	7.47			
TURBIDITY (NTU)	34			2.5			1.4	12			

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	POND	POND	POND	POND	POND	POND	POND	POND	POND	POND
Sampling Round	03	01	01	01	01	03	03	01	01	01	01
Location	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD005	08SW/SD005
Sample Number	08SW00303	08SW00401	08SW00401-F	08SW00402	08SW00402-F	08SW00403	08SW00403-D	08SW00501	08SW00501-F	08SW00502	08SW00502-F
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005	10/25/2005	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005
Volatile Organics (ug/L)											
1,1,1,2-TETRACHLOROETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
1,1,1-TRICHLOROETHANE	0.3 U	21		200		13	12	33		39	
1,1,2,2-TETRACHLOROETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
1,1,2-TRICHLOROETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
1,1-DICHLOROETHANE	0.3 U	18		99		12	12	30		41	
1,1-DICHLOROETHENE	0.3 U	0.3 U		7.7		0.3 U	0.3 U	0.3 U		1.5	
1,2,3-TRICHLOROPROPANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
1,2-DIBROMOETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
1,2-DICHLOROETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
1,2-DICHLOROPROPANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
2-BUTANONE	0.9 J	0.5 U		0.5 U		1.6 J	1.4 J	0.5 U		0.5 U	
2-HEXANONE	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
3-CHLOROPROPENE	0.5 U	0.5 UJ		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
4-METHYL-2-PENTANONE	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
ACETONE	2.7 J	0.5 UJ		15 J		7 J	7.3 J	1.5 J		1.8 J	
ACETONITRILE	20 UR	20 UR		20 UR		20 UR	20 UR	20 UR		20 UR	
ACROLEIN	0.5 UR	0.5 UR		0.5 UR		0.5 UR	0.5 UR	0.5 UR		0.5 UR	
ACRYLONITRILE	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
BENZENE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
BROMODICHLOROMETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
BROMOFORM	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
BROMOMETHANE	0.3 U	0.3 UJ		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
CARBON DISULFIDE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
CARBON TETRACHLORIDE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
CHLOROBENZENE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
CHLORODIBROMOMETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
CHLOROETHANE	0.5 U	9.9		89		43	47	22		44	
CHLOROFORM	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
CHLOROMETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
CHLOROPRENE	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
CIS-1,2-DICHLOROETHENE	0.3 U	12		140		6.3	6.2	22		30	
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
DIBROMOMETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
DICHLORODIFLUOROMETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
ETHYL METHACRYLATE	0.5 U	0.5 UJ		0.5 UJ		0.5 U	0.5 U	0.5 UJ		0.5 UJ	
ETHYLBENZENE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
ISOBUTANOL	20 UR	20 UR		20 UR		20 UR	20 UR	20 UR		20 UR	
METHACRYLONITRILE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
METHYL IODIDE	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
METHYL METHACRYLATE	0.5 U	0.5 UJ		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
METHYL TERT-BUTYL ETHER	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
METHYLENE CHLORIDE	0.3 U	0.3 UJ		0.3 UJ		0.3 U	0.3 U	0.3 UJ		0.3 UJ	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	POND	POND	POND	POND	POND	POND	POND	POND	POND	POND
Sampling Round	03	01	01	01	01	03	03	01	01	01	01
Location	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD005	08SW/SD005
Sample Number	08SW00303	08SW00401	08SW00401-F	08SW00402	08SW00402-F	08SW00403	08SW00403-D	08SW00501	08SW00501-F	08SW00502	08SW00502-F
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005	10/25/2005	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005
PROPIONITRILE	20 UR	20 UR		20 UR		20 UR	20 UR	20 UR		20 UR	
STYRENE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
TETRACHLOROETHENE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
TOLUENE	0.3 U	0.3 U		3		0.3 U	0.3 U	0.3 U		0.3 U	
TOTAL XYLENES	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
TRANS-1,2-DICHLOROETHENE	0.3 U	0.3 U		4.4		0.3 U	0.3 U	0.3 U		0.3 U	
TRANS-1,3-DICHLOROPROPENE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
TRICHLOROETHENE	0.3 U	7.3		590		0.3 U	0.3 U	8.8		9.2	
TRICHLOROFLUOROMETHANE	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U	0.3 U		0.3 U	
VINYL ACETATE	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U	0.5 U		0.5 U	
VINYL CHLORIDE	0.3 U	0.7 J		40		1.4	1.4 J	3.4		8.8	
Semivolatile Organics (ug/L)											
1,2,4,5-TETRACHLOROBENZENE		0.98 U		1 U				0.971 U		1.08 U	
1,2,4-TRICHLOROBENZENE		0.98 U		1 U				0.971 U		1.08 U	
1,2-DICHLOROBENZENE		0.98 U		1 U				0.971 U		1.08 U	
1,3-DICHLOROBENZENE		0.98 U		1 U				0.971 U		1.08 U	
1,4-DICHLOROBENZENE		0.98 U		1 U				0.971 U		1.08 U	
1,4-DIOXANE		5		5				4 J		5 J	
1,4-NAPHTHOQUINONE		0.98 U		1 U				0.971 U		1.08 U	
1,4-PHENYLENEDIAMINE		0.98 U		1 U				0.971 U		1.08 U	
1-NAPHTHYLAMINE		0.98 U		1 U				0.971 U		1.08 U	
2,2'-OXYBIS(1-CHLOROPROPANE)		0.98 UJ		1 U				0.971 U		1.08 U	
2,3,4,6-TETRACHLOROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2,4,5-TRICHLOROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2,4,6-TRICHLOROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2,4-DICHLOROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2,4-DIMETHYLPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2,4-DINITROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2,6-DICHLOROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2-ACETYLAMINOFLUORENE		0.98 U		1 U				0.971 U		1.08 U	
2-CHLORONAPHTHALENE		0.98 U		1 U				0.971 U		1.08 U	
2-CHLOROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2-METHYLNAPHTHALENE		0.05 U		0.9				0.052 U		0.051 U	
2-METHYLPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2-NAPHTHYLAMINE		0.98 U		1 U				0.971 U		1.08 U	
2-NITROANILINE		0.98 U		1 U				0.971 U		1.08 U	
2-NITROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
2-PICOLINE		0.98 U		1 U				0.971 U		1.08 U	
3&4-METHYLPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
3,3'-DICHLOROBENZIDINE		0.98 U		1 U				0.971 U		1.08 U	
3,3'-DIMETHYLBENZIDINE		0.98 UJ		1 UJ				0.971 UJ		1.08 UJ	
3-METHYLCHOLANTHRENE		0.98 U		1 U				0.971 U		1.08 U	
3-NITROANILINE		0.98 U		1 U				0.971 U		1.08 U	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	POND	POND	POND	POND	POND	POND	POND	POND	POND	POND
Sampling Round	03	01	01	01	01	03	03	01	01	01	01
Location	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD005	08SW/SD005
Sample Number	08SW00303	08SW00401	08SW00401-F	08SW00402	08SW00402-F	08SW00403	08SW00403-D	08SW00501	08SW00501-F	08SW00502	08SW00502-F
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005	10/25/2005	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005
4,6-DINITRO-2-METHYLPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
4-AMINOBIPHENYL		0.98 U		1 U				0.971 U		1.08 U	
4-BROMOPHENYL PHENYL ETHER		0.98 U		1 U				0.971 U		1.08 U	
4-CHLORO-3-METHYLPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
4-CHLOROANILINE		0.98 U		1 U				0.971 U		1.08 U	
4-CHLOROPHENYL PHENYL ETHER		0.98 U		1 U				0.971 U		1.08 U	
4-NITROANILINE		0.98 U		1 U				0.971 U		1.08 U	
4-NITROPHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
4-NITROQUINOLINE-1-OXIDE		0.98 UR		1 UR				0.971 UR		1.08 UR	
5-NITRO-O-TOLUIDINE		0.98 U		1 U				0.971 U		1.08 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE		0.98 U		1 U				0.971 U		1.08 U	
A,A-DIMETHYLPHENETHYLAMINE		0.98 U		1 UJ				0.971 UJ		1.08 UJ	
ACENAPHTHENE		0.05 U		0.37 J				0.052 U		0.051 U	
ACENAPHTHYLENE		0.05 U		0.215 U				0.052 U		0.051 U	
ACETOPHENONE		0.98 UJ		1 U				0.971 U		1.08 U	
ANILINE		0.98 U		1 U				0.971 U		1.08 U	
ANTHRACENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
ARAMITE		0.98 U		1 U				0.971 U		1.08 U	
BENZO(A)ANTHRACENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
BENZO(A)PYRENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
BENZO(B)FLUORANTHENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
BENZO(G,H,I)PERYLENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
BENZO(K)FLUORANTHENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
BENZYL ALCOHOL		0.98 U		1 U				0.971 U		1.08 U	
BIS(2-CHLOROETHOXY)METHANE		0.98 U		1 U				0.971 U		1.08 U	
BIS(2-CHLOROETHYL)ETHER		0.98 U		1 U				0.971 U		1.08 U	
BIS(2-ETHYLHEXYL)PHTHALATE		1 J		1 U				0.971 U		1.08 U	
BUTYL BENZYL PHTHALATE		0.98 U		1 U				0.971 U		1.08 U	
CHLOROBENZILATE		0.98 U		1 U				0.971 U		1.08 U	
CHRYSENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
DI-N-BUTYL PHTHALATE		0.98 U		1 U				0.971 U		1.08 U	
DI-N-OCTYL PHTHALATE		0.98 UJ		1 U				0.971 U		1.08 U	
DIALLATE		0.98 U		1 U				0.971 U		1.08 U	
DIBENZO(A,H)ANTHRACENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
DIBENZOFURAN		0.98 U		1 U				0.971 U		1.08 U	
DIETHYL PHTHALATE		0.98 U		1 U				0.971 U		1.08 U	
DIMETHYL PHTHALATE		0.98 U		1 U				0.971 U		1.08 U	
DIPHENYLAMINE		0.98 U		1 U				0.97 U		1.08 U	
ETHYL METHANE SULFONATE		0.98 UJ		1 U				0.971 U		1.08 U	
FLUORANTHENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
FLUORENE		0.05 U		0.215 U				0.052 U		0.051 U	
HEXACHLOROBENZENE		0.98 UJ		1 U				0.971 U		1.08 U	
HEXACHLOROBUTADIENE		0.98 U		1 U				0.971 U		1.08 U	
HEXACHLOROCYCLOPENTADIENE		0.98 UJ		1 UJ				0.971 UJ		1.08 UJ	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	POND	POND	POND	POND	POND	POND	POND	POND	POND	POND
Sampling Round	03	01	01	01	01	03	03	01	01	01	01
Location	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD005	08SW/SD005
Sample Number	08SW00303	08SW00401	08SW00401-F	08SW00402	08SW00402-F	08SW00403	08SW00403-D	08SW00501	08SW00501-F	08SW00502	08SW00502-F
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005	10/25/2005	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005
HEXACHLOROETHANE		0.98 U		1 U				0.971 U		1.08 U	
HEXACHLOROPROPENE		0.98 U		1 U				0.971 U		1.08 U	
INDENO(1,2,3-CD)PYRENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
ISODRIN		0.98 U		1 U				0.971 U		1.08 U	
ISOPHORONE		0.98 U		1 U				0.971 U		1.08 U	
ISOSAFROLE		0.98 U		1 U				0.971 U		1.08 U	
KEPONE		0.98 UJ		1 UJ				0.971 UJ		1.08 UJ	
METHAPYRILENE		0.98 UJ		1 UJ				0.971 UJ		1.08 UJ	
METHYL METHANE SULFONATE		0.98 U		1 U				0.971 U		1.08 U	
N-NITROSO-DI-N-BUTYLAMINE		0.98 U		1 U				0.971 U		1.08 U	
N-NITROSO-DI-N-PROPYLAMINE		0.98 U		1 U				0.971 U		1.08 U	
N-NITROSODIETHYLAMINE		0.98 U		1 U				0.971 U		1.08 U	
N-NITROSODIMETHYLAMINE		0.98 U		1 UJ				0.971 UJ		1.08 UJ	
N-NITROSODIPHENYLAMINE		0.98 U		1 U				0.971 U		1.08 U	
N-NITROSOMETHYLETHYLAMINE		0.98 U		1 U				0.971 U		1.08 U	
N-NITROSOMORPHOLINE		0.98 UJ		1 U				0.971 U		1.08 U	
N-NITROSOPIPERIDINE		0.98 U		1 U				0.971 U		1.08 U	
N-NITROSOPYRROLIDINE		0.98 U		1 U				0.971 U		1.08 U	
NAPHTHALENE		0.05 U		0.34 J				0.052 U		0.051 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE		0.98 U		1 U				0.971 U		1.08 U	
O-TOLUIDINE		0.98 U		1 U				0.971 U		1.08 U	
P-(DIMETHYLAMINO)AZOBENZENE		0.98 U		1 U				0.971 U		1.08 U	
PENTACHLOROBENZENE		0.98 U		1 U				0.971 U		1.08 U	
PENTACHLOROETHANE		0.98 U		1 U				0.971 U		1.08 U	
PENTACHLORONITROBENZENE		0.98 U		1 U				0.971 U		1.08 U	
PHENACETIN		0.98 U		1 U				0.971 U		1.08 U	
PHENANTHRENE		0.05 U		1.42 J				0.052 U		0.051 U	
PHENOL		0.98 U		1 UR				0.971 UR		1.08 UR	
PRONAMIDE		0.98 U		1 U				0.971 U		1.08 U	
PYRENE		0.05 U		0.215 UJ				0.052 U		0.051 U	
PYRIDINE		0.98 U		1 U				0.971 U		1.08 U	
SAFROLE		0.98 U		1 U				0.971 U		1.08 U	
Pesticides PCBs (ug/L)											
AROCLOR-1016											
AROCLOR-1221											
AROCLOR-1232											
AROCLOR-1242											
AROCLOR-1248											
AROCLOR-1254											
AROCLOR-1260											
Energetics (ug/L)											
1,3,5-TRINITROBENZENE		0.248 U		0.248 U				0.252 U		0.271 U	
1,3-DINITROBENZENE		0.248 U		0.248 U				0.252 U		0.271 U	
2,4,6-TRINITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	POND	POND	POND	POND	POND	POND	POND	POND	POND	POND
Sampling Round	03	01	01	01	01	03	03	01	01	01	01
Location	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD005	08SW/SD005
Sample Number	08SW00303	08SW00401	08SW00401-F	08SW00402	08SW00402-F	08SW00403	08SW00403-D	08SW00501	08SW00501-F	08SW00502	08SW00502-F
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005	10/25/2005	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005
2,4-DINITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	
2,6-DINITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	
2-AMINO-4,6-DINITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	
2-NITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	
3-NITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	
4-AMINO-2,6-DINITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	
4-NITROTOLUENE		0.248 U		0.248 U				0.252 U		0.271 U	
HMX		0.248 U		0.248 U				0.252 U		0.271 U	
NITROBENZENE		0.248 U		0.248 U				0.252 U		0.271 U	
RDX		0.248 U		0.248 U				0.252 U		0.271 U	
TETRYL		0.248 U		0.248 U				0.252 U		0.271 U	
Total Metals (ug/L)											
ALUMINUM		402 J		472 J				344 J		328 J	
ANTIMONY		0.31 U		0.46 U				0.41 U		0.29 U	
ARSENIC		0.59 U		0.68 U				0.6 U		0.65 U	
BARIUM		94.8 J		115 J				97.4 J		113 J	
BERYLLIUM		0.02 U		0.02 U				0.02 U		0.02 U	
CADMIUM		0.17 U		2.4 J				0.15 U		0.37 U	
CALCIUM		61600 J		68600 J				61600 J		66400 J	
CHROMIUM		1.1 J		24.6 J				1.1 J		2.5 J	
COBALT		0.5 J		1.2				0.48 J		0.52 J	
COPPER		2 J		8.1 J				2.1 J		2.1 J	
IRON		938 J		2520 J				1270 J		1640 J	
LEAD		1.2 J		25.9 J				1.2 J		2.9 J	
MAGNESIUM		8540 J		9540 J				8490 J		9220 J	
MANGANESE		160 J		218 J				158 J		190 J	
MERCURY		0.03 U		0.03 U				0.03 U		0.03 U	
NICKEL		1.3		3.2				1.3		1.4	
POTASSIUM		3490 J		3890 J				3470 J		3830 J	
SELENIUM		0.21 U		0.19 U				0.19 U		0.22 U	
SILVER		0.028 U		0.028 U				0.028 U		0.028 U	
SODIUM		25200 J		30400 J				25200 J		28900 J	
THALLIUM		0.043 U		0.043 U				0.043 U		0.043 U	
TIN											
VANADIUM		1.14 U		1.14 U				1.14 U		1.14 U	
ZINC		12.3 U		93 J				12.2 U		16.6 U	
Dissolved Metals (ug/L)											
ALUMINUM, FILTERED			113 J		50.8 U				8.6 U		8.6 U
ANTIMONY, FILTERED			0.62 U		0.38 U				0.34 U		0.31 U
ARSENIC, FILTERED			0.48 U		0.45 U				0.3 U		0.34 U
BARIUM, FILTERED			91.4 J		95.6 J				81.1 J		111 J
BERYLLIUM, FILTERED			0.02 U		0.02 U				0.02 U		0.02 U
CADMIUM, FILTERED			0.3 J		0.61 J				0.33 J		0.15 J
CALCIUM, FILTERED			60200		64400				57300		59300

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	POND	POND	POND	POND	POND	POND	POND	POND	POND	POND
Sampling Round	03	01	01	01	01	03	03	01	01	01	01
Location	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD004	08SW/SD005	08SW/SD005	08SW/SD005	08SW/SD005
Sample Number	08SW00303	08SW00401	08SW00401-F	08SW00402	08SW00402-F	08SW00403	08SW00403-D	08SW00501	08SW00501-F	08SW00502	08SW00502-F
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005	10/25/2005	10/25/2005	1/10/2005	1/10/2005	1/10/2005	1/10/2005
CHROMIUM, FILTERED			1.7 U		4.5 J				0.54 U		0.78 U
COBALT, FILTERED			0.54 J		0.65 J				0.41 J		0.47 J
COPPER, FILTERED			2 J		2.3 J				1.4 J		1.1 J
IRON, FILTERED			910 J		922 J				452 J		517 J
LEAD, FILTERED			1.7 J		5.5 J				0.213 J		0.212 J
MAGNESIUM, FILTERED			8410 J		9190 J				8040 J		8980 J
MANGANESE, FILTERED			135 J		164 J				88.2 J		152 J
MERCURY, FILTERED			0.037 U		0.034 U				0.049 U		0.056 U
NICKEL, FILTERED			4.7 J		5.4 J				4.7 J		5.1 J
POTASSIUM, FILTERED			3070 J		3430 J				2870 J		3270 J
SELENIUM, FILTERED			0.41 U		0.35 U				0.33 U		0.29 U
SILVER, FILTERED			0.028 U		0.028 U				0.028 U		0.028 U
SODIUM, FILTERED			23400 J		27000 J				19300 J		23600 J
THALLIUM, FILTERED			0.1 J		0.11 J				0.11 J		0.11 J
TIN, FILTERED											
VANADIUM, FILTERED			1.14 U		1.14 U				1.14 U		1.14 U
ZINC, FILTERED			10.5 J		22 J				4.2 J		3.5 U
Miscellaneous Parameters											
PERCHLORATE (ug/L)		4 U		4 U				4 U		4 U	
TOTAL COLIFORM (CFU/100 mL)											
Field Parameters (mg/L)											
DISSOLVED OXYGEN	11.09					3.88					
DISSOLVED OXYGEN - METER		6.34		2.64				6.61		8.27	
OXIDATION REDUCTION POTENTIAL (MV)	109	-76		-103		145		-91		120.9	
PH (S.U.)	7.97	7.19		7.1		7.42		7.22		7.12	
SPECIFIC CONDUCTANCE (MS/CM)	0.365	0.31		0.42		0.294		0.3		0.34	
TEMPERATURE (C)	11.01	5.92		6.34		11.4		5.85		6.15	
TURBIDITY (NTU)	3.3	11		18		6.9		13		21	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	01	01	01	02	02	03
Location	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007
Sample Number	08SW00601	08SW00601-F	---	---	08SW00701	08SW00701-D	08SW00701-F	08SW00701-F-D	08SW00702	08SW00702-F	---
Sample Code	NORMAL	NORMAL	DRY	DRY	ORIG	DUP	ORIG	DUP	NORMAL	NORMAL	DRY
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/8/2005	1/9/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005
Volatile Organics (ug/L)											
1,1,1,2-TETRACHLOROETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
1,1,1-TRICHLOROETHANE	13				0.3 U	0.3 U			0.3 U		
1,1,2,2-TETRACHLOROETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
1,1,2-TRICHLOROETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
1,1-DICHLOROETHANE	4.9				0.3 U	0.3 U			0.3 U		
1,1-DICHLOROETHENE	1.1				0.3 U	0.3 U			0.3 U		
1,2,3-TRICHLOROPROPANE	0.3 U				0.3 U	0.3 U			0.3 U		
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U				0.3 U	0.3 U			0.3 U		
1,2-DIBROMOETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
1,2-DICHLOROETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
1,2-DICHLOROPROPANE	0.3 U				0.3 U	0.3 U			0.3 U		
2-BUTANONE	0.5 U				0.5 U	0.5 U			0.5 U		
2-HEXANONE	0.5 U				0.5 U	0.5 U			0.5 U		
3-CHLOROPROPENE	0.5 U				0.5 U	0.5 U			0.5 U		
4-METHYL-2-PENTANONE	0.5 U				0.5 U	0.5 U			0.5 U		
ACETONE	0.5 UJ				0.5 UJ	0.5 UJ			0.5 UJ		
ACETONITRILE	20 UR				20 UR	20 UR			20 UR		
ACROLEIN	0.5 UR				0.5 UR	0.5 UR			0.5 UR		
ACRYLONITRILE	0.5 U				0.5 U	0.5 U			0.5 U		
BENZENE	0.3 U				0.3 U	0.3 U			0.3 U		
BROMODICHLOROMETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
BROMOFORM	0.3 U				0.3 U	0.3 U			0.3 U		
BROMOMETHANE	0.3 U				0.3 U	0.3 U			0.3 UJ		
CARBON DISULFIDE	0.3 U				0.3 U	0.3 U			0.3 U		
CARBON TETRACHLORIDE	0.3 U				0.3 U	0.3 U			0.3 U		
CHLOROBENZENE	0.3 U				0.3 U	0.3 U			0.3 U		
CHLORODIBROMOMETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
CHLOROETHANE	0.5 U				0.5 U	0.5 U			0.5 U		
CHLOROFORM	0.3 U				0.3 U	0.3 U			0.3 U		
CHLOROMETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
CHLOROPRENE	0.5 U				0.5 U	0.5 U			0.5 U		
CIS-1,2-DICHLOROETHENE	7.9				0.3 U	0.3 U			0.3 U		
CIS-1,3-DICHLOROPROPENE	0.3 U				0.3 U	0.3 U			0.3 U		
DIBROMOMETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
DICHLORODIFLUOROMETHANE	0.3 U				0.3 U	0.3 U			0.3 UJ		
ETHYL METHACRYLATE	0.5 UJ				0.5 UJ	0.5 UJ			0.5 U		
ETHYLBENZENE	0.3 U				0.3 U	0.3 U			0.3 U		
ISOBUTANOL	20 UR				20 UR	20 UR			20 UR		
METHACRYLONITRILE	0.3 U				0.3 U	0.3 U			0.3 U		
METHYL IODIDE	0.5 U				0.5 U	0.5 U			0.5 U		
METHYL METHACRYLATE	0.5 U				0.5 U	0.5 U			0.5 U		
METHYL TERT-BUTYL ETHER	0.5 U				0.5 U	0.5 U			0.5 U		
METHYLENE CHLORIDE	0.3 UJ				0.3 UJ	0.3 UJ			0.3 UJ		

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	01	01	01	02	02	03
Location	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007
Sample Number	08SW00601	08SW00601-F	---	---	08SW00701	08SW00701-D	08SW00701-F	08SW00701-F-D	08SW00702	08SW00702-F	---
Sample Code	NORMAL	NORMAL	DRY	DRY	ORIG	DUP	ORIG	DUP	NORMAL	NORMAL	DRY
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/8/2005	1/9/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005
PROPIONITRILE	20 UR				20 UR	20 UR			20 UR		
STYRENE	0.3 U				0.3 U	0.3 U			0.3 U		
TETRACHLOROETHENE	0.3 U				0.3 U	0.3 U			0.3 U		
TOLUENE	0.3 U				0.3 U	0.3 U			0.3 U		
TOTAL XYLENES	0.3 U				0.3 U	0.3 U			0.3 U		
TRANS-1,2-DICHLOROETHENE	0.3 U				0.3 U	0.3 U			0.3 U		
TRANS-1,3-DICHLOROPROPENE	0.3 U				0.3 U	0.3 U			0.3 U		
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U				0.5 U	0.5 U			0.5 U		
TRICHLOROETHENE	34				0.6 J	0.6 J			0.3 U		
TRICHLOROFLUOROMETHANE	0.3 U				0.3 U	0.3 U			0.3 U		
VINYL ACETATE	0.5 U				0.5 U	0.5 U			0.5 U		
VINYL CHLORIDE	0.3 U				0.3 U	0.3 U			0.3 U		
Semivolatile Organics (ug/L)											
1,2,4,5-TETRACHLOROBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
1,2,4-TRICHLOROBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
1,2-DICHLOROBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
1,3-DICHLOROBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
1,4-DICHLOROBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
1,4-DIOXANE	3 J				0.962 U	0.962 U			6		
1,4-NAPHTHOQUINONE	0.971 U				0.962 U	0.962 U			0.98 U		
1,4-PHENYLENEDIAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
1-NAPHTHYLAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
2,2'-OXYBIS(1-CHLOROPROPANE)	0.971 UJ				0.962 U	0.962 U			0.98 U		
2,3,4,6-TETRACHLOROPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2,4,5-TRICHLOROPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2,4,6-TRICHLOROPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2,4-DICHLOROPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2,4-DIMETHYLPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2,4-DINITROPHENOL	0.971 U				0.962 UJ	0.962 UJ			0.98 UR		
2,6-DICHLOROPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2-ACETYLAMINOFLUORENE	0.971 U				0.962 U	0.962 U			0.98 U		
2-CHLORONAPHTHALENE	0.971 U				0.962 U	0.962 U			0.98 U		
2-CHLOROPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2-METHYLNAPHTHALENE	0.049 U				0.048 U	0.049 U					
2-METHYLPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
2-NAPHTHYLAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
2-NITROANILINE	0.971 U				0.962 U	0.962 U			0.98 U		
2-NITROPHENOL	0.971 U				0.962 UJ	0.962 U			0.98 U		
2-PICOLINE	0.971 U				0.962 U	0.962 U			0.98 U		
3&4-METHYLPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
3,3'-DICHLOROBENZIDINE	0.971 U				0.962 U	0.962 U			0.98 U		
3,3'-DIMETHYLBENZIDINE	0.971 UJ				0.962 U	0.962 UJ			0.98 U		
3-METHYLCHOLANTHRENE	0.971 U				0.962 U	0.962 U			0.98 U		
3-NITROANILINE	0.971 U				0.962 U	0.962 U			0.98 U		

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	01	01	01	02	02	03
Location	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007
Sample Number	08SW00601	08SW00601-F	---	---	08SW00701	08SW00701-D	08SW00701-F	08SW00701-F-D	08SW00702	08SW00702-F	---
Sample Code	NORMAL	NORMAL	DRY	DRY	ORIG	DUP	ORIG	DUP	NORMAL	NORMAL	DRY
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/8/2005	1/9/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005
4,6-DINITRO-2-METHYLPHENOL	0.971 U				0.962 UJ	0.962 U			0.98 UJ		
4-AMINOBIPHENYL	0.971 U				0.962 U	0.962 U			0.98 U		
4-BROMOPHENYL PHENYL ETHER	0.971 U				0.962 U	0.962 U			0.98 U		
4-CHLORO-3-METHYLPHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
4-CHLOROANILINE	0.971 U				0.962 U	0.962 U			0.98 U		
4-CHLOROPHENYL PHENYL ETHER	0.971 U				0.962 U	0.962 U			0.98 U		
4-NITROANILINE	0.971 U				0.962 U	0.962 U			0.98 U		
4-NITROPHENOL	0.971 U				0.962 UR	0.962 UJ			0.98 U		
4-NITROQUINOLINE-1-OXIDE	0.971 UR				0.962 UR	0.962 UR			0.98 UR		
5-NITRO-O-TOLUIDINE	0.971 U				0.962 U	0.962 U			0.98 U		
7,12-DIMETHYLBENZ(A)ANTHRACENE	0.971 U				0.962 U	0.962 U			0.98 U		
A,A-DIMETHYLPHENETHYLAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
ACENAPHTHENE	0.049 U				0.048 U	0.049 U					
ACENAPHTHYLENE	0.049 U				0.048 U	0.049 U					
ACETOPHENONE	0.971 UJ				0.962 U	0.962 U			0.98 U		
ANILINE	0.971 U				0.962 U	0.962 U			0.98 U		
ANTHRACENE	0.049 U				0.048 U	0.049 U					
ARAMITE	0.971 U				0.962 U	0.962 U			0.98 U		
BENZO(A)ANTHRACENE	0.049 U				0.048 U	0.049 U					
BENZO(A)PYRENE	0.049 U				0.048 U	0.049 U					
BENZO(B)FLUORANTHENE	0.049 U				0.048 U	0.049 U					
BENZO(G,H,I)PERYLENE	0.049 U				0.048 U	0.049 U					
BENZO(K)FLUORANTHENE	0.049 U				0.048 U	0.049 U					
BENZYL ALCOHOL	0.971 U				0.962 U	0.962 U			0.98 U		
BIS(2-CHLOROETHOXY)METHANE	0.971 U				0.962 U	0.962 U			0.98 U		
BIS(2-CHLOROETHYL)ETHER	0.971 U				0.962 U	0.962 U			0.98 U		
BIS(2-ETHYLHEXYL)PHTHALATE	0.971 U				0.962 U	0.962 U			0.98 U		
BUTYL BENZYL PHTHALATE	0.971 U				0.962 U	0.962 U			0.98 U		
CHLOROBENZILATE	0.971 U				0.962 U	0.962 U			0.98 U		
CHRYSENE	0.049 U				0.048 U	0.049 U					
DI-N-BUTYL PHTHALATE	0.971 U				0.962 U	0.962 U			0.98 U		
DI-N-OCTYL PHTHALATE	0.971 UJ				0.962 U	0.962 U			0.98 U		
DIALLATE	0.971 U				0.962 U	0.962 U			0.98 U		
DIBENZO(A,H)ANTHRACENE	0.049 U				0.048 U	0.049 U					
DIBENZOFURAN	0.971 U				0.962 U	0.962 U			0.98 U		
DIETHYL PHTHALATE	0.971 U				0.962 U	0.962 U			0.98 U		
DIMETHYL PHTHALATE	0.971 U				0.962 U	0.962 U			0.98 U		
DIPHENYLAMINE	0.97 U				0.962 U	0.962 U			0.98 U		
ETHYL METHANE SULFONATE	0.971 UJ				0.962 U	0.962 U			0.98 U		
FLUORANTHENE	0.049 U				0.048 U	0.049 U					
FLUORENE	0.049 U				0.048 U	0.049 U					
HEXACHLOROBENZENE	0.971 UJ				0.962 U	0.962 U			0.98 U		
HEXACHLOROBUTADIENE	0.971 U				0.962 U	0.962 U			0.98 U		
HEXACHLOROCYCLOPENTADIENE	0.971 UJ				0.962 UJ	0.962 UJ			0.98 UJ		

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	01	01	01	02	02	03
Location	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007
Sample Number	08SW00601	08SW00601-F	---	---	08SW00701	08SW00701-D	08SW00701-F	08SW00701-F-D	08SW00702	08SW00702-F	---
Sample Code	NORMAL	NORMAL	DRY	DRY	ORIG	DUP	ORIG	DUP	NORMAL	NORMAL	DRY
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/8/2005	1/9/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005
HEXACHLOROETHANE	0.971 U				0.962 U	0.962 U			0.98 U		
HEXACHLOROPROPENE	0.971 U				0.962 U	0.962 U			0.98 U		
INDENO(1,2,3-CD)PYRENE	0.049 U				0.048 U	0.049 U					
ISODRIN	0.971 U				0.962 U	0.962 U			0.98 U		
ISOPHORONE	0.971 U				0.962 U	0.962 U			0.98 U		
ISOSAFROLE	0.971 U				0.962 U	0.962 U			0.98 U		
KEPONE	0.971 UJ				0.962 UJ	0.962 UJ			0.98 UR		
METHAPYRILENE	0.971 UJ				0.962 UJ	0.962 UJ			0.98 U		
METHYL METHANE SULFONATE	0.971 U				0.962 U	0.962 U			0.98 U		
N-NITROSO-DI-N-BUTYLAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
N-NITROSO-DI-N-PROPYLAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
N-NITROSODIETHYLAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
N-NITROSODIMETHYLAMINE	0.971 U				0.962 UJ	0.962 UJ			0.98 U		
N-NITROSODIPHENYLAMINE	0.971 U				0.962 U	0.962 U			0.98 U		
N-NITROSOMETHYLETHYLAMINE	0.971 U				0.962 UJ	0.962 U			0.98 U		
N-NITROSOMORPHOLINE	0.971 UJ				0.962 U	0.962 U			0.98 U		
N-NITROSOPIPERIDINE	0.971 U				0.962 U	0.962 U			0.98 U		
N-NITROSOPYRROLIDINE	0.971 U				0.962 U	0.962 U			0.98 U		
NAPHTHALENE	0.049 U				0.048 U	0.049 U					
O,O,O-TRIETHYL PHOSPHOROTHIOATE	0.971 U				0.962 U	0.962 U			0.98 U		
O-TOLUIDINE	0.971 U				0.962 U	0.962 U			0.98 U		
P-(DIMETHYLAMINO)AZOBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
PENTACHLOROBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
PENTACHLOROETHANE	0.971 U				0.962 U	0.962 U			0.98 U		
PENTACHLORONITROBENZENE	0.971 U				0.962 U	0.962 U			0.98 U		
PHENACETIN	0.971 U				0.962 U	0.962 U			0.98 U		
PHENANTHRENE	0.049 U				0.048 U	0.049 U					
PHENOL	0.971 U				0.962 U	0.962 U			0.98 U		
PRONAMIDE	0.971 U				0.962 U	0.962 U			0.98 U		
PYRENE	0.049 U				0.048 U	0.049 U					
PYRIDINE	0.971 U				0.962 U	0.962 U			0.98 U		
SAFROLE	0.971 U				0.962 U	0.962 U			0.98 U		
Pesticides PCBs (ug/L)											
AROCLOR-1016	0.245 U				0.236 U	0.24 U					
AROCLOR-1221	0.245 U				0.236 U	0.24 U					
AROCLOR-1232	0.245 U				0.236 U	0.24 U					
AROCLOR-1242	0.245 U				0.236 U	0.24 U					
AROCLOR-1248	0.245 U				0.236 U	0.24 U					
AROCLOR-1254	0.245 U				0.236 U	0.24 U					
AROCLOR-1260	0.245 U				0.236 U	0.24 U					
Energetics (ug/L)											
1,3,5-TRINITROBENZENE	0.242 U				0.238 U	0.238 U					
1,3-DINITROBENZENE	0.242 U				0.238 U	0.238 U					
2,4,6-TRINITROTOLUENE	0.242 U				0.238 U	0.238 U					

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	01	01	01	02	02	03
Location	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007
Sample Number	08SW00601	08SW00601-F	---	---	08SW00701	08SW00701-D	08SW00701-F	08SW00701-F-D	08SW00702	08SW00702-F	---
Sample Code	NORMAL	NORMAL	DRY	DRY	ORIG	DUP	ORIG	DUP	NORMAL	NORMAL	DRY
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/8/2005	1/9/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005
2,4-DINITROTOLUENE	0.242 U				0.238 U	0.238 U					
2,6-DINITROTOLUENE	0.242 U				0.238 U	0.238 U					
2-AMINO-4,6-DINITROTOLUENE	0.242 U				0.238 U	0.238 U					
2-NITROTOLUENE	0.242 U				0.238 U	0.238 U					
3-NITROTOLUENE	0.242 U				0.238 U	0.238 U					
4-AMINO-2,6-DINITROTOLUENE	0.242 U				0.238 U	0.238 U					
4-NITROTOLUENE	0.242 U				0.238 U	0.238 U					
HMX	0.242 U				0.238 U	0.238 U					
NITROBENZENE	0.242 U				0.238 U	0.238 U					
RDX	0.242 U				0.238 U	0.238 U					
TETRYL	0.242 U				0.238 U	0.238 U					
Total Metals (ug/L)											
ALUMINUM	557 J				349 J	324 J			21.9 U		
ANTIMONY	0.44 U				0.16 U	0.19 U			0.22 U		
ARSENIC	0.36 U				0.22 U	0.21 U			0.42 U		
BARIUM	73.8 J				48 J	43.2 J			80.2 J		
BERYLLIUM	0.02 U				0.02 U	0.02 U			0.02 U		
CADMIUM	0.18 U				0.06 U	0.11 U			0.15 J		
CALCIUM	65000 J				24700 J	23400 J			47000 J		
CHROMIUM	1.3 J				0.79 J	0.92 J			0.32 J		
COBALT	0.23 J				0.13 J	0.13 J			0.85 J		
COPPER	2.2 J				2.1 J	2.1 J			2.7 U		
IRON	442 J				278 J	245 J			93.2		
LEAD	0.499 U				0.374 U	0.369 U			0.069 U		
MAGNESIUM	8880 J				4850 J	4980 J			8870		
MANGANESE	6.2 J				7.3 J	4.8 J			97		
MERCURY	0.03 U				0.03 U	0.03 U			0.03 U		
NICKEL	1.3				1.1	1.2			1		
POTASSIUM	2200 J				1490 J	1530 J			1520		
SELENIUM	0.12 U				0.094 U	0.094 U			0.094 U		
SILVER	0.028 U				0.028 U	0.028 U			0.028 U		
SODIUM	16900 J				7210 J	7540 J			22500 J		
THALLIUM	0.043 U				0.043 U	0.043 U			0.1 U		
TIN									0.048 U		
VANADIUM	1.14 U				1.14 U	1.14 U			1.14 U		
ZINC	21 U				6.4 U	6.8 U			16.4 J		
Dissolved Metals (ug/L)											
ALUMINUM, FILTERED		21.9 U					8.6 U	17.2 U		8.35 U	
ANTIMONY, FILTERED		0.53 U					0.22 U	0.24 U		0.23 U	
ARSENIC, FILTERED		0.18 U					0.2 U	0.13 U		0.41 U	
BARIUM, FILTERED		72.9 J					40 J	41 J		79 J	
BERYLLIUM, FILTERED		0.02 U					0.02 U	0.02 U		0.02 U	
CADMIUM, FILTERED		0.21 J					0.05 J	0.08 J		0.11 U	
CALCIUM, FILTERED		61800					22700	23400		47300 J	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	01	01	02	03	01	01	01	01	02	02	03
Location	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD007
Sample Number	08SW00601	08SW00601-F	---	---	08SW00701	08SW00701-D	08SW00701-F	08SW00701-F-D	08SW00702	08SW00702-F	---
Sample Code	NORMAL	NORMAL	DRY	DRY	ORIG	DUP	ORIG	DUP	NORMAL	NORMAL	DRY
Sample Date	1/9/2005	1/9/2005	6/5/2005	10/25/2005	1/8/2005	1/9/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005
CHROMIUM, FILTERED		0.7 U					0.52 U	0.58 U		0.25 J	
COBALT, FILTERED		0.27 J					0.14 J	0.14 J		0.86 J	
COPPER, FILTERED		1.9 J					1.7 J	1.7 J		1.8 U	
IRON, FILTERED		475 J					177 J	171 J		30.7 J	
LEAD, FILTERED		0.244 J					0.069 U	0.069 U		0.13 J	
MAGNESIUM, FILTERED		8820 J					4590 J	4840 J		8840	
MANGANESE, FILTERED		0.88 J					1.8 J	1.4 J		86.5	
MERCURY, FILTERED		0.042 U					0.053 U	0.039 U		0.03 U	
NICKEL, FILTERED		5.2 J					2 J	2.3 J		1.3	
POTASSIUM, FILTERED		1820 J					1200 J	1180 J		1500	
SELENIUM, FILTERED		0.33 U					0.34 U	0.37 U		0.094 U	
SILVER, FILTERED		0.028 U					0.028 U	0.028 U		0.028 U	
SODIUM, FILTERED		14400 J					6020 J	5970 J		22300 J	
THALLIUM, FILTERED		0.1 J					0.08 J	0.07 J		0.1 U	
TIN, FILTERED							0.09 U			0.048 U	
VANADIUM, FILTERED		1.14 U					1.14 U	1.14 U		1.14 U	
ZINC, FILTERED		6.3 J					4.7 J	4.5 J		16.2 J	
Miscellaneous Parameters											
PERCHLORATE (ug/L)	4 U				2 U	2 U					
TOTAL COLIFORM (CFU/100 mL)											
Field Parameters (mg/L)											
DISSOLVED OXYGEN											
DISSOLVED OXYGEN - METER	11.36				12.41						
OXIDATION REDUCTION POTENTIAL (MV)	22.5				42.8						
PH (S.U.)	7.46				7.31						
SPECIFIC CONDUCTANCE (MS/CM)	0.541				0.223						
TEMPERATURE (C)	7.62				6.02						
TURBIDITY (NTU)	11				8.3						

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD
Area of Concern	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSUP
Sampling Round	01	01	02	02	03	01	01	02	02	03	02
Location	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD010
Sample Number	08SW00801	08SW00801-F	08SW00802	08SW00802-F	08SW00803	08SW00901	08SW00901-F	08SW00902	08SW00902-F	08SW00903	08SW01001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
Volatile Organics (ug/L)											
1,1,1,2-TETRACHLOROETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,1,1-TRICHLOROETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,1,2,2-TETRACHLOROETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,1,2-TRICHLOROETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,1-DICHLOROETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,1-DICHLOROETHENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,2,3-TRICHLOROPROPANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,2-DIBROMOETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,2-DICHLOROETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
1,2-DICHLOROPROPANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
2-BUTANONE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
2-HEXANONE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
3-CHLOROPROPENE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
4-METHYL-2-PENTANONE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
ACETONE	0.5 UJ		0.5 UJ		0.5 U	0.5 UJ		0.5 UJ		0.5 U	0.5 UJ
ACETONITRILE	20 UR		20 UR		20 UR	20 UR		20 UR		20 UR	20 UR
ACROLEIN	0.5 UR		0.5 UR		0.5 UR	0.5 UR		0.5 UR		0.5 UR	0.5 UR
ACRYLONITRILE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
BENZENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
BROMODICHLOROMETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
BROMOFORM	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
BROMOMETHANE	0.3 U		0.3 UJ		0.3 U	0.3 U		0.3 UJ		0.3 U	0.3 UJ
CARBON DISULFIDE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
CARBON TETRACHLORIDE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
CHLOROBENZENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
CHLORODIBROMOMETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
CHLOROETHANE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
CHLOROFORM	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
CHLOROMETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
CHLOROPRENE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
CIS-1,3-DICHLOROPROPENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
DIBROMOMETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
DICHLORODIFLUOROMETHANE	0.3 U		0.3 UJ		0.3 U	0.3 U		0.3 UJ		0.3 U	0.3 UJ
ETHYL METHACRYLATE	0.5 UJ		0.5 U		0.5 U	0.5 UJ		0.5 U		0.5 U	0.5 U
ETHYLBENZENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
ISOBUTANOL	20 UR		20 UR		20 UR	20 UR		20 UR		20 UR	20 UR
METHACRYLONITRILE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
METHYL IODIDE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
METHYL METHACRYLATE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
METHYL TERT-BUTYL ETHER	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
METHYLENE CHLORIDE	0.3 UJ		0.3 UJ		0.3 U	0.3 UJ		0.3 UJ		0.3 U	0.3 UJ

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD
Area of Concern	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSUP
Sampling Round	01	01	02	02	03	01	01	02	02	03	02
Location	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD010
Sample Number	08SW00801	08SW00801-F	08SW00802	08SW00802-F	08SW00803	08SW00901	08SW00901-F	08SW00902	08SW00902-F	08SW00903	08SW01001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
PROPIONITRILE	20 UR		20 UR		20 UR	20 UR		20 UR		20 UR	20 UR
STYRENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
TETRACHLOROETHENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
TOLUENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
TOTAL XYLENES	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
TRANS-1,3-DICHLOROPROPENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
TRICHLOROETHENE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
TRICHLOROFLUOROMETHANE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
VINYL ACETATE	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U
VINYL CHLORIDE	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U
Semivolatile Organics (ug/L)											
1,2,4,5-TETRACHLOROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1,2,4-TRICHLOROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1,2-DICHLOROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1,3-DICHLOROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1,4-DICHLOROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1,4-DIOXANE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1,4-NAPHTHOQUINONE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1,4-PHENYLENEDIAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
1-NAPHTHYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2,2'-OXYBIS(1-CHLOROPROPANE)	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2,3,4,6-TETRACHLOROPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2,4,5-TRICHLOROPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2,4,6-TRICHLOROPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2,4-DICHLOROPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2,4-DIMETHYLPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2,4-DINITROPHENOL	0.98 UJ		0.962 UR			1.06 UJ		0.98 UR			0.98 UR
2,6-DICHLOROPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-ACETYLAMINOFLUORENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-CHLORONAPHTHALENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-CHLOROPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-METHYLNAPHTHALENE	0.048 U					0.053 U					
2-METHYLPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-NAPHTHYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-NITROANILINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-NITROPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
2-PICOLINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
3&4-METHYLPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
3,3'-DICHLOROBENZIDINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
3,3'-DIMETHYLBENZIDINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
3-METHYLCHOLANTHRENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
3-NITROANILINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD
Area of Concern	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSUP
Sampling Round	01	01	02	02	03	01	01	02	02	03	02
Location	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD010
Sample Number	08SW00801	08SW00801-F	08SW00802	08SW00802-F	08SW00803	08SW00901	08SW00901-F	08SW00902	08SW00902-F	08SW00903	08SW01001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
4,6-DINITRO-2-METHYLPHENOL	0.98 U		0.962 UJ			1.06 U		0.98 UJ			0.98 UJ
4-AMINOBIPHENYL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
4-BROMOPHENYL PHENYL ETHER	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
4-CHLORO-3-METHYLPHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
4-CHLOROANILINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
4-CHLOROPHENYL PHENYL ETHER	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
4-NITROANILINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
4-NITROPHENOL	0.98 UJ		0.962 U			1.06 UJ		0.98 U			0.98 U
4-NITROQUINOLINE-1-OXIDE	0.98 UR		0.962 UR			1.06 UR		0.98 UR			0.98 UR
5-NITRO-O-TOLUIDINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
A,A-DIMETHYLPHENETHYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
ACENAPHTHENE	0.048 U					0.053 U					
ACENAPHTHYLENE	0.048 U					0.053 U					
ACETOPHENONE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
ANILINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
ANTHRACENE	0.048 U					0.053 U					
ARAMITE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
BENZO(A)ANTHRACENE	0.048 U					0.053 U					
BENZO(A)PYRENE	0.048 U					0.053 U					
BENZO(B)FLUORANTHENE	0.048 U					0.053 U					
BENZO(G,H,I)PERYLENE	0.048 U					0.053 U					
BENZO(K)FLUORANTHENE	0.048 U					0.053 U					
BENZYL ALCOHOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
BIS(2-CHLOROETHOXY)METHANE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
BIS(2-CHLOROETHYL)ETHER	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
BIS(2-ETHYLHEXYL)PHTHALATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
BUTYL BENZYL PHTHALATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
CHLOROBENZILATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
CHRYSENE	0.048 U					0.053 U					
DI-N-BUTYL PHTHALATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
DI-N-OCTYL PHTHALATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
DIALLATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
DIBENZO(A,H)ANTHRACENE	0.048 U					0.053 U					
DIBENZOFURAN	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
DIETHYL PHTHALATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
DIMETHYL PHTHALATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
DIPHENYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
ETHYL METHANE SULFONATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
FLUORANTHENE	0.048 U					0.053 U					
FLUORENE	0.048 U					0.053 U					
HEXACHLOROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
HEXACHLOROBUTADIENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
HEXACHLOROCYCLOPENTADIENE	0.98 UJ		0.962 UJ			1.06 UJ		0.98 UJ			0.98 UJ

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD
Area of Concern	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSUP
Sampling Round	01	01	02	02	03	01	01	02	02	03	02
Location	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD010
Sample Number	08SW00801	08SW00801-F	08SW00802	08SW00802-F	08SW00803	08SW00901	08SW00901-F	08SW00902	08SW00902-F	08SW00903	08SW01001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
HEXACHLOROETHANE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
HEXACHLOROPROPENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
INDENO(1,2,3-CD)PYRENE	0.048 U					0.053 U					
ISODRIN	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
ISOPHORONE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
ISOSAFROLE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
KEPONE	0.98 UJ		0.962 UR			1.06 UJ		0.98 UR			0.98 UR
METHAPYRILENE	0.98 UJ		0.962 U			1.06 UJ		0.98 U			0.98 U
METHYL METHANE SULFONATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
N-NITROSO-DI-N-BUTYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
N-NITROSO-DI-N-PROPYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
N-NITROSODIETHYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
N-NITROSODIMETHYLAMINE	0.98 UJ		0.962 U			1.06 UJ		0.98 U			0.98 U
N-NITROSODIPHENYLAMINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
N-NITROSOMETHYLETHYLAMINE	0.98 UJ		0.962 U			1.06 UJ		0.98 U			0.98 U
N-NITROSOMORPHOLINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
N-NITROSOPIPERIDINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
N-NITROSOPYRROLIDINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
NAPHTHALENE	0.048 U					0.053 U					
O,O,O-TRIETHYL PHOSPHOROTHIOATE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
O-TOLUIDINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
P-(DIMETHYLAMINO)AZOBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
PENTACHLOROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
PENTACHLOROETHANE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
PENTACHLORONITROBENZENE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
PHENACETIN	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
PHENANTHRENE	0.048 U					0.053 U					
PHENOL	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
PRONAMIDE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
PYRENE	0.048 U					0.053 U					
PYRIDINE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
SAFROLE	0.98 U		0.962 U			1.06 U		0.98 U			0.98 U
Pesticides PCBs (ug/L)											
AROCLOR-1016	0.265 U					0.26 U					
AROCLOR-1221	0.265 U					0.26 U					
AROCLOR-1232	0.265 U					0.26 U					
AROCLOR-1242	0.265 U					0.26 U					
AROCLOR-1248	0.265 U					0.26 U					
AROCLOR-1254	0.265 U					0.26 U					
AROCLOR-1260	0.265 U					0.26 U					
Energetics (ug/L)											
1,3,5-TRINITROBENZENE	0.252 U					0.264 U					
1,3-DINITROBENZENE	0.252 U					0.264 U					
2,4,6-TRINITROTOLUENE	0.252 U					0.264 U					

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD
Area of Concern	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSUP
Sampling Round	01	01	02	02	03	01	01	02	02	03	02
Location	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD010
Sample Number	08SW00801	08SW00801-F	08SW00802	08SW00802-F	08SW00803	08SW00901	08SW00901-F	08SW00902	08SW00902-F	08SW00903	08SW01001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
2,4-DINITROTOLUENE	0.252 U					0.264 U					
2,6-DINITROTOLUENE	0.252 U					0.264 U					
2-AMINO-4,6-DINITROTOLUENE	0.252 U					0.264 U					
2-NITROTOLUENE	0.252 U					0.264 U					
3-NITROTOLUENE	0.252 U					0.264 U					
4-AMINO-2,6-DINITROTOLUENE	0.252 U					0.264 U					
4-NITROTOLUENE	0.252 U					0.264 U					
HMX	0.252 U					0.264 U					
NITROBENZENE	0.252 U					0.264 U					
RDX	0.252 U					0.264 U					
TETRYL	0.252 U					0.264 U					
Total Metals (ug/L)											
ALUMINUM	635 J		56.7 J			710 J		41.8 U			517 J
ANTIMONY	0.3 U		0.085 U			0.085 U		0.5 U			0.23 U
ARSENIC	0.31 U		0.2 U			0.23 U		0.31 U			0.43 U
BARIUM	35.6 J		69.1 J			37.9 J		65.3 J			53.2 J
BERYLLIUM	0.03 U		0.02 U			0.02 U		0.02 U			0.05 U
CADMIUM	0.05 U		0.06 J			0.05 U		0.07 J			0.06 J
CALCIUM	35000 J		58400 J			32200 J		59400 J			42800 J
CHROMIUM	0.97 J		0.39 J			0.89 J		0.66 J			0.88 J
COBALT	0.18 J		0.12 J			0.23 J		0.27 J			0.62 J
COPPER	1 J		1.6 U			0.99 J		1.9 U			1.9 U
IRON	501 J		83.8			588 J		67.8			637
LEAD	0.407 U		0.13 J			0.492 U		0.09 J			0.48 J
MAGNESIUM	6810 J		11400			6210 J		9760			6420
MANGANESE	7.3 J		55.2			16.4 J		156			178
MERCURY	0.03 U		0.03 U			0.03 U		0.03 U			0.03 U
NICKEL	1.2		0.42 J			1.3		0.63 J			1.3
POTASSIUM	1080 J		1320			1030 J		1430			1190
SELENIUM	0.23 U		0.094 U			0.13 U		0.094 U			0.094 U
SILVER	0.04 U		0.028 U			0.028 U		0.028 U			0.36 U
SODIUM	16300 J		28700 J			14200 J		24300 J			14500 J
THALLIUM	0.043 U		0.11 U			0.043 U		0.16 U			0.11 U
TIN			0.048 U					0.048 U			0.05 U
VANADIUM	1.14 U		1.14 U			1.14 U		1.14 U			1.14 U
ZINC	5.1 U		2.5 U			4.4 U		3 U			10.1 J
Dissolved Metals (ug/L)											
ALUMINUM, FILTERED		38.3 U		8.35 U			8.6 U		8.35 U		
ANTIMONY, FILTERED		0.46 U		0.085 U			0.11 U		0.36 U		
ARSENIC, FILTERED		0.15 U		0.13 U			0.13 U		0.27 U		
BARIUM, FILTERED		31.5 J		63.3 J			33.1 J		65 J		
BERYLLIUM, FILTERED		0.03 U		0.02 U			0.02 U		0.02 U		
CADMIUM, FILTERED		0.14 J		0.05 U			0.04 J		0.06 U		
CALCIUM, FILTERED		34600		56500 J			31200		58700 J		

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD
Area of Concern	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSDOWN	MSUP
Sampling Round	01	01	02	02	03	01	01	02	02	03	02
Location	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD008	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD009	08SW/SD010
Sample Number	08SW00801	08SW00801-F	08SW00802	08SW00802-F	08SW00803	08SW00901	08SW00901-F	08SW00902	08SW00902-F	08SW00903	08SW01001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	1/9/2005	1/9/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
CHROMIUM, FILTERED		0.46 U		0.2 J			0.49 U		0.44 J		
COBALT, FILTERED		0.15 J		0.088 U			0.14 J		0.21 J		
COPPER, FILTERED		0.74 J		1.2 U			0.84 J		1.4 U		
IRON, FILTERED		239 J		7.1 J			245 J		8.1 J		
LEAD, FILTERED		0.181 J		0.1 J			0.193 J		0.27 J		
MAGNESIUM, FILTERED		6540 J		10900			6250 J		9580		
MANGANESE, FILTERED		1.8 J		40.9			2.4 J		137		
MERCURY, FILTERED		0.052 U		0.03 U			0.032 U		0.03 U		
NICKEL, FILTERED		2.7 J		0.45 J			2.7 J		0.75 J		
POTASSIUM, FILTERED		770 J		1280			801 J		1380		
SELENIUM, FILTERED		0.39 U		0.094 U			0.4 U		0.094 U		
SILVER, FILTERED		0.04 U		0.028 U			0.028 U		0.028 U		
SODIUM, FILTERED		13200 J		27900 J			12200 J		23600 J		
THALLIUM, FILTERED		0.11 J		0.1 U			0.12 J		0.13 U		
TIN, FILTERED				0.048 U					0.05 U		
VANADIUM, FILTERED		1.14 U		1.14 U			1.14 U		1.14 U		
ZINC, FILTERED		1.8 U		1.2 J			2 U		2.2 J		
Miscellaneous Parameters											
PERCHLORATE (ug/L)	4 U					4 U					
TOTAL COLIFORM (CFU/100 mL)											
Field Parameters (mg/L)											
DISSOLVED OXYGEN					9.3					8.88	
DISSOLVED OXYGEN - METER	12.99					13.54					
OXIDATION REDUCTION POTENTIAL (MV)	32.3				184	40.5				175	
PH (S.U.)	7.45				7.35	7.2				7.35	
SPECIFIC CONDUCTANCE (MS/CM)	0.33				0.347	0.301				0.323	
TEMPERATURE (C)	5.1				10.39	4.68				9.53	
TURBIDITY (NTU)	12				2	9.7				13	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	UPGRAD	DOWNGRAD
Area of Concern	MSUP	MSUP	TRIBDOWN	TRIBDOWN	POND	POND	POND	POND	TRIBUP	TRIBUP	MSDOWN
Sampling Round	02	03	02	03	02	02	02	02	02	03	02
Location	08SW/SD010	08SW/SD010	08SW/SD011	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD013	08SW/SD014
Sample Number	08SW01001-F	08SW01002	---	08SW01101	08SW01201	08SW01201-D	08SW01201-F	08SW01201-F-D	---	08SW01301	08SW01401
Sample Code	NORMAL	NORMAL	DRY	NORMAL	ORIG	DUP	ORIG	DUP	DRY	NORMAL	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	10/25/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
Volatile Organics (ug/L)											
1,1,1,2-TETRACHLOROETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,1,1-TRICHLOROETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,1,2,2-TETRACHLOROETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,1,2-TRICHLOROETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,1-DICHLOROETHANE		0.3 U		0.3 U	1.9	1.9				0.3 U	0.3 U
1,1-DICHLOROETHENE		0.3 U		0.3 U	1.4	1.5				0.3 U	0.3 U
1,2,3-TRICHLOROPROPANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,2-DIBROMOETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,2-DICHLOROETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
1,2-DICHLOROPROPANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
2-BUTANONE		1.2 J		0.5 U	7200	6600				0.5 U	0.5 U
2-HEXANONE		0.5 U		0.5 U	0.9 J	1.1 J				0.5 U	0.5 U
3-CHLOROPROPENE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
4-METHYL-2-PENTANONE		0.5 U		0.5 U	530	510				0.5 U	0.5 U
ACETONE		4.5 J		2.6 J	440 J	410 J				3.9 J	0.5 UJ
ACETONITRILE		20 UR		20 UR	20 UR	20 UR				20 UR	20 UR
ACROLEIN		0.5 UR		0.5 UR	0.5 UR	0.5 UR				0.5 UR	0.5 UR
ACRYLONITRILE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
BENZENE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
BROMODICHLOROMETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
BROMOFORM		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
BROMOMETHANE		0.3 U		0.3 U	0.3 UJ	0.3 UJ				0.3 U	0.3 UJ
CARBON DISULFIDE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
CARBON TETRACHLORIDE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
CHLOROBENZENE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
CHLORODIBROMOMETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
CHLOROETHANE		0.5 U		0.5 U	1.6	1.6				0.5 U	0.5 U
CHLOROFORM		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
CHLOROMETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
CHLOROPRENE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE		0.3 U		0.3 U	100	100				0.3 U	0.3 U
CIS-1,3-DICHLOROPROPENE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
DIBROMOMETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
DICHLORODIFLUOROMETHANE		0.3 U		0.3 U	0.3 UJ	0.3 UJ				0.3 U	0.3 UJ
ETHYL METHACRYLATE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
ETHYLBENZENE		0.3 U		0.3 U	11	11				0.3 U	0.3 U
ISOBUTANOL		20 UR		20 UR	20 UR	20 UR				20 UR	20 UR
METHACRYLONITRILE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
METHYL IODIDE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
METHYL METHACRYLATE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
METHYL TERT-BUTYL ETHER		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
METHYLENE CHLORIDE		0.3 U		0.3 U	0.3 UJ	0.3 UJ				0.3 U	0.3 UJ

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	UPGRAD	DOWNGRAD
Area of Concern	MSUP	MSUP	TRIBDOWN	TRIBDOWN	POND	POND	POND	POND	TRIBUP	TRIBUP	MSDOWN
Sampling Round	02	03	02	03	02	02	02	02	02	03	02
Location	08SW/SD010	08SW/SD010	08SW/SD011	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD013	08SW/SD014
Sample Number	08SW01001-F	08SW01002	---	08SW01101	08SW01201	08SW01201-D	08SW01201-F	08SW01201-F-D	---	08SW01301	08SW01401
Sample Code	NORMAL	NORMAL	DRY	NORMAL	ORIG	DUP	ORIG	DUP	DRY	NORMAL	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	10/25/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
PROPIONITRILE		20 UR		20 UR	20 UR	20 UR				20 UR	20 UR
STYRENE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
TETRACHLOROETHENE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
TOLUENE		0.3 U		0.3 U	110	110				0.3 U	0.3 U
TOTAL XYLENES		0.3 U		0.3 U	57	56				0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE		0.3 U		0.3 U	0.5 J	0.3 U				0.3 U	0.3 U
TRANS-1,3-DICHLOROPROPENE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
TRICHLOROETHENE		0.3 U		0.3 U	4.7	4.5				0.3 U	0.3 U
TRICHLOROFLUOROMETHANE		0.3 U		0.3 U	0.3 U	0.3 U				0.3 U	0.3 U
VINYL ACETATE		0.5 U		0.5 U	0.5 U	0.5 U				0.5 U	0.5 U
VINYL CHLORIDE		0.3 U		0.3 U	22	23				0.3 U	0.3 U
Semivolatile Organics (ug/L)											
1,2,4,5-TETRACHLOROBENZENE					1 U	1.03 U					1.01 U
1,2,4-TRICHLOROBENZENE					1 U	1.03 U					1.01 U
1,2-DICHLOROBENZENE					1 U	1.03 U					1.01 U
1,3-DICHLOROBENZENE					1 U	1.03 U					1.01 U
1,4-DICHLOROBENZENE					1 U	1.03 U					1.01 U
1,4-DIOXANE					1 U	1.03 U					1.01 U
1,4-NAPHTHOQUINONE					1 U	1.03 U					1.01 U
1,4-PHENYLENEDIAMINE					1 U	1.03 U					1.01 U
1-NAPHTHYLAMINE					1 U	1.03 U					1.01 U
2,2'-OXYBIS(1-CHLOROPROPANE)					1 U	1.03 U					1.01 U
2,3,4,6-TETRACHLOROPHENOL					1 U	1.03 UJ					1.01 U
2,4,5-TRICHLOROPHENOL					1 U	1.03 UJ					1.01 U
2,4,6-TRICHLOROPHENOL					1 U	1.03 UJ					1.01 U
2,4-DICHLOROPHENOL					1 U	1.03 U					1.01 U
2,4-DIMETHYLPHENOL					1 U	1.03 U					1.01 U
2,4-DINITROPHENOL					1 UR	1.03 UR					1.01 UR
2,6-DICHLOROPHENOL					1 U	1.03 U					1.01 U
2-ACETYLAMINOFLUORENE					1 U	1.03 U					1.01 U
2-CHLORONAPHTHALENE					1 U	1.03 UJ					1.01 U
2-CHLOROPHENOL					1 U	1.03 U					1.01 U
2-METHYLNAPHTHALENE											
2-METHYLPHENOL					4 J	3 J					1.01 U
2-NAPHTHYLAMINE					1 U	1.03 U					1.01 U
2-NITROANILINE					1 U	1.03 UJ					1.01 U
2-NITROPHENOL					1 U	1.03 U					1.01 U
2-PICOLINE					1 U	1.03 U					1.01 U
3&4-METHYLPHENOL					7	6					1.01 U
3,3'-DICHLOROBENZIDINE					1 U	1.03 U					1.01 U
3,3'-DIMETHYLBENZIDINE					1 U	1.03 U					1.01 U
3-METHYLCHOLANTHRENE					1 U	1.03 U					1.01 U
3-NITROANILINE					1 U	1.03 UJ					1.01 U

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	UPGRAD	DOWNGRAD
Area of Concern	MSUP	MSUP	TRIBDOWN	TRIBDOWN	POND	POND	POND	POND	TRIBUP	TRIBUP	MSDOWN
Sampling Round	02	03	02	03	02	02	02	02	02	03	02
Location	08SW/SD010	08SW/SD010	08SW/SD011	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD013	08SW/SD014
Sample Number	08SW01001-F	08SW01002	---	08SW01101	08SW01201	08SW01201-D	08SW01201-F	08SW01201-F-D	---	08SW01301	08SW01401
Sample Code	NORMAL	NORMAL	DRY	NORMAL	ORIG	DUP	ORIG	DUP	DRY	NORMAL	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	10/25/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
4,6-DINITRO-2-METHYLPHENOL					1 UJ	1.03 UJ					1.01 UJ
4-AMINOBIPHENYL					1 U	1.03 U					1.01 U
4-BROMOPHENYL PHENYL ETHER					1 UJ	1.03 UJ					1.01 U
4-CHLORO-3-METHYLPHENOL					1 U	1.03 U					1.01 U
4-CHLOROANILINE					1 U	1.03 U					1.01 U
4-CHLOROPHENYL PHENYL ETHER					1 U	1.03 UJ					1.01 U
4-NITROANILINE					1 U	1.03 UJ					1.01 U
4-NITROPHENOL					1 U	1.03 UJ					1.01 U
4-NITROQUINOLINE-1-OXIDE					1 UR	1.03 UR					1.01 UR
5-NITRO-O-TOLUIDINE					1 U	1.03 U					1.01 U
7,12-DIMETHYLBENZ(A)ANTHRACENE					1 U	1.03 U					1.01 U
A,A-DIMETHYLPHENETHYLAMINE					1 U	1.03 U					1.01 U
ACENAPHTHENE											
ACENAPHTHYLENE											
ACETOPHENONE					7	5 J					1.01 U
ANILINE					1 U	1.03 U					1.01 U
ANTHRACENE											
ARAMITE					1 U	1.03 U					1.01 U
BENZO(A)ANTHRACENE											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(G,H,I)PERYLENE											
BENZO(K)FLUORANTHENE											
BENZYL ALCOHOL					3 J	3 J					1.01 U
BIS(2-CHLOROETHOXY)METHANE					1 U	1.03 U					1.01 U
BIS(2-CHLOROETHYL)ETHER					1 U	1.03 U					1.01 U
BIS(2-ETHYLHEXYL)PHTHALATE					2 J	1.03 J					1.01 U
BUTYL BENZYL PHTHALATE					1 U	1.03 U					1.01 U
CHLOROBENZILATE					1 U	1.03 U					1.01 U
CHRYSENE											
DI-N-BUTYL PHTHALATE					1 UJ	1.03 UJ					1.01 U
DI-N-OCTYL PHTHALATE					1 U	1.03 U					1.01 U
DIALLATE					1 U	1.03 U					1.01 U
DIBENZO(A,H)ANTHRACENE											
DIBENZOFURAN					1 U	1.03 U					1.01 U
DIETHYL PHTHALATE					1 U	1.03 UJ					1.01 U
DIMETHYL PHTHALATE					1 U	1.03 UJ					1.01 U
DIPHENYLAMINE					1 U	1.03 U					1.01 U
ETHYL METHANE SULFONATE					1 U	1.03 U					1.01 U
FLUORANTHENE											
FLUORENE											
HEXACHLOROBENZENE					1 UJ	1.03 UJ					1.01 U
HEXACHLOROBUTADIENE					1 U	1.03 U					1.01 U
HEXACHLOROCYCLOPENTADIENE					1 UJ	1.03 UJ					1.01 UJ

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	UPGRAD	DOWNGRAD
Area of Concern	MSUP	MSUP	TRIBDOWN	TRIBDOWN	POND	POND	POND	POND	TRIBUP	TRIBUP	MSDOWN
Sampling Round	02	03	02	03	02	02	02	02	02	03	02
Location	08SW/SD010	08SW/SD010	08SW/SD011	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD013	08SW/SD014
Sample Number	08SW01001-F	08SW01002	---	08SW01101	08SW01201	08SW01201-D	08SW01201-F	08SW01201-F-D	---	08SW01301	08SW01401
Sample Code	NORMAL	NORMAL	DRY	NORMAL	ORIG	DUP	ORIG	DUP	DRY	NORMAL	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	10/25/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
HEXACHLOROETHANE					1 U	1.03 U					1.01 U
HEXACHLOROPROPENE					1 U	1.03 U					1.01 U
INDENO(1,2,3-CD)PYRENE											
ISODRIN					1 U	1.03 U					1.01 U
ISOPHORONE					1 U	1.03 U					1.01 U
ISOSAFROLE					1 U	1.03 U					1.01 U
KEPONE					1 UR	1.03 UR					1.01 UR
METHAPYRILENE					1 U	1.03 U					1.01 U
METHYL METHANE SULFONATE					1 U	1.03 U					1.01 U
N-NITROSO-DI-N-BUTYLAMINE					1 U	1.03 U					1.01 U
N-NITROSO-DI-N-PROPYLAMINE					1 U	1.03 U					1.01 U
N-NITROSODIETHYLAMINE					1 U	1.03 U					1.01 U
N-NITROSODIMETHYLAMINE					1 U	1.03 U					1.01 U
N-NITROSODIPHENYLAMINE					1 UJ	1.03 UJ					1.01 U
N-NITROSOMETHYLETHYLAMINE					1 U	1.03 U					1.01 U
N-NITROSOMORPHOLINE					1 U	1.03 U					1.01 U
N-NITROSOPIPERIDINE					1 U	1.03 U					1.01 U
N-NITROSOPYRROLIDINE					1 U	1.03 U					1.01 U
NAPHTHALENE											
O,O,O-TRIETHYL PHOSPHOROTHIOATE					1 U	1.03 U					1.01 U
O-TOLUIDINE					1 U	1.03 U					1.01 U
P-(DIMETHYLAMINO)AZOBENZENE					1 U	1.03 U					1.01 U
PENTACHLOROBENZENE					1 U	1.03 U					1.01 U
PENTACHLOROETHANE					1 U	1.03 U					1.01 U
PENTACHLORONITROBENZENE					1 U	1.03 U					1.01 U
PHENACETIN					1 U	1.03 U					1.01 U
PHENANTHRENE											
PHENOL					7	6					1.01 U
PRONAMIDE					1 U	1.03 U					1.01 U
PYRENE											
PYRIDINE					1 U	1.03 U					1.01 U
SAFROLE					1 U	1.03 U					1.01 U
Pesticides PCBs (ug/L)											
AROCLOR-1016											
AROCLOR-1221											
AROCLOR-1232											
AROCLOR-1242											
AROCLOR-1248											
AROCLOR-1254											
AROCLOR-1260											
Energetics (ug/L)											
1,3,5-TRINITROBENZENE											
1,3-DINITROBENZENE											
2,4,6-TRINITROTOLUENE											

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	UPGRAD	DOWNGRAD
Area of Concern	MSUP	MSUP	TRIBDOWN	TRIBDOWN	POND	POND	POND	POND	TRIBUP	TRIBUP	MSDOWN
Sampling Round	02	03	02	03	02	02	02	02	02	03	02
Location	08SW/SD010	08SW/SD010	08SW/SD011	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD013	08SW/SD014
Sample Number	08SW01001-F	08SW01002	---	08SW01101	08SW01201	08SW01201-D	08SW01201-F	08SW01201-F-D	---	08SW01301	08SW01401
Sample Code	NORMAL	NORMAL	DRY	NORMAL	ORIG	DUP	ORIG	DUP	DRY	NORMAL	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	10/25/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
2,4-DINITROTOLUENE											
2,6-DINITROTOLUENE											
2-AMINO-4,6-DINITROTOLUENE											
2-NITROTOLUENE											
3-NITROTOLUENE											
4-AMINO-2,6-DINITROTOLUENE											
4-NITROTOLUENE											
HMX											
NITROBENZENE											
RDX											
TETRYL											
Total Metals (ug/L)											
ALUMINUM					6780 J	8120 J					23.7 U
ANTIMONY					3.1 J	2.9 J					0.12 U
ARSENIC					20.6 J	15.8 J					0.17 U
BARIUM					450 J	375 J					57.4 J
BERYLLIUM					0.32 J	0.37 J					0.02 U
CADMIUM					9.5	9.3					0.06 J
CALCIUM					240000 J	129000 J					47100 J
CHROMIUM					73.4	76.4					0.46 J
COBALT					24.8	22.5					0.088 U
COPPER					184 J	154 J					2.2 U
IRON					31100	25800					28.4 J
LEAD					171	185					0.07 J
MAGNESIUM					12400	12000					8370
MANGANESE					4310	3190					10.2
MERCURY					0.03 U	0.03 U					0.03 U
NICKEL					22.9	22.5					0.26 J
POTASSIUM					6900	5560					1210
SELENIUM					0.63 J	0.48 J					0.094 U
SILVER					0.2 U	0.21 U					0.028 U
SODIUM					52900 J	50600 J					19600 J
THALLIUM					0.28 U	0.25 U					0.11 U
TIN					31.2 J	27.3 J					0.048 U
VANADIUM					12.8	14.1					1.14 U
ZINC					1700 J	1810 J					3.2 U
Dissolved Metals (ug/L)											
ALUMINUM, FILTERED	39.6 J						8.35 U	8.35 U			
ANTIMONY, FILTERED	0.24 U						0.51 U	0.44 U			
ARSENIC, FILTERED	0.26 U						5.8 J	5.7 J			
BARIUM, FILTERED	53.1 J						234 J	233 J			
BERYLLIUM, FILTERED	0.02 U						0.02 U	0.02 U			
CADMIUM, FILTERED	0.05 U						0.05 U	0.07 U			
CALCIUM, FILTERED	46100 J						106000 J	99800 J			

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RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	UPGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	UPGRAD	DOWNGRAD
Area of Concern	MSUP	MSUP	TRIBDOWN	TRIBDOWN	POND	POND	POND	POND	TRIBUP	TRIBUP	MSDOWN
Sampling Round	02	03	02	03	02	02	02	02	02	03	02
Location	08SW/SD010	08SW/SD010	08SW/SD011	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD013	08SW/SD014
Sample Number	08SW01001-F	08SW01002	---	08SW01101	08SW01201	08SW01201-D	08SW01201-F	08SW01201-F-D	---	08SW01301	08SW01401
Sample Code	NORMAL	NORMAL	DRY	NORMAL	ORIG	DUP	ORIG	DUP	DRY	NORMAL	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	10/25/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	10/25/2005	6/5/2005
CHROMIUM, FILTERED	0.21 J						0.73 J	0.99 J			
COBALT, FILTERED	0.22 J						8.3	8			
COPPER, FILTERED	1.4 U						1.4 U	1.4 U			
IRON, FILTERED	56.7						7000	7500			
LEAD, FILTERED	0.19 J						0.14 J	0.14 J			
MAGNESIUM, FILTERED	6620						11600	11400			
MANGANESE, FILTERED	99.8						2960	2780			
MERCURY, FILTERED	0.03 U						0.03 U	0.03 U			
NICKEL, FILTERED	0.8 J						6	6.1			
POTASSIUM, FILTERED	1180						4730	4710			
SELENIUM, FILTERED	0.094 U						0.15 J	0.14 J			
SILVER, FILTERED	0.36 U						0.07 U	0.028 U			
SODIUM, FILTERED	15400 J						57400 J	55400 J			
THALLIUM, FILTERED	0.1 U						0.19 U	0.07 U			
TIN, FILTERED	0.05 U						1.1 J	0.92 J			
VANADIUM, FILTERED	1.14 U						1.14 U	1.14 U			
ZINC, FILTERED	2.2 J						6.1 J	5.7 J			
Miscellaneous Parameters											
PERCHLORATE (ug/L)											
TOTAL COLIFORM (CFU/100 mL)											
Field Parameters (mg/L)											
DISSOLVED OXYGEN		3.48		7.93						14.41	
DISSOLVED OXYGEN - METER											
OXIDATION REDUCTION POTENTIAL (MV)		155		176						95	
PH (S.U.)		7.12		7.67						9.02	
SPECIFIC CONDUCTANCE (MS/CM)		0.23		0.292						0.095	
TEMPERATURE (C)		10.76		11.8						13.78	
TURBIDITY (NTU)		2.7		16						9.4	

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	03	03	03	03	03
Location	08SW/SD014	08SW/SD014	08SW/SD015	08SW/SD015	08SW/SD015	08SW/SD016	08SW/SD017	08SW/SD018	08SW/SD019	08SW/SD020
Sample Number	08SW01401-F	08SW01402	08SW01501	08SW01501-F	08SW01502	---	08SW01701	08SW01801	---	08SW02001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DRY	NORMAL	NORMAL	DRY	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	6/5/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,1,1-TRICHLOROETHANE		0.3 U	0.3 U		0.3 U		0.9 J	0.3 U		0.3 U
1,1,2,2-TETRACHLOROETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,1,2-TRICHLOROETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,1-DICHLOROETHANE		0.3 U	0.3 U		0.3 U		1.4	0.3 U		0.3 U
1,1-DICHLOROETHENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,2,3-TRICHLOROPROPANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,2-DIBROMO-3-CHLOROPROPANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,2-DIBROMOETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,2-DICHLOROETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
1,2-DICHLOROPROPANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
2-BUTANONE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
2-HEXANONE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
3-CHLOROPROPENE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
4-METHYL-2-PENTANONE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
ACETONE		1.1 J	0.5 UJ		0.5 U		0.5 U	0.5 U		0.5 U
ACETONITRILE		20 UR	20 UR		20 UR		20 UR	20 UR		20 UR
ACROLEIN		0.5 UR	0.5 UR		0.5 UR		0.5 UR	0.5 UR		0.5 UR
ACRYLONITRILE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
BENZENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
BROMODICHLOROMETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
BROMOFORM		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
BROMOMETHANE		0.3 U	0.3 UJ		0.3 U		0.3 U	0.3 U		0.3 U
CARBON DISULFIDE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
CARBON TETRACHLORIDE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
CHLOROBENZENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
CHLORODIBROMOMETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
CHLOROETHANE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
CHLOROFORM		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
CHLOROMETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
CHLOROPRENE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
CIS-1,2-DICHLOROETHENE		0.3 U	0.3 U		0.3 U		3.4	1.4		0.3 U
CIS-1,3-DICHLOROPROPENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
DIBROMOMETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
DICHLORODIFLUOROMETHANE		0.3 U	0.3 UJ		0.3 U		0.3 U	0.3 U		0.3 U
ETHYL METHACRYLATE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
ETHYLBENZENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
ISOBUTANOL		20 UR	20 UR		20 UR		20 UR	20 UR		20 UR
METHACRYLONITRILE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
METHYL IODIDE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
METHYL METHACRYLATE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
METHYL TERT-BUTYL ETHER		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
METHYLENE CHLORIDE		0.3 U	0.3 UJ		0.3 U		0.3 U	0.3 U		0.3 U

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	03	03	03	03	03
Location	08SW/SD014	08SW/SD014	08SW/SD015	08SW/SD015	08SW/SD015	08SW/SD016	08SW/SD017	08SW/SD018	08SW/SD019	08SW/SD020
Sample Number	08SW01401-F	08SW01402	08SW01501	08SW01501-F	08SW01502	---	08SW01701	08SW01801	---	08SW02001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DRY	NORMAL	NORMAL	DRY	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	6/5/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005
PROPIONITRILE		20 UR	20 UR		20 UR		20 UR	20 UR		20 UR
STYRENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
TETRACHLOROETHENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
TOLUENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
TOTAL XYLENES		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
TRANS-1,2-DICHLOROETHENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
TRANS-1,3-DICHLOROPROPENE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
TRANS-1,4-DICHLORO-2-BUTENE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
TRICHLOROETHENE		0.3 U	0.3 U		0.3 U		7.7	1.2		0.3 U
TRICHLOROFLUOROMETHANE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
VINYL ACETATE		0.5 U	0.5 U		0.5 U		0.5 U	0.5 U		0.5 U
VINYL CHLORIDE		0.3 U	0.3 U		0.3 U		0.3 U	0.3 U		0.3 U
Semivolatile Organics (ug/L)										
1,2,4,5-TETRACHLOROBENZENE			0.962 U							
1,2,4-TRICHLOROBENZENE			0.962 U							
1,2-DICHLOROBENZENE			0.962 U							
1,3-DICHLOROBENZENE			0.962 U							
1,4-DICHLOROBENZENE			0.962 U							
1,4-DIOXANE			0.962 U							
1,4-NAPHTHOQUINONE			0.962 U							
1,4-PHENYLENEDIAMINE			0.962 U							
1-NAPHTHYLAMINE			0.962 U							
2,2'-OXYBIS(1-CHLOROPROPANE)			0.962 U							
2,3,4,6-TETRACHLOROPHENOL			0.962 U							
2,4,5-TRICHLOROPHENOL			0.962 U							
2,4,6-TRICHLOROPHENOL			0.962 U							
2,4-DICHLOROPHENOL			0.962 U							
2,4-DIMETHYLPHENOL			0.962 U							
2,4-DINITROPHENOL			0.962 UR							
2,6-DICHLOROPHENOL			0.962 U							
2-ACETYLAMINOFLUORENE			0.962 U							
2-CHLORONAPHTHALENE			0.962 U							
2-CHLOROPHENOL			0.962 U							
2-METHYLNAPHTHALENE										
2-METHYLPHENOL			0.962 U							
2-NAPHTHYLAMINE			0.962 U							
2-NITROANILINE			0.962 U							
2-NITROPHENOL			0.962 U							
2-PICOLINE			0.962 U							
3&4-METHYLPHENOL			0.962 U							
3,3'-DICHLOROBENZIDINE			0.962 U							
3,3'-DIMETHYLBENZIDINE			0.962 U							
3-METHYLCHOLANTHRENE			0.962 U							
3-NITROANILINE			0.962 U							

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization Area of Concern Sampling Round Location Sample Number Sample Code Sample Date	DOWNGRAD MSDOWN 02 08SW/SD014 08SW01401-F NORMAL 6/5/2005	DOWNGRAD MSDOWN 03 08SW/SD014 08SW01402 NORMAL 10/25/2005	DOWNGRAD TRIBDOWN 02 08SW/SD015 08SW01501 NORMAL 6/5/2005	DOWNGRAD TRIBDOWN 02 08SW/SD015 08SW01501-F NORMAL 6/5/2005	DOWNGRAD TRIBDOWN 03 08SW/SD015 08SW01502 NORMAL 10/25/2005	DOWNGRAD TRIBDOWN 03 08SW/SD016 --- DRY 10/25/2005	DOWNGRAD TRIBDOWN 03 08SW/SD017 08SW01701 NORMAL 10/25/2005	DOWNGRAD TRIBDOWN 03 08SW/SD018 08SW01801 NORMAL 10/25/2005	DOWNGRAD TRIBDOWN 03 08SW/SD019 --- DRY 10/25/2005	DOWNGRAD TRIBDOWN 03 08SW/SD020 08SW02001 NORMAL 10/25/2005
4,6-DINITRO-2-METHYLPHENOL			0.962 UJ							
4-AMINOBIPHENYL			0.962 U							
4-BROMOPHENYL PHENYL ETHER			0.962 U							
4-CHLORO-3-METHYLPHENOL			0.962 U							
4-CHLOROANILINE			0.962 U							
4-CHLOROPHENYL PHENYL ETHER			0.962 U							
4-NITROANILINE			0.962 U							
4-NITROPHENOL			0.962 U							
4-NITROQUINOLINE-1-OXIDE			0.962 UR							
5-NITRO-O-TOLUIDINE			0.962 U							
7,12-DIMETHYLBENZ(A)ANTHRACENE			0.962 U							
A,A-DIMETHYLPHENETHYLAMINE			0.962 U							
ACENAPHTHENE										
ACENAPHTHYLENE										
ACETOPHENONE			0.962 U							
ANILINE			0.962 U							
ANTHRACENE										
ARAMITE			0.962 U							
BENZO(A)ANTHRACENE										
BENZO(A)PYRENE										
BENZO(B)FLUORANTHENE										
BENZO(G,H,I)PERYLENE										
BENZO(K)FLUORANTHENE										
BENZYL ALCOHOL			0.962 U							
BIS(2-CHLOROETHOXY)METHANE			0.962 U							
BIS(2-CHLOROETHYL)ETHER			0.962 U							
BIS(2-ETHYLHEXYL)PHTHALATE			1 J							
BUTYL BENZYL PHTHALATE			0.962 U							
CHLOROBENZILATE			0.962 U							
CHRYSENE										
DI-N-BUTYL PHTHALATE			0.962 U							
DI-N-OCTYL PHTHALATE			0.962 U							
DIALLATE			0.962 U							
DIBENZO(A,H)ANTHRACENE										
DIBENZOFURAN			0.962 U							
DIETHYL PHTHALATE			0.962 U							
DIMETHYL PHTHALATE			0.962 U							
DIPHENYLAMINE			0.962 U							
ETHYL METHANE SULFONATE			0.962 U							
FLUORANTHENE										
FLUORENE										
HEXACHLOROBENZENE			0.962 U							
HEXACHLOROBUTADIENE			0.962 U							
HEXACHLOROCYCLOPENTADIENE			0.962 UJ							

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	03	03	03	03	03
Location	08SW/SD014	08SW/SD014	08SW/SD015	08SW/SD015	08SW/SD015	08SW/SD016	08SW/SD017	08SW/SD018	08SW/SD019	08SW/SD020
Sample Number	08SW01401-F	08SW01402	08SW01501	08SW01501-F	08SW01502	---	08SW01701	08SW01801	---	08SW02001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DRY	NORMAL	NORMAL	DRY	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	6/5/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005
HEXACHLOROETHANE			0.962 U							
HEXACHLOROPROPENE			0.962 U							
INDENO(1,2,3-CD)PYRENE										
ISODRIN			0.962 U							
ISOPHORONE			0.962 U							
ISOSAFROLE			0.962 U							
KEPONE			0.962 UR							
METHAPYRILENE			0.962 U							
METHYL METHANE SULFONATE			0.962 U							
N-NITROSO-DI-N-BUTYLAMINE			0.962 U							
N-NITROSO-DI-N-PROPYLAMINE			0.962 U							
N-NITROSODIETHYLAMINE			0.962 U							
N-NITROSODIMETHYLAMINE			0.962 U							
N-NITROSODIPHENYLAMINE			0.962 U							
N-NITROSOMETHYLETHYLAMINE			0.962 U							
N-NITROSOMORPHOLINE			0.962 U							
N-NITROSOPIPERIDINE			0.962 U							
N-NITROSOPYRROLIDINE			0.962 U							
NAPHTHALENE										
O,O,O-TRIETHYL PHOSPHOROTHIOATE			0.962 U							
O-TOLUIDINE			0.962 U							
P-(DIMETHYLAMINO)AZOBENZENE			0.962 U							
PENTACHLOROBENZENE			0.962 U							
PENTACHLOROETHANE			0.962 U							
PENTACHLORONITROBENZENE			0.962 U							
PHENACETIN			0.962 U							
PHENANTHRENE										
PHENOL			0.962 U							
PRONAMIDE			0.962 U							
PYRENE										
PYRIDINE			0.962 U							
SAFROLE			0.962 U							
Pesticides PCBs (ug/L)										
AROCLOR-1016										
AROCLOR-1221										
AROCLOR-1232										
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
Energetics (ug/L)										
1,3,5-TRINITROBENZENE										
1,3-DINITROBENZENE										
2,4,6-TRINITROTOLUENE										

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	03	03	03	03	03
Location	08SW/SD014	08SW/SD014	08SW/SD015	08SW/SD015	08SW/SD015	08SW/SD016	08SW/SD017	08SW/SD018	08SW/SD019	08SW/SD020
Sample Number	08SW01401-F	08SW01402	08SW01501	08SW01501-F	08SW01502	---	08SW01701	08SW01801	---	08SW02001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DRY	NORMAL	NORMAL	DRY	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	6/5/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005
2,4-DINITROTOLUENE										
2,6-DINITROTOLUENE										
2-AMINO-4,6-DINITROTOLUENE										
2-NITROTOLUENE										
3-NITROTOLUENE										
4-AMINO-2,6-DINITROTOLUENE										
4-NITROTOLUENE										
HMX										
NITROBENZENE										
RDX										
TETRYL										
Total Metals (ug/L)										
ALUMINUM			282 J							
ANTIMONY			0.085 U							
ARSENIC			0.26 U							
BARIUM			60 J							
BERYLLIUM			0.02 U							
CADMIUM			0.07 J							
CALCIUM			62800 J							
CHROMIUM			0.66 J							
COBALT			0.47 J							
COPPER			1.9 U							
IRON			393							
LEAD			0.43 J							
MAGNESIUM			10100							
MANGANESE			102							
MERCURY			0.03 U							
NICKEL			0.79 J							
POTASSIUM			976							
SELENIUM			0.094 U							
SILVER			0.028 U							
SODIUM			21200 J							
THALLIUM			0.1 U							
TIN			0.048 U							
VANADIUM			1.14 U							
ZINC			9.7 J							
Dissolved Metals (ug/L)										
ALUMINUM, FILTERED	8.35 U			8.35 U						
ANTIMONY, FILTERED	0.13 U			0.085 U						
ARSENIC, FILTERED	0.16 U			0.12 U						
BARIUM, FILTERED	59.1 J			61.6 J						
BERYLLIUM, FILTERED	0.02 U			0.02 U						
CADMIUM, FILTERED	0.05 U			0.06 U						
CALCIUM, FILTERED	47200 J			60200 J						

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RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	03	03	03	03	03
Location	08SW/SD014	08SW/SD014	08SW/SD015	08SW/SD015	08SW/SD015	08SW/SD016	08SW/SD017	08SW/SD018	08SW/SD019	08SW/SD020
Sample Number	08SW01401-F	08SW01402	08SW01501	08SW01501-F	08SW01502	---	08SW01701	08SW01801	---	08SW02001
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DRY	NORMAL	NORMAL	DRY	NORMAL
Sample Date	6/5/2005	10/25/2005	6/5/2005	6/5/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005	10/25/2005
CHROMIUM, FILTERED	0.47 J			0.22 J						
COBALT, FILTERED	0.088 U			0.12 J						
COPPER, FILTERED	1.6 U			1.2 U						
IRON, FILTERED	6.15 U			31.1 J						
LEAD, FILTERED	0.14 J			0.069 U						
MAGNESIUM, FILTERED	8500			10000						
MANGANESE, FILTERED	12			51.5						
MERCURY, FILTERED	0.03 U			0.03 U						
NICKEL, FILTERED	0.36 J			0.38 J						
POTASSIUM, FILTERED	1210			941						
SELENIUM, FILTERED	0.094 U			0.094 U						
SILVER, FILTERED	0.028 U			0.028 U						
SODIUM, FILTERED	19800 J			21800 J						
THALLIUM, FILTERED	0.09 U			0.11 U						
TIN, FILTERED	0.048 U			0.048 U						
VANADIUM, FILTERED	1.14 U			1.14 U						
ZINC, FILTERED	1.4 J			5.9 J						
Miscellaneous Parameters										
PERCHLORATE (ug/L)										
TOTAL COLIFORM (CFU/100 mL)										
Field Parameters (mg/L)										
DISSOLVED OXYGEN		5.48			10.16		6.56	10.06		7
DISSOLVED OXYGEN - METER										
OXIDATION REDUCTION POTENTIAL (MV)		186			181		191	-2		177
PH (S.U.)		7.02			7.47		7.41	7.42		7.19
SPECIFIC CONDUCTANCE (MS/CM)		0.267			0.38		0.136	0.484		0.237
TEMPERATURE (C)		9.7			11.89		11.01	12.32		8.65
TURBIDITY (NTU)		1.7			1.5		1.6	8.8		2.4

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	02	03
Location	08SP001	08SP001	08SP002	08SP002	08SP002	08SP003	08SP003
Sample Number	---	---	08SP00201	08SP00201-F	08SP00202	---	---
Sample Code	DRY	DRY	NORMAL	NORMAL	NORMAL	DRY	DRY
Sample Date	6/7/2005	10/25/2005	6/7/2005	6/4/2005	10/25/2005	6/7/2005	10/25/2005
Volatile Organics (ug/L)							
1,1,1,2-TETRACHLOROETHANE			0.3 U		0.3 U		
1,1,1-TRICHLOROETHANE			4.4		1.2		
1,1,2,2-TETRACHLOROETHANE			0.3 U		0.3 U		
1,1,2-TRICHLOROETHANE			0.3 U		0.3 U		
1,1-DICHLOROETHANE			27		30		
1,1-DICHLOROETHENE			5.6		4.1		
1,2,3-TRICHLOROPROPANE			0.3 U		0.3 U		
1,2-DIBROMO-3-CHLOROPROPANE			0.3 U		0.3 U		
1,2-DIBROMOETHANE			0.3 U		0.3 U		
1,2-DICHLOROETHANE			0.3 U		0.3 U		
1,2-DICHLOROPROPANE			0.3 U		0.3 U		
2-BUTANONE			0.5 U		0.5 U		
2-HEXANONE			0.5 U		0.5 U		
3-CHLOROPROPENE			0.5 U		0.5 U		
4-METHYL-2-PENTANONE			0.5 U		0.5 U		
ACETONE			0.5 UJ		0.5 U		
ACETONITRILE			20 UR		20 UR		
ACROLEIN			0.5 UR		0.5 UR		
ACRYLONITRILE			0.5 U		0.5 U		
BENZENE			0.3 U		0.3 U		
BROMODICHLOROMETHANE			0.3 U		0.3 U		
BROMOFORM			0.3 U		0.3 U		
BROMOMETHANE			0.3 UJ		0.3 U		
CARBON DISULFIDE			0.3 U		0.3 U		
CARBON TETRACHLORIDE			0.3 U		0.3 U		
CHLOROBENZENE			0.3 U		0.3 U		
CHLORODIBROMOMETHANE			0.3 U		0.3 U		
CHLOROETHANE			0.5 U		0.5 U		
CHLOROFORM			0.3 U		0.3 U		
CHLOROMETHANE			0.3 U		0.3 U		
CHLOROPRENE			0.5 U		0.5 U		
CIS-1,2-DICHLOROETHENE			1.5		2.8		
CIS-1,3-DICHLOROPROPENE			0.3 U		0.3 U		
DIBROMOMETHANE			0.3 U		0.3 U		
DICHLORODIFLUOROMETHANE			0.3 UJ		0.3 U		
ETHYL METHACRYLATE			0.5 U		0.5 U		
ETHYLBENZENE			0.3 U		0.3 U		
ISOBUTANOL			20 UR		20 UR		
METHACRYLONITRILE			0.3 U		0.3 U		
METHYL IODIDE			0.5 U		0.5 U		
METHYL METHACRYLATE			0.5 U		0.5 U		
METHYL TERT-BUTYL ETHER			0.5 U		0.5 U		
METHYLENE CHLORIDE			0.3 UJ		0.3 U		

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	02	03
Location	08SP001	08SP001	08SP002	08SP002	08SP002	08SP003	08SP003
Sample Number	---	---	08SP00201	08SP00201-F	08SP00202	---	---
Sample Code	DRY	DRY	NORMAL	NORMAL	NORMAL	DRY	DRY
Sample Date	6/7/2005	10/25/2005	6/7/2005	6/4/2005	10/25/2005	6/7/2005	10/25/2005
PROPIONITRILE			20 UR		20 UR		
STYRENE			0.3 U		0.3 U		
TETRACHLOROETHENE			0.3 U		0.3 U		
TOLUENE			0.3 U		0.3 U		
TOTAL XYLENES			0.3 U		0.3 U		
TRANS-1,2-DICHLOROETHENE			0.3 U		0.3 U		
TRANS-1,3-DICHLOROPROPENE			0.3 U		0.3 U		
TRANS-1,4-DICHLORO-2-BUTENE			0.5 U		0.5 U		
TRICHLOROETHENE			4.9		2		
TRICHLOROFLUOROMETHANE			0.3 U		0.3 U		
VINYL ACETATE			0.5 U		0.5 U		
VINYL CHLORIDE			0.3 U		0.3 U		
Semivolatile Organics (ug/L)							
1,2,4,5-TETRACHLOROBENZENE							
1,2,4-TRICHLOROBENZENE							
1,2-DICHLOROBENZENE							
1,3-DICHLOROBENZENE							
1,4-DICHLOROBENZENE							
1,4-DIOXANE			5				
1,4-NAPHTHOQUINONE							
1,4-PHENYLENEDIAMINE							
1-NAPHTHYLAMINE							
2,2'-OXYBIS(1-CHLOROPROPANE)							
2,3,4,6-TETRACHLOROPHENOL							
2,4,5-TRICHLOROPHENOL							
2,4,6-TRICHLOROPHENOL							
2,4-DICHLOROPHENOL							
2,4-DIMETHYLPHENOL							
2,4-DINITROPHENOL							
2,6-DICHLOROPHENOL							
2-ACETYLAMINOFLUORENE							
2-CHLORONAPHTHALENE							
2-CHLOROPHENOL							
2-METHYLNAPHTHALENE							
2-METHYLPHENOL							
2-NAPHTHYLAMINE							
2-NITROANILINE							
2-NITROPHENOL							
2-PICOLINE							
3&4-METHYLPHENOL							
3,3'-DICHLOROBENZIDINE							
3,3'-DIMETHYLBENZIDINE							
3-METHYLCHOLANTHRENE							
3-NITROANILINE							

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
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Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	02	03
Location	08SP001	08SP001	08SP002	08SP002	08SP002	08SP003	08SP003
Sample Number	---	---	08SP00201	08SP00201-F	08SP00202	---	---
Sample Code	DRY	DRY	NORMAL	NORMAL	NORMAL	DRY	DRY
Sample Date	6/7/2005	10/25/2005	6/7/2005	6/4/2005	10/25/2005	6/7/2005	10/25/2005
4,6-DINITRO-2-METHYLPHENOL							
4-AMINOBIPHENYL							
4-BROMOPHENYL PHENYL ETHER							
4-CHLORO-3-METHYLPHENOL							
4-CHLOROANILINE							
4-CHLOROPHENYL PHENYL ETHER							
4-NITROANILINE							
4-NITROPHENOL							
4-NITROQUINOLINE-1-OXIDE							
5-NITRO-O-TOLUIDINE							
7,12-DIMETHYLBENZ(A)ANTHRACENE							
A,A-DIMETHYLPHENETHYLAMINE							
ACENAPHTHENE							
ACENAPHTHYLENE							
ACETOPHENONE							
ANILINE							
ANTHRACENE							
ARAMITE							
BENZO(A)ANTHRACENE							
BENZO(A)PYRENE							
BENZO(B)FLUORANTHENE							
BENZO(G,H,I)PERYLENE							
BENZO(K)FLUORANTHENE							
BENZYL ALCOHOL							
BIS(2-CHLOROETHOXY)METHANE							
BIS(2-CHLOROETHYL)ETHER							
BIS(2-ETHYLHEXYL)PHTHALATE							
BUTYL BENZYL PHTHALATE							
CHLOROBENZILATE							
CHRYSENE							
DI-N-BUTYL PHTHALATE							
DI-N-OCTYL PHTHALATE							
DIALLATE							
DIBENZO(A,H)ANTHRACENE							
DIBENZOFURAN							
DIETHYL PHTHALATE							
DIMETHYL PHTHALATE							
DIPHENYLAMINE							
ETHYL METHANE SULFONATE							
FLUORANTHENE							
FLUORENE							
HEXACHLOROBENZENE							
HEXACHLOROBUTADIENE							
HEXACHLOROCYCLOPENTADIENE							

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	02	03
Location	08SP001	08SP001	08SP002	08SP002	08SP002	08SP003	08SP003
Sample Number	---	---	08SP00201	08SP00201-F	08SP00202	---	---
Sample Code	DRY	DRY	NORMAL	NORMAL	NORMAL	DRY	DRY
Sample Date	6/7/2005	10/25/2005	6/7/2005	6/4/2005	10/25/2005	6/7/2005	10/25/2005
HEXACHLOROETHANE							
HEXACHLOROPROPENE							
INDENO(1,2,3-CD)PYRENE							
ISODRIN							
ISOPHORONE							
ISOSAFROLE							
KEPONE							
METHAPYRILENE							
METHYL METHANE SULFONATE							
N-NITROSO-DI-N-BUTYLAMINE							
N-NITROSO-DI-N-PROPYLAMINE							
N-NITROSODIETHYLAMINE							
N-NITROSODIMETHYLAMINE							
N-NITROSODIPHENYLAMINE							
N-NITROSOMETHYLETHYLAMINE							
N-NITROSOMORPHOLINE							
N-NITROSOPIPERIDINE							
N-NITROSOPYRROLIDINE							
NAPHTHALENE							
O,O,O-TRIETHYL PHOSPHOROTHIOATE							
O-TOLUIDINE							
P-(DIMETHYLAMINO)AZOBENZENE							
PENTACHLOROBENZENE							
PENTACHLOROETHANE							
PENTACHLORONITROBENZENE							
PHENACETIN							
PHENANTHRENE							
PHENOL							
PRONAMIDE							
PYRENE							
PYRIDINE							
SAFROLE							
Pesticides PCBs (ug/L)							
AROCLOR-1016							
AROCLOR-1221							
AROCLOR-1232							
AROCLOR-1242							
AROCLOR-1248							
AROCLOR-1254							
AROCLOR-1260							
Energetics (ug/L)							
1,3,5-TRINITROBENZENE							
1,3-DINITROBENZENE							
2,4,6-TRINITROTOLUENE							

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	02	03
Location	08SP001	08SP001	08SP002	08SP002	08SP002	08SP003	08SP003
Sample Number	---	---	08SP00201	08SP00201-F	08SP00202	---	---
Sample Code	DRY	DRY	NORMAL	NORMAL	NORMAL	DRY	DRY
Sample Date	6/7/2005	10/25/2005	6/7/2005	6/4/2005	10/25/2005	6/7/2005	10/25/2005
2,4-DINITROTOLUENE							
2,6-DINITROTOLUENE							
2-AMINO-4,6-DINITROTOLUENE							
2-NITROTOLUENE							
3-NITROTOLUENE							
4-AMINO-2,6-DINITROTOLUENE							
4-NITROTOLUENE							
HMX							
NITROBENZENE							
RDX							
TETRYL							
Total Metals (ug/L)							
ALUMINUM			25800 J				
ANTIMONY			0.25 U				
ARSENIC			7.5 J				
BARIUM			207 J				
BERYLLIUM			1.1 J				
CADMIUM			1.1				
CALCIUM			96000 J				
CHROMIUM			23.8				
COBALT			52.4				
COPPER			28.4 J				
IRON			29000				
LEAD			29.8				
MAGNESIUM			15200				
MANGANESE			6200				
MERCURY			0.068 J				
NICKEL			47.3				
POTASSIUM			3110				
SELENIUM			0.58 J				
SILVER			0.028 U				
SODIUM			8690 J				
THALLIUM			0.46 J				
TIN			0.41 J				
VANADIUM			39.8				
ZINC			79.8 J				
Dissolved Metals (ug/L)							
ALUMINUM, FILTERED				213			
ANTIMONY, FILTERED				0.1 U			
ARSENIC, FILTERED				0.42 U			
BARIUM, FILTERED				72.3 J			
BERYLLIUM, FILTERED				0.02 U			
CADMIUM, FILTERED				0.1 U			
CALCIUM, FILTERED				104000 J			

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	02	03
Location	08SP001	08SP001	08SP002	08SP002	08SP002	08SP003	08SP003
Sample Number	---	---	08SP00201	08SP00201-F	08SP00202	---	---
Sample Code	DRY	DRY	NORMAL	NORMAL	NORMAL	DRY	DRY
Sample Date	6/7/2005	10/25/2005	6/7/2005	6/4/2005	10/25/2005	6/7/2005	10/25/2005
CHROMIUM, FILTERED				0.45 J			
COBALT, FILTERED				7.4			
COPPER, FILTERED				1.6 U			
IRON, FILTERED				260			
LEAD, FILTERED				0.4 J			
MAGNESIUM, FILTERED				14800			
MANGANESE, FILTERED				3190			
MERCURY, FILTERED				0.03 U			
NICKEL, FILTERED				5.5			
POTASSIUM, FILTERED				1040			
SELENIUM, FILTERED				0.14 J			
SILVER, FILTERED				0.028 U			
SODIUM, FILTERED				10000 J			
THALLIUM, FILTERED				0.09 U			
TIN, FILTERED				0.06 U			
VANADIUM, FILTERED				1.14 U			
ZINC, FILTERED				4.6 J			
Miscellaneous Parameters							
PERCHLORATE (ug/L)							
TOTAL COLIFORM (CFU/100 mL)			2419.2 >				
Field Parameters (mg/L)							
DISSOLVED OXYGEN					5.88		
DISSOLVED OXYGEN - METER							
OXIDATION REDUCTION POTENTIAL (MV)					203		
PH (S.U.)					6.85		
SPECIFIC CONDUCTANCE (MS/CM)					0.362		
TEMPERATURE (C)					13.41		
TURBIDITY (NTU)					3.9		

C - Celsius
CFU/100 mL - colony forming units per 100 milliliters
Data qualifiers (e.g., U, J) are defined in section 3 of the text.
DOWNGRAD - Location is a downgradient location
DRY - Location dry during sampling, no sample collected
mg/L - milligrams per liter
MS/CM - milliSiemens per centimeter
MSDOWN - Location is a downgradient Main Stream location
MSUP - Location is a upgradient Main Stream location
MV - millivolts
NTU - nephelometric turbidity units
POND - Location is a pond location
S.U. - standard units
TRIBDOWN - Location is a downgradient tributary location
TRIBUP - Location is a upgradient tributary location

APPENDIX TABLE G-2
RESULTS OF CHEMICALS ANALYZED IN ALL SURFACE WATER SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN
Sampling Round	02	03	02	02	03	02	03
Location	08SP001	08SP001	08SP002	08SP002	08SP002	08SP003	08SP003
Sample Number	---	---	08SP00201	08SP00201-F	08SP00202	---	---
Sample Code	DRY	DRY	NORMAL	NORMAL	NORMAL	DRY	DRY
Sample Date	6/7/2005	10/25/2005	6/7/2005	6/4/2005	10/25/2005	6/7/2005	10/25/2005

ug/L - micrograms per liter

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	POND	POND	POND
Sampling Round	01	02	01	02	01	02	01	01	01
Location	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD005
Sample Number	08SD001010006	08SD001020006	08SD002010006	08SD002020006	08SD003010006	08SD003020006	08SD004010012	08SD004011224	08SD005010012
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 2	0 - 1
Sample Date	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/10/2005	1/10/2005	1/10/2005
Volatile Organics (ug/kg)									
1,1,1,2-TETRACHLOROETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
1,1,1-TRICHLOROETHANE	1.46 U		1.27 U		1.15 U		6600000 J	17300000 J	178 J
1,1,2,2-TETRACHLOROETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
1,1,2-TRICHLOROETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
1,1-DICHLOROETHANE	1.46 U		1.27 U		1.15 U		440000 J	1100000 J	200 J
1,1-DICHLOROETHENE	1.46 U		1.27 U		1.15 U		320000 J	1500000 J	178 J
1,2,3-TRICHLOROPROPANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
1,2-DIBROMO-3-CHLOROPROPANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
1,2-DIBROMOETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
1,2-DICHLOROETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
1,2-DICHLOROPROPANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
2-BUTANONE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
2-HEXANONE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
3-CHLOROPROPENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
4-METHYL-2-PENTANONE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
ACETONE	1.46 UJ		1.27 UJ		1.15 UJ		19960 UJ	15015 UJ	59.3 UJ
ACETONITRILE	58.4 UR		50.8 UR		45.9 UR		420000 UR	315000 UR	1100 UR
ACROLEIN	1.46 UR		1.27 UR		1.15 UR		19960 UR	15015 UR	59.3 UR
ACRYLONITRILE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
BENZENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
BROMODICHLOROMETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
BROMOFORM	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
BROMOMETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CARBON DISULFIDE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CARBON TETRACHLORIDE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CHLOROBENZENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CHLORODIBROMOMETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CHLOROETHANE	1.46 U		1.27 U		1.15 U		59880 J	45045 J	59.3 U
CHLOROFORM	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CHLOROMETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CHLOROPRENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
CIS-1,2-DICHLOROETHENE	1.46 U		1.27 U		1.15 U		290000 J	390000 J	9000
CIS-1,3-DICHLOROPROPENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
DIBROMOMETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
DICHLORODIFLUOROMETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
ETHYL METHACRYLATE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
ETHYLBENZENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
ISOBUTANOL	58.4 UR		50.8 UR		45.9 UR		798402 UR	600600 UR	2372 UR
METHACRYLONITRILE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
METHYL IODIDE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
METHYL METHACRYLATE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	POND	POND	POND
Sampling Round	01	02	01	02	01	02	01	01	01
Location	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD005
Sample Number	08SD001010006	08SD001020006	08SD002010006	08SD002020006	08SD003010006	08SD003020006	08SD004010012	08SD004011224	08SD005010012
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 2	0 - 1
Sample Date	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/10/2005	1/10/2005	1/10/2005
METHYL TERT-BUTYL ETHER	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
METHYLENE CHLORIDE	6 U		5 U		4 U		19960 UJ	15015 UJ	59.3 UJ
PROPIONITRILE	58.4 UR		50.8 UR		45.9 UR		798402 UR	600600 UR	2372 UR
STYRENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
TETRACHLOROETHENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
TOLUENE	1.46 U		1.27 U		1.15 U		59880 J	95000 J	178 J
TOTAL XYLENES	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	550
TRANS-1,2-DICHLOROETHENE	1.46 U		1.27 U		1.15 U		19960 UJ	51000 J	59.3 U
TRANS-1,3-DICHLOROPROPENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
TRANS-1,4-DICHLORO-2-BUTENE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
TRICHLOROETHENE	1.46 U		1.27 U		1.15 U		5300000 J	27800000 J	24000
TRICHLOROFLUOROMETHANE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
VINYL ACETATE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
VINYL CHLORIDE	1.46 U		1.27 U		1.15 U		19960 UJ	15015 UJ	59.3 U
Semivolatile Organics (ug/kg)									
1,2,4,5-TETRACHLOROBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
1,2,4-TRICHLOROBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
1,2-DICHLOROBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
1,3-DICHLOROBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
1,4-DICHLOROBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
1,4-DIOXANE	149 UJ	130 U	127 UJ	136 U	120 UJ	137 UJ	599 UJ	450 UJ	178 UJ
1,4-NAPHTHOQUINONE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
1,4-PHENYLENEDIAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
1-NAPHTHYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,2'-OXYBIS(1-CHLOROPROPANE)	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,3,4,6-TETRACHLOROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,4,5-TRICHLOROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,4,6-TRICHLOROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,4-DICHLOROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,4-DIMETHYLPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,4-DINITROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2,6-DICHLOROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-ACETYLAMINOFLUORENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-CHLORONAPHTHALENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-CHLOROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-METHYLNAPHTHALENE	6 J		4.19 U		3.95 U		230 J	230 J	14
2-METHYLPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-NAPHTHYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-NITROANILINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-NITROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
2-PICOLINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
3&4-METHYLPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	1100 J	1200 J	119 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	POND	POND	POND
Sampling Round	01	02	01	02	01	02	01	01	01
Location	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD005
Sample Number	08SD001010006	08SD001020006	08SD002010006	08SD002020006	08SD003010006	08SD003020006	08SD004010012	08SD004011224	08SD005010012
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 2	0 - 1
Sample Date	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/10/2005	1/10/2005	1/10/2005
3,3'-DICHLOROBENZIDINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
3,3'-DIMETHYLBENZIDINE	99.9 UJ	87.1 U	85.1 UJ	90.9 U	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
3-METHYLCHOLANTHRENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
3-NITROANILINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4,6-DINITRO-2-METHYLPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-AMINOBIPHENYL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-BROMOPHENYL PHENYL ETHER	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-CHLORO-3-METHYLPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-CHLOROANILINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-CHLOROPHENYL PHENYL ETHER	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-NITROANILINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-NITROPHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
4-NITROQUINOLINE-1-OXIDE	99.9 UR	87.1 UR	85.1 UR	90.9 UR	80.1 UR	91.5 UR	401 UR	302 UR	119 UR
5-NITRO-O-TOLUIDINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
A,A-DIMETHYLPHENETHYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
ACENAPHTHENE	4.92 U		4.19 U		3.95 U		39.5 UJ	120 J	24 J
ACENAPHTHYLENE	11		4.19 U		3.95 U		39.5 UJ	59.5 UJ	25 J
ACETOPHENONE	99.9 UJ	87.1 U	85.1 UJ	90.9 U	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
ANILINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
ANTHRACENE	10		4.19 U		3.95 U		39.5 UJ	59.5 UJ	5.87 UJ
ARAMITE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
BENZO(A)ANTHRACENE	51 J		4.19 U		3.95 U		39.5 UJ	59.5 UJ	74 J
BENZO(A)PYRENE	69		4.19 U		3.95 U		39.5 UJ	59.5 UJ	94
BENZO(B)FLUORANTHENE	140		4.19 U		3.95 U		39.5 UJ	59.5 UJ	100
BENZO(G,H,I)PERYLENE	120		4.19 U		3.95 U		39.5 UJ	59.5 UJ	160
BENZO(K)FLUORANTHENE	67		4.19 U		3.95 U		39.5 UJ	59.5 UJ	46
BENZYL ALCOHOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
BIS(2-CHLOROETHOXY)METHANE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
BIS(2-CHLOROETHYL)ETHER	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
BIS(2-ETHYLHEXYL)PHTHALATE	680	250 J	85.1 U	630	80.1 U	240 J	6000 J	35000 J	950
BUTYL BENZYL PHTHALATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
CHLOROBENZILATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
CHRYSENE	100 J		4.19 U		3.95 U		39.5 UJ	59.5 UJ	140 J
DI-N-BUTYL PHTHALATE	99.9 U	87.1 U	85.1 U	130 J	80.1 U	91.5 UJ	401 UJ	590 J	119 U
DI-N-OCTYL PHTHALATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
DIALLATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
DIBENZO(A,H)ANTHRACENE	20		4.19 U		3.95 U		39.5 UJ	59.5 UJ	5.87 U
DIBENZOFURAN	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
DIETHYL PHTHALATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
DIMETHYL PHTHALATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
DIPHENYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	POND	POND	POND
Sampling Round	01	02	01	02	01	02	01	01	01
Location	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD005
Sample Number	08SD001010006	08SD001020006	08SD002010006	08SD002020006	08SD003010006	08SD003020006	08SD004010012	08SD004011224	08SD005010012
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 2	0 - 1
Sample Date	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/10/2005	1/10/2005	1/10/2005
ETHYL METHANE SULFONATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
FLUORANTHENE	85		4.19 U		3.95 U		39.5 UJ	59.5 UJ	110 J
FLUORENE	4.92 U		4.19 U		3.95 U		39.5 UJ	130 J	33 J
HEXACHLOROBENZENE	99.9 UJ	87.1 UJ	85.1 UJ	90.9 UJ	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
HEXACHLOROBUTADIENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
HEXACHLOROCYCLOPENTADIENE	99.9 UJ	87.1 UJ	85.1 UJ	90.9 UJ	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
HEXACHLOROETHANE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
HEXACHLOROPROPENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
INDENO(1,2,3-CD)PYRENE	81		4.19 U		3.95 U		39.5 UJ	59.5 UJ	110
ISODRIN	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
ISOPHORONE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
ISOSAFROLE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	250 J
KEPONE	99.9 UJ	87.1 UR	85.1 UJ	90.9 UR	80.1 UJ	91.5 UR	401 UJ	302 UJ	119 UJ
METHAPYRILENE	99.9 UJ	87.1 U	85.1 UJ	90.9 U	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
METHYL METHANE SULFONATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
N-NITROSO-DI-N-BUTYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
N-NITROSO-DI-N-PROPYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
N-NITROSODIETHYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
N-NITROSODIMETHYLAMINE	99.9 UJ	87.1 U	85.1 UJ	90.9 U	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
N-NITROSODIPHENYLAMINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
N-NITROSOMETHYLETHYLAMINE	99.9 UJ	87.1 U	85.1 UJ	90.9 U	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
N-NITROSOMORPHOLINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
N-NITROSOPIPERIDINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
N-NITROSOPYRROLIDINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
NAPHTHALENE	8 J		4.19 U		3.95 U		240 J	360 J	20
O,O,O-TRIETHYL PHOSPHOROTHIOATE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
O-TOLUIDINE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
P-(DIMETHYLAMINO)AZOBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
PENTACHLOROBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
PENTACHLOROETHANE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
PENTACHLORONITROBENZENE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
PHENACETIN	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
PHENANTHRENE	36		10		3.95 U		470 J	2000 J	370 J
PHENOL	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	650 J	119 U
PRONAMIDE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
PYRENE	210 J		8 J		6 J		39.5 UJ	59.5 UJ	180 J
PYRIDINE	99.9 UJ	87.1 U	85.1 UJ	90.9 U	80.1 UJ	91.5 UJ	401 UJ	302 UJ	119 UJ
SAFROLE	99.9 U	87.1 U	85.1 U	90.9 U	80.1 U	91.5 UJ	401 UJ	302 UJ	119 U
Pesticides PCBs (ug/kg)									
AROCLOR-1016									
AROCLOR-1221									
AROCLOR-1232									

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD TRIBDOWN	DOWNGRAD TRIBDOWN	DOWNGRAD TRIBDOWN	DOWNGRAD TRIBDOWN	DOWNGRAD TRIBDOWN	DOWNGRAD TRIBDOWN	DOWNGRAD POND	DOWNGRAD POND	DOWNGRAD POND
Area of Concern	01	02	01	02	01	02	01	01	01
Sampling Round	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD005
Location	08SD001010006	08SD001020006	08SD002010006	08SD002020006	08SD003010006	08SD003020006	08SD004010012	08SD004011224	08SD005010012
Sample Number	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Code	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 2	0 - 1
Depth Range	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/10/2005	1/10/2005	1/10/2005
Sample Date									
AROCLOR-1242									
AROCLOR-1248									
AROCLOR-1254									
AROCLOR-1260									
Energetics (mg/kg)									
1,3,5-TRINITROBENZENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
1,3-DINITROBENZENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
2,4,6-TRINITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
2,4-DINITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
2,6-DINITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
2-NITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
3-NITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
4-AMINO-2,6-DINITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
4-NITROTOLUENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
HMX	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
NITROBENZENE	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
RDX	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
TETRYL	0.25 U		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
Inorganics (mg/kg)									
ALUMINUM									
ANTIMONY									
ARSENIC									
BARIUM									
BERYLLIUM									
CADMIUM									
CALCIUM									
CHROMIUM									
COBALT									
COPPER									
IRON									
LEAD									
MAGNESIUM									
MANGANESE									
MERCURY									
NICKEL									
POTASSIUM									
SELENIUM									
SILVER									
SODIUM									
THALLIUM									
TIN									

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	POND	POND	POND
Sampling Round	01	02	01	02	01	02	01	01	01
Location	08SW/SD001	08SW/SD001	08SW/SD002	08SW/SD002	08SW/SD003	08SW/SD003	08SW/SD004	08SW/SD004	08SW/SD005
Sample Number	08SD001010006	08SD001020006	08SD002010006	08SD002020006	08SD003010006	08SD003020006	08SD004010012	08SD004011224	08SD005010012
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1	1 - 2	0 - 1
Sample Date	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/10/2005	1/10/2005	1/10/2005
VANADIUM									
ZINC									
Miscellaneous Parameters									
PERCHLORATE (mg/kg)	0.118 U		0.11 J		0.24		0.57 J	1.7 J	0.85
PERCHLORATE-8321 (ug/kg)			1.3 U		1.2 U		5.6 UJ	4.3 UJ	

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	POND	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	MSDOWN	MSDOWN	MSDOWN
Sampling Round	01	01	02	01	01	02	01	02	01
Location	08SW/SD005	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD008	08SW/SD008	08SW/SD009
Sample Number	08SD005011224	08SD006010006	08SD006020006	08SD007010006	08SD007010006-D	08SD007020006	08SD008010006	08SD008020006	08SD009010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	1/10/2005	1/9/2005	6/5/2005	1/9/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005
Volatile Organics (ug/kg)									
1,1,1,2-TETRACHLOROETHANE	13.7 U	1.2 U		1.29 UJ	1.26 U		1.2 U		1.24 U
1,1,1-TRICHLOROETHANE	13.7 U	1.2 U		2 J	2 J		1.2 U		2 J
1,1,2,2-TETRACHLOROETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
1,1,2-TRICHLOROETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
1,1-DICHLOROETHANE	75	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
1,1-DICHLOROETHENE	14 J	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
1,2,3-TRICHLOROPROPANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
1,2-DIBROMO-3-CHLOROPROPANE	13.7 U	1.2 U		1.29 UJ	1.26 U		1.2 U		1.24 U
1,2-DIBROMOETHANE	13.7 U	1.2 U		1.29 UJ	1.26 U		1.2 U		1.24 U
1,2-DICHLOROETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
1,2-DICHLOROPROPANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
2-BUTANONE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
2-HEXANONE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
3-CHLOROPROPENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
4-METHYL-2-PENTANONE	13.7 UJ	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
ACETONE	59 U	4 U		2 U	1.26 U		3 U		3 U
ACETONITRILE	546 UR	47.9 UR		51.5 UR	50.3 UR		48.1 UR		49.7 UR
ACROLEIN	13.7 UR	1.2 UR		1.29 UR	1.26 UR		1.2 UR		1.24 UR
ACRYLONITRILE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
BENZENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
BROMODICHLOROMETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
BROMOFORM	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
BROMOMETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CARBON DISULFIDE	14 J	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CARBON TETRACHLORIDE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CHLOROBENZENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CHLORODIBROMOMETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CHLOROETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CHLOROFORM	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CHLOROMETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CHLOROPRENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CIS-1,2-DICHLOROETHENE	2300	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
CIS-1,3-DICHLOROPROPENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
DIBROMOMETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
DICHLORODIFLUOROMETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
ETHYL METHACRYLATE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
ETHYLBENZENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
ISOBUTANOL	546 UR	47.9 UR		51.5 UR	50.3 UR		48.1 UR		49.7 UR
METHACRYLONITRILE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
METHYL IODIDE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
METHYL METHACRYLATE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	POND	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	MSDOWN	MSDOWN	MSDOWN
Sampling Round	01	01	02	01	01	02	01	02	01
Location	08SW/SD005	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD008	08SW/SD008	08SW/SD009
Sample Number	08SD005011224	08SD006010006	08SD006020006	08SD007010006	08SD007010006-D	08SD007020006	08SD008010006	08SD008020006	08SD009010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	1/10/2005	1/9/2005	6/5/2005	1/9/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005
METHYL TERT-BUTYL ETHER	13.7 U	1.2 U		1.29 UJ	1.26 U		1.2 U		1.24 U
METHYLENE CHLORIDE	13.7 UJ	6 U		6 U	6 U		6 U		1.24 U
PROPIONITRILE	546 UR	47.9 UR		51.5 UR	50.3 UR		48.1 UR		49.7 UR
STYRENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
TETRACHLOROETHENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
TOLUENE	15 J	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
TOTAL XYLENES	15 J	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
TRANS-1,2-DICHLOROETHENE	25 J	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
TRANS-1,3-DICHLOROPROPENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
TRANS-1,4-DICHLORO-2-BUTENE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
TRICHLOROETHENE	2100 J	4 J		2 J	2 J		3 J		1.24 U
TRICHLOROFLUOROMETHANE	13.7 U	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
VINYL ACETATE	13.7 UJ	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
VINYL CHLORIDE	54	1.2 U		1.29 U	1.26 U		1.2 U		1.24 U
Semivolatile Organics (ug/kg)									
1,2,4,5-TETRACHLOROBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
1,2,4-TRICHLOROBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
1,2-DICHLOROBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
1,3-DICHLOROBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
1,4-DICHLOROBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
1,4-DIOXANE	137 UJ	125 UJ	128 U	129 UJ	128 UJ	129 U	120 UJ	143 U	130 UJ
1,4-NAPHTHOQUINONE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
1,4-PHENYLENEDIAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
1-NAPHTHYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,2'-OXYBIS(1-CHLOROPROPANE)	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,3,4,6-TETRACHLOROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,4,5-TRICHLOROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,4,6-TRICHLOROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,4-DICHLOROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,4-DIMETHYLPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,4-DINITROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2,6-DICHLOROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-ACETYLAMINOFLUORENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-CHLORONAPHTHALENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-CHLOROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-METHYLNAPHTHALENE	4.51 U	4.12 U		4.25 U	4.24 U		3.97 U		13
2-METHYLPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-NAPHTHYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-NITROANILINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-NITROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
2-PICOLINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
3&4-METHYLPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	POND	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	MSDOWN	MSDOWN	MSDOWN
Sampling Round	01	01	02	01	01	02	01	02	01
Location	08SW/SD005	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD008	08SW/SD008	08SW/SD009
Sample Number	08SD005011224	08SD006010006	08SD006020006	08SD007010006	08SD007010006-D	08SD007020006	08SD008010006	08SD008020006	08SD009010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	1/10/2005	1/9/2005	6/5/2005	1/9/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005
3,3'-DICHLOROBENZIDINE	91.5 U	83.6 U	85.5 U	86.3 UR	86 U	86.3 U	80.6 U	95.7 U	86.8 U
3,3'-DIMETHYLBENZIDINE	91.5 UJ	83.6 UJ	85.5 U	86.3 UJ	86 UJ	86.3 U	80.6 UJ	95.7 U	86.8 UJ
3-METHYLCHOLANTHRENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
3-NITROANILINE	91.5 U	83.6 U	85.5 U	86.3 UJ	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4,6-DINITRO-2-METHYLPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-AMINOBIPHENYL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-BROMOPHENYL PHENYL ETHER	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-CHLORO-3-METHYLPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-CHLOROANILINE	91.5 U	83.6 U	85.5 U	86.3 UR	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-CHLOROPHENYL PHENYL ETHER	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-NITROANILINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-NITROPHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
4-NITROQUINOLINE-1-OXIDE	91.5 UR	83.6 UR	85.5 UR	86.3 UR	86 UR	86.3 UR	80.6 UR	95.7 UR	86.8 UR
5-NITRO-O-TOLUIDINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
A,A-DIMETHYLPHENETHYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
ACENAPHTHENE	6 J	4.12 U		4.25 U	4.24 U		3.97 U		4.27 U
ACENAPHTHYLENE	4.51 U	4.12 U		4.25 U	4.24 U		3.97 U		4.27 U
ACETOPHENONE	91.5 UJ	83.6 UJ	85.5 U	86.3 UJ	86 UJ	86.3 U	80.6 UJ	95.7 U	86.8 UJ
ANILINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
ANTHRACENE	4.51 UJ	4.12 U		4.25 U	4.24 U		3.97 U		4.27 U
ARAMITE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
BENZO(A)ANTHRACENE	21 J	4.12 U		4.25 U	4.24 U		9		12
BENZO(A)PYRENE	18	4.12 U		4.25 U	4.24 U		10		10
BENZO(B)FLUORANTHENE	4.51 U	4.12 U		4.25 U	4.24 U		11		13
BENZO(G,H,I)PERYLENE	28	4.12 U		4.25 U	4.24 U		14		13
BENZO(K)FLUORANTHENE	4.51 U	4.12 U		4.25 U	4.24 U		10		9
BENZYL ALCOHOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
BIS(2-CHLOROETHOXY)METHANE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
BIS(2-CHLOROETHYL)ETHER	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
BIS(2-ETHYLHEXYL)PHTHALATE	170 J	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	210 J
BUTYL BENZYL PHTHALATE	210 J	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
CHLOROBENZILATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
CHRYSENE	27 J	4.12 U		4.25 U	4.24 U		11		12
DI-N-BUTYL PHTHALATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
DI-N-OCTYL PHTHALATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
DIALLATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
DIBENZO(A,H)ANTHRACENE	4.51 U	4.12 U		4.25 U	4.24 U		3.97 U		4.27 U
DIBENZOFURAN	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
DIETHYL PHTHALATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
DIMETHYL PHTHALATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
DIPHENYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	POND	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	MSDOWN	MSDOWN	MSDOWN
Sampling Round	01	01	02	01	01	02	01	02	01
Location	08SW/SD005	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD008	08SW/SD008	08SW/SD009
Sample Number	08SD005011224	08SD006010006	08SD006020006	08SD007010006	08SD007010006-D	08SD007020006	08SD008010006	08SD008020006	08SD009010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	1/10/2005	1/9/2005	6/5/2005	1/9/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005
ETHYL METHANE SULFONATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
FLUORANTHENE	26 J	4.12 U		4.25 U	4.24 U		13		10
FLUORENE	5 J	4.12 U		4.25 U	4.24 U		3.97 U		4.27 U
HEXACHLOROBENZENE	91.5 UJ	83.6 UJ	85.5 UJ	86.3 UJ	86 UJ	86.3 UJ	80.6 UJ	95.7 UJ	86.8 UJ
HEXACHLOROBUTADIENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
HEXACHLOROCYCLOPENTADIENE	91.5 UJ	83.6 UJ	85.5 UJ	86.3 UJ	86 UJ	86.3 UJ	80.6 UJ	95.7 UJ	86.8 UJ
HEXACHLOROETHANE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
HEXACHLOROPROPENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
INDENO(1,2,3-CD)PYRENE	18	4.12 U		4.25 U	4.24 U		10		11
ISODRIN	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
ISOPHORONE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
ISOSAFROLE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
KEPONE	91.5 UJ	83.6 UJ	85.5 UR	86.3 UJ	86 UJ	86.3 UR	80.6 UJ	95.7 UR	86.8 UJ
METHAPYRILENE	91.5 UJ	83.6 UJ	85.5 U	86.3 UJ	86 UJ	86.3 U	80.6 UJ	95.7 U	86.8 UJ
METHYL METHANE SULFONATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
N-NITROSO-DI-N-BUTYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
N-NITROSO-DI-N-PROPYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
N-NITROSODIETHYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
N-NITROSODIMETHYLAMINE	91.5 UJ	83.6 UJ	85.5 U	86.3 UJ	86 UJ	86.3 U	80.6 UJ	95.7 U	86.8 UJ
N-NITROSODIPHENYLAMINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
N-NITROSOMETHYLETHYLAMINE	91.5 UJ	83.6 UJ	85.5 U	86.3 UJ	86 UJ	86.3 U	80.6 UJ	95.7 U	86.8 UJ
N-NITROSOMORPHOLINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
N-NITROSOPIPERIDINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
N-NITROSOPYRROLIDINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
NAPHTHALENE	5 J	4.12 U		4.25 U	4.24 U		3.97 U		6 J
O,O,O-TRIETHYL PHOSPHOROTHIOATE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
O-TOLUIDINE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
P-(DIMETHYLAMINO)AZOBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
PENTACHLOROBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
PENTACHLOROETHANE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
PENTACHLORONITROBENZENE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
PHENACETIN	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
PHENANTHRENE	33 J	4.12 U		4.25 U	4.24 U		14		4.27 U
PHENOL	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
PRONAMIDE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
PYRENE	35 J	4.12 U		7 J	6 J		25 J		18 J
PYRIDINE	91.5 UJ	83.6 UJ	85.5 U	86.3 UJ	86 UJ	86.3 U	80.6 UJ	95.7 U	86.8 UJ
SAFROLE	91.5 U	83.6 U	85.5 U	86.3 U	86 U	86.3 U	80.6 U	95.7 U	86.8 U
Pesticides PCBs (ug/kg)									
AROCLOR-1016		11.2 U		11.6 U	11.6 U		10.8 U		11.7 U
AROCLOR-1221		11.2 U		11.6 U	11.6 U		10.8 U		11.7 U
AROCLOR-1232		11.2 U		11.6 U	11.6 U		10.8 U		11.7 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	POND	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	MSDOWN	MSDOWN	MSDOWN
Sampling Round	01	01	02	01	01	02	01	02	01
Location	08SW/SD005	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD008	08SW/SD008	08SW/SD009
Sample Number	08SD005011224	08SD006010006	08SD006020006	08SD007010006	08SD007010006-D	08SD007020006	08SD008010006	08SD008020006	08SD009010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	1/10/2005	1/9/2005	6/5/2005	1/9/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005
AROCLOR-1242		11.2 U		11.6 U	11.6 U		10.8 U		11.7 U
AROCLOR-1248		11.2 U		11.6 U	11.6 U		10.8 U		11.7 U
AROCLOR-1254		11.2 U		11.6 U	11.6 U		10.8 U		11.7 U
AROCLOR-1260		11.2 U		11.6 U	11.6 U		10.8 U		11.7 U
Energetics (mg/kg)									
1,3,5-TRINITROBENZENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
1,3-DINITROBENZENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
2,4,6-TRINITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
2,4-DINITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
2,6-DINITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
2-AMINO-4,6-DINITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
2-NITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
3-NITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
4-AMINO-2,6-DINITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
4-NITROTOLUENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
HMX	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
NITROBENZENE	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
RDX	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
TETRYL	0.25 U	0.25 U		0.25 U	0.25 U		0.25 U		0.25 U
Inorganics (mg/kg)									
ALUMINUM									
ANTIMONY									
ARSENIC									
BARIUM									
BERYLLIUM									
CADMIUM									
CALCIUM									
CHROMIUM									
COBALT									
COPPER									
IRON									
LEAD									
MAGNESIUM									
MANGANESE									
MERCURY									
NICKEL									
POTASSIUM									
SELENIUM									
SILVER									
SODIUM									
THALLIUM									
TIN									

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	POND	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	TRIBDOWN	MSDOWN	MSDOWN	MSDOWN
Sampling Round	01	01	02	01	01	02	01	02	01
Location	08SW/SD005	08SW/SD006	08SW/SD006	08SW/SD007	08SW/SD007	08SW/SD007	08SW/SD008	08SW/SD008	08SW/SD009
Sample Number	08SD005011224	08SD006010006	08SD006020006	08SD007010006	08SD007010006-D	08SD007020006	08SD008010006	08SD008020006	08SD009010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
Depth Range	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	1/10/2005	1/9/2005	6/5/2005	1/9/2005	1/9/2005	6/5/2005	1/9/2005	6/5/2005	1/9/2005
VANADIUM									
ZINC									
Miscellaneous Parameters									
PERCHLORATE (mg/kg)	0.52	0.099 U		0.102 U	0.44		0.096 U		0.103 U
PERCHLORATE-8321 (ug/kg)	0.6 U				0.28 U				

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSUP	TRIBDOWN	POND	POND	TRIBUP	MSDOWN	TRIBDOWN
Sampling Round	02	02	02	02	02	02	02	02
Location	08SW/SD009	08SW/SD010	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD014	08SW/SD015
Sample Number	08SD009020006	08SD010010006	08SD011010006	08SD012010006	08SD012010006-D	08SD013010006	08SD014010006	08SD015010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005
Volatile Organics (ug/kg)								
1,1,1,2-TETRACHLOROETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
1,1,1-TRICHLOROETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
1,1,2,2-TETRACHLOROETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
1,1,2-TRICHLOROETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
1,1-DICHLOROETHANE		1.39 U	1.5 U	5 J	84 J	1.04 U	1.25 U	1.34 U
1,1-DICHLOROETHENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
1,2,3-TRICHLOROPROPANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
1,2-DIBROMO-3-CHLOROPROPANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
1,2-DIBROMOETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
1,2-DICHLOROETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
1,2-DICHLOROPROPANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
2-BUTANONE		1.39 U	1.5 U	870 J	79 J	1.04 U	1.25 U	1.34 U
2-HEXANONE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
3-CHLOROPROPENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
4-METHYL-2-PENTANONE		1.39 U	1.5 U	40 J	10 J	1.04 U	1.25 U	1.34 U
ACETONE		1.39 U	1.5 U	210 J	120 J	1.04 U	1.25 U	1.34 U
ACETONITRILE		55.7 UR	59.9 UR	69 UR	63.5 UR	41.6 UR	50.1 UR	53.5 UR
ACROLEIN		1.39 UR	1.5 UR	1.73 UR	1.59 UR	1.04 UR	1.25 UR	1.34 UR
ACRYLONITRILE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
BENZENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
BROMODICHLOROMETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
BROMOFORM		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
BROMOMETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CARBON DISULFIDE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CARBON TETRACHLORIDE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CHLOROBENZENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
CHLORODIBROMOMETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CHLOROETHANE		1.39 U	1.5 U	220 J	180	1.04 U	1.25 U	1.34 U
CHLOROFORM		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CHLOROMETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CHLOROPRENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CIS-1,2-DICHLOROETHENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
CIS-1,3-DICHLOROPROPENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
DIBROMOMETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
DICHLORODIFLUOROMETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
ETHYL METHACRYLATE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
ETHYLBENZENE		1.39 U	1.5 U	6 J	1.59 UJ	1.04 U	1.25 U	1.34 UJ
ISOBUTANOL		55.7 UR	59.9 UR	69 UR	63.5 UR	41.6 UR	50.1 UR	53.5 UR
METHACRYLONITRILE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
METHYL IODIDE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
METHYL METHACRYLATE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSUP	TRIBDOWN	POND	POND	TRIBUP	MSDOWN	TRIBDOWN
Sampling Round	02	02	02	02	02	02	02	02
Location	08SW/SD009	08SW/SD010	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD014	08SW/SD015
Sample Number	08SD009020006	08SD010010006	08SD011010006	08SD012010006	08SD012010006-D	08SD013010006	08SD014010006	08SD015010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005
METHYL TERT-BUTYL ETHER		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
METHYLENE CHLORIDE		1.39 UJ	1.5 UJ	1.73 UJ	1.59 UJ	1.04 UJ	1.25 UJ	1.34 UJ
PROPIONITRILE		55.7 UR	59.9 UR	69 UR	63.5 UR	41.6 UR	50.1 UR	53.5 UR
STYRENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
TETRACHLOROETHENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
TOLUENE		1.39 U	1.5 U	27 J	13 J	1.04 U	1.25 U	1.34 UJ
TOTAL XYLENES		1.39 U	1.5 U	35 J	6 J	1.04 U	1.25 U	1.34 UJ
TRANS-1,2-DICHLOROETHENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
TRANS-1,3-DICHLOROPROPENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
TRANS-1,4-DICHLORO-2-BUTENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
TRICHLOROETHENE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 UJ
TRICHLOROFLUOROMETHANE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
VINYL ACETATE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
VINYL CHLORIDE		1.39 U	1.5 U	1.73 U	1.59 U	1.04 U	1.25 U	1.34 U
Semivolatile Organics (ug/kg)								
1,2,4,5-TETRACHLOROBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
1,2,4-TRICHLOROBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
1,2-DICHLOROBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
1,3-DICHLOROBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
1,4-DICHLOROBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
1,4-DIOXANE	120 U	139 U	123 U	176 U	162 U	104 U	125 U	131 U
1,4-NAPHTHOQUINONE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
1,4-PHENYLENEDIAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
1-NAPHTHYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2,2'-OXYBIS(1-CHLOROPROPANE)	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2,3,4,6-TETRACHLOROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2,4,5-TRICHLOROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2,4,6-TRICHLOROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2,4-DICHLOROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2,4-DIMETHYLPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 UR
2,4-DINITROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2,6-DICHLOROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-ACETYLAMINOFLUORENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-CHLORONAPHTHALENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-CHLOROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-METHYLNAPHTHALENE								
2-METHYLPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-NAPHTHYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-NITROANILINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-NITROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
2-PICOLINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
3&4-METHYLPHENOL	80.6 U	93.3 UJ	82.2 U	280 J	109 U	69.7 U	84 U	87.8 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSUP	TRIBDOWN	POND	POND	TRIBUP	MSDOWN	TRIBDOWN
Sampling Round	02	02	02	02	02	02	02	02
Location	08SW/SD009	08SW/SD010	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD014	08SW/SD015
Sample Number	08SD009020006	08SD010010006	08SD011010006	08SD012010006	08SD012010006-D	08SD013010006	08SD014010006	08SD015010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005
3,3'-DICHLOROBENZIDINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 UR
3,3'-DIMETHYLBENZIDINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
3-METHYLCHOLANTHRENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
3-NITROANILINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4,6-DINITRO-2-METHYLPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4-AMINOBIPHENYL	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4-BROMOPHENYL PHENYL ETHER	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4-CHLORO-3-METHYLPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4-CHLOROANILINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 UR
4-CHLOROPHENYL PHENYL ETHER	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4-NITROANILINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4-NITROPHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
4-NITROQUINOLINE-1-OXIDE	80.6 UR	93.3 UR	82.2 UR	118 UR	109 UR	69.7 UR	84 UR	87.8 UR
5-NITRO-O-TOLUIDINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
A,A-DIMETHYLPHENETHYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
ACENAPHTHENE								
ACENAPHTHYLENE								
ACETOPHENONE	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
ANILINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
ANTHRACENE								
ARAMITE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
BENZO(A)ANTHRACENE								
BENZO(A)PYRENE								
BENZO(B)FLUORANTHENE								
BENZO(G,H,I)PERYLENE								
BENZO(K)FLUORANTHENE								
BENZYL ALCOHOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
BIS(2-CHLOROETHOXY)METHANE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
BIS(2-CHLOROETHYL)ETHER	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
BIS(2-ETHYLHEXYL)PHTHALATE	80.6 U	93.3 U	82.2 U	1300 J	690 J	180 J	84 U	87.8 U
BUTYL BENZYL PHTHALATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
CHLOROBENZILATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
CHRYSENE								
DI-N-BUTYL PHTHALATE	80.6 U	93.3 U	82.2 U	180 J	109 U	69.7 U	84 U	87.8 U
DI-N-OCTYL PHTHALATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
DIALLATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
DIBENZO(A,H)ANTHRACENE								
DIBENZOFURAN	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
DIETHYL PHTHALATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
DIMETHYL PHTHALATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
DIPHENYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 UJ

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSUP	TRIBDOWN	POND	POND	TRIBUP	MSDOWN	TRIBDOWN
Sampling Round	02	02	02	02	02	02	02	02
Location	08SW/SD009	08SW/SD010	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD014	08SW/SD015
Sample Number	08SD009020006	08SD010010006	08SD011010006	08SD012010006	08SD012010006-D	08SD013010006	08SD014010006	08SD015010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005
ETHYL METHANE SULFONATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
FLUORANTHENE								
FLUORENE								
HEXACHLOROBENZENE	80.6 UJ	93.3 UJ	82.2 UJ	118 UJ	109 UJ	69.7 UJ	84 UJ	87.8 UJ
HEXACHLOROBUTADIENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
HEXACHLOROCYCLOPENTADIENE	80.6 UJ	93.3 UJ	82.2 UJ	118 UJ	109 UJ	69.7 UJ	84 UJ	87.8 UJ
HEXACHLOROETHANE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
HEXACHLOROPROPENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
INDENO(1,2,3-CD)PYRENE								
ISODRIN	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
ISOPHORONE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
ISOSAFROLE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
KEPONE	80.6 UR	93.3 UR	82.2 UR	118 UR	109 UR	69.7 UR	84 UR	87.8 UR
METHAPYRILENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
METHYL METHANE SULFONATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSO-DI-N-BUTYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSO-DI-N-PROPYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSODIETHYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSODIMETHYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSODIPHENYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSOMETHYLETHYLAMINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSOMORPHOLINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSOPIPERIDINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
N-NITROSOPYRROLIDINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
NAPHTHALENE								
O,O,O-TRIETHYL PHOSPHOROTHIOATE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
O-TOLUIDINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
P-(DIMETHYLAMINO)AZOBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
PENTACHLOROBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
PENTACHLOROETHANE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
PENTACHLORONITROBENZENE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
PHENACETIN	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
PHENANTHRENE								
PHENOL	80.6 U	93.3 UJ	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
PRONAMIDE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
PYRENE								
PYRIDINE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
SAFROLE	80.6 U	93.3 U	82.2 U	118 U	109 U	69.7 U	84 U	87.8 U
Pesticides PCBs (ug/kg)								
AROCLOR-1016								
AROCLOR-1221								
AROCLOR-1232								

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSUP	TRIBDOWN	POND	POND	TRIBUP	MSDOWN	TRIBDOWN
Sampling Round	02	02	02	02	02	02	02	02
Location	08SW/SD009	08SW/SD010	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD014	08SW/SD015
Sample Number	08SD009020006	08SD010010006	08SD011010006	08SD012010006	08SD012010006-D	08SD013010006	08SD014010006	08SD015010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005
AROCLOR-1242								
AROCLOR-1248								
AROCLOR-1254								
AROCLOR-1260								
Energetics (mg/kg)								
1,3,5-TRINITROBENZENE								
1,3-DINITROBENZENE								
2,4,6-TRINITROTOLUENE								
2,4-DINITROTOLUENE								
2,6-DINITROTOLUENE								
2-AMINO-4,6-DINITROTOLUENE								
2-NITROTOLUENE								
3-NITROTOLUENE								
4-AMINO-2,6-DINITROTOLUENE								
4-NITROTOLUENE								
HMX								
NITROBENZENE								
RDX								
TETRYL								
Inorganics (mg/kg)								
ALUMINUM		19600	17800	5630	7000	8400	11800	12800
ANTIMONY		2.2 J	0.29 U	0.77 U	0.86 J	0.59 J	1.4 J	0.92 J
ARSENIC		27.6 J	5.1 J	2.5 J	3 J	4.4 J	19.7 J	18.7 J
BARIUM		247 J	58.9 J	49.1 J	42.1 J	64.8 J	83.3 J	133 J
BERYLLIUM		3.1	0.5	0.2 J	0.28 J	0.27 J	1.6	2.2
CADMIUM		0.62	0.2 J	2	2	1.8	0.79	0.86
CALCIUM		2970 J	1710 J	2550 J	1510 J	189000 J	1540 J	7450 J
CHROMIUM		132 J	16.9 J	26.5 J	53.1 J	22.7 J	61.2 J	60.4 J
COBALT		71.2 J	5.3 J	2.9 J	4.3 J	4.4 J	18.9 J	27.8 J
COPPER		12 J	8.7 J	32.8 J	34.1 J	16.3 J	11.6 J	15.9 J
IRON		120000 J	18200 J	8360 J	8870 J	11800 J	71400 J	71900 J
LEAD		66.2 J	9.8 J	45.8 J	47.4 J	263 J	27.6 J	34.9 J
MAGNESIUM		1580 J	1740 J	743 J	698 J	11700 J	855 J	1880 J
MANGANESE		7160 J	336 J	79.6 J	76.7 J	290 J	1790 J	3130 J
MERCURY		0.084 J	0.029 J	0.033 J	0.026 J	0.1 J	0.04 J	0.022 J
NICKEL		42.6 J	11.3 J	5 J	5.9 J	48.7 J	17.5 J	17.1 J
POTASSIUM		1010 J	1410 J	482 J	587 J	889 J	735 J	788 J
SELENIUM		1.3 J	0.22 J	0.19 U	0.24 J	0.21 J	0.59 J	0.75 J
SILVER		0.051 U	0.12 U	0.068 U	0.056 U	0.08 U	0.09 U	0.07 U
SODIUM		58.8 U	48.8 U	103 U	83.4 U	104 U	46.6 U	51.4 U
THALLIUM		0.35 U	0.23 U	0.1 U	0.11 U	0.14 U	0.15 U	0.17 U
TIN		2.5 U	0.6 U	3.9 J	7.9 J	1.3 U	1 U	0.88 U

APPENDIX TABLE G-3
RESULTS FOR CHEMICALS ANALYZED IN ALL SEDIMENT SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Characterization	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD	DOWNGRAD	UPGRAD	DOWNGRAD	DOWNGRAD
Area of Concern	MSDOWN	MSUP	TRIBDOWN	POND	POND	TRIBUP	MSDOWN	TRIBDOWN
Sampling Round	02	02	02	02	02	02	02	02
Location	08SW/SD009	08SW/SD010	08SW/SD011	08SW/SD012	08SW/SD012	08SW/SD013	08SW/SD014	08SW/SD015
Sample Number	08SD009020006	08SD010010006	08SD011010006	08SD012010006	08SD012010006-D	08SD013010006	08SD014010006	08SD015010006
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
Depth Range	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5
Sample Date	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005	6/5/2005
VANADIUM		99.3 J	28.6 J	13.6 J	17 J	56.4 J	54.3 J	53.1 J
ZINC		56.7 J	26.3 J	236 J	294 J	157 J	59.3 J	93.3 J
Miscellaneous Parameters								
PERCHLORATE (mg/kg)								
PERCHLORATE-8321 (ug/kg)								

Data qualifiers (e.g., U, J) are defined in section 3 of the text.
DOWNGRAD - downgradient well
mg/kg - milligrams per kilogram
MSDOWN - Downgradient Main Stream sediment location
MSUP - Upgradient Main Stream sediment location
POND - Pond sediment location
TRIBDOWN - Downgradient tributary sediment location
TRIBUP - Upgradient tributary sediment location
ug/kg - micrograms per kilogram
UPGRAD - upgradient well

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	01	01	01	01	01	01	01	01	01
LOCATION	13SW/SD01	13SW/SD01	13SW/SD02	13SW/SD03	13SW/SD04	13SW/SD05	13SW/SD05	13SW/SD06	13SW/SD07	13SW/SD08	13SW/SD09	13SW/SD10
SAMPLE NUMBER	13SD0101	13SD0102	13SD0201	13SD0301	13SD0401	13SD0501	13SD0501-D	13SD0601	13SD0701	13SD0801	13SD0901	13SD1001
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003
Semivolatile Organics (ug/kg)												
1,2,4,5-TETRACHLOROBENZENE					83 U	87 U		79 U				
1,2,4-TRICHLOROBENZENE					83 U	87 U		79 U				
1,2-DICHLOROBENZENE					83 U	87 U		79 U				
1,3-DICHLOROBENZENE					83 U	87 U		79 U				
1,4-DICHLOROBENZENE					83 U	87 U		79 U				
1,4-NAPHTHOQUINONE					83 U	87 U		79 U				
1,4-PHENYLENEDIAMINE					83 UJ	87 UJ		79 UJ				
1-NAPHTHYLAMINE					83 U	87 U		79 U				
2,2'-OXYBIS(1-CHLOROPROPANE)					83 U	87 U		79 U				
2,3,4,6-TETRACHLOROPHENOL					83 U	87 U		79 U				
2,4,5-TRICHLOROPHENOL					83 U	87 U		79 U				
2,4,6-TRICHLOROPHENOL					83 U	87 U		79 U				
2,4-DICHLOROPHENOL					83 U	87 U		79 U				
2,4-DIMETHYLPHENOL					83 U	87 U		79 U				
2,4-DINITROPHENOL					83 U	87 U		79 U				
2,6-DICHLOROPHENOL					83 U	87 U		79 U				
2-ACETYLAMINOFLUORENE					83 U	87 U		79 U				
2-CHLORONAPHTHALENE					83 U	87 U		79 U				
2-CHLOROPHENOL					83 U	87 U		79 U				
2-METHYLNAPHTHALENE					4.1 U	4.3 U		3.9 U				
2-METHYLPHENOL					83 U	87 U		79 U				
2-NAPHTHYLAMINE					83 U	87 U		79 U				
2-NITROANILINE					83 U	87 U		79 U				
2-NITROPHENOL					83 U	87 U		79 U				
2-PICOLINE					83 U	87 U		79 U				
3&4-METHYLPHENOL					83 U	87 U		79 U				
3,3'-DICHLOROBENZIDINE					83 U	87 U		79 U				
3,3'-DIMETHYLBENZIDINE					83 U	87 U		79 U				
3-METHYLCHOLANTHRENE					83 U	87 U		79 U				
3-NITROANILINE					83 U	87 U		79 U				
4,6-DINITRO-2-METHYLPHENOL					83 U	87 U		79 U				
4-AMINOBIPHENYL					83 U	87 U		79 U				
4-BROMOPHENYL PHENYL ETHER					83 U	87 U		79 U				
4-CHLORO-3-METHYLPHENOL					83 U	87 U		79 U				
4-CHLOROANILINE					83 U	87 U		79 U				
4-CHLOROPHENYL PHENYL ETHER					83 U	87 U		79 U				
4-NITROANILINE					83 U	87 U		79 U				
4-NITROPHENOL					83 U	87 U		79 U				
4-NITROQUINOLINE-1-OXIDE					83 UR	87 UR		79 UR				
5-NITRO-O-TOLUIDINE					83 U	87 U		79 U				
7,12-DIMETHYLBENZ(A)ANTHRACENE					83 U	87 U		79 U				

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	01	01	01	01	01	01	01	01	01
LOCATION	13SW/SD01	13SW/SD01	13SW/SD02	13SW/SD03	13SW/SD04	13SW/SD05	13SW/SD05	13SW/SD06	13SW/SD07	13SW/SD08	13SW/SD09	13SW/SD10
SAMPLE NUMBER	13SD0101	13SD0102	13SD0201	13SD0301	13SD0401	13SD0501	13SD0501-D	13SD0601	13SD0701	13SD0801	13SD0901	13SD1001
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003
A,A-DIMETHYLPHENETHYLAMINE					83 UJ	87 UJ		79 UJ				
ACENAPHTHENE					4.1 U	43 J		24				
ACENAPHTHYLENE					4.1 U	4.3 U		3.9 U				
ACETOPHENONE					83 U	87 U		79 U				
ANILINE					83 U	87 U		79 U				
ANTHRACENE					4.1 U	88		72				
ARAMITE					83 UR	87 UR		79 UR				
BENZO(A)ANTHRACENE					11	330		290 J				
BENZO(A)PYRENE					15	360 J		390 J				
BENZO(B)FLUORANTHENE					18	420 J		460 J				
BENZO(G,H,I)PERYLENE					10	270 J		380 J				
BENZO(K)FLUORANTHENE					10	250 J		210 J				
BENZYL ALCOHOL					83 U	87 U		79 U				
BIS(2-CHLOROETHOXY)METHANE					83 U	87 U		79 U				
BIS(2-CHLOROETHYL)ETHER					83 U	87 U		79 U				
BIS(2-ETHYLHEXYL)PHTHALATE					83 U	390 BU		250 BU				
BUTYL BENZYL PHTHALATE					83 U	87 U		79 U				
CHLOROBENZILATE					83 U	87 U		79 U				
CHRYSENE					18	400		430 J				
DI-N-BUTYL PHTHALATE					83 U	87 U		86 J				
DI-N-OCTYL PHTHALATE					83 U	87 U		100 J				
DIALLATE					83 U	87 U		79 U				
DIBENZO(A,H)ANTHRACENE					4.1 U	66 J		74 J				
DIBENZOFURAN					83 U	87 U		79 U				
DIETHYL PHTHALATE					83 U	87 U		79 U				
DIMETHYL PHTHALATE					83 U	87 U		79 U				
DIPHENYLAMINE					83 U	87 U		79 U				
ETHYL METHANE SULFONATE					83 U	87 U		79 U				
FLUORANTHENE					44	860		830				
FLUORENE					4.1 U	42 J		33				
HEXACHLOROBENZENE					83 U	87 U		79 U				
HEXACHLOROBUTADIENE					83 U	87 U		79 U				
HEXACHLOROCYCLOPENTADIENE					83 U	87 UR		79 U				
HEXACHLOROETHANE					83 U	87 U		79 U				
HEXACHLOROPROPENE					83 U	87 U		79 U				
INDENO(1,2,3-CD)PYRENE					8 J	220 J		290 J				
ISODRIN					83 U	87 U		79 U				
ISOPHORONE					83 U	87 U		79 U				
ISOSAFROLE					83 U	87 U		79 U				
KEPONE					83 UJ	87 UJ		79 UJ				
METHAPYRILENE					83 UJ	87 UJ		79 UJ				
METHYL METHANE SULFONATE					83 U	87 U		79 U				

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	01	01	01	01	01	01	01	01	01
LOCATION	13SW/SD01	13SW/SD01	13SW/SD02	13SW/SD03	13SW/SD04	13SW/SD05	13SW/SD05	13SW/SD06	13SW/SD07	13SW/SD08	13SW/SD09	13SW/SD10
SAMPLE NUMBER	13SD0101	13SD0102	13SD0201	13SD0301	13SD0401	13SD0501	13SD0501-D	13SD0601	13SD0701	13SD0801	13SD0901	13SD1001
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003
N-NITROSO-DI-N-BUTYLAMINE					83 U	87 U		79 U				
N-NITROSO-DI-N-PROPYLAMINE					83 U	87 U		79 U				
N-NITROSODIETHYLAMINE					83 U	87 U		79 U				
N-NITROSODIMETHYLAMINE					83 U	87 U		79 U				
N-NITROSOMETHYLETHYLAMINE					83 U	87 U		79 U				
N-NITROSOMORPHOLINE					83 U	87 U		79 U				
N-NITROSOPIPERIDINE					83 U	87 U		79 U				
N-NITROSOPYRROLIDINE					83 U	87 U		79 U				
NAPHTHALENE					4.1 U	6 J		6 J				
O,O,O-TRIETHYL PHOSPHOROTHIOATE					83 U	87 U		79 U				
O-TOLUIDINE					83 U	87 U		79 U				
P-(DIMETHYLAMINO)AZOBENZENE					83 U	87 U		79 U				
PENTACHLOROBENZENE					83 U	87 U		79 U				
PENTACHLOROETHANE					83 U	87 U		79 U				
PENTACHLORONITROBENZENE					83 U	87 U		79 U				
PHENACETIN					83 U	87 U		79 U				
PHENANTHRENE					27	570		620				
PHENOL					83 U	87 U		79 U				
PRONAMIDE					83 U	87 U		79 U				
PYRENE					36	1000		1300 J				
PYRIDINE					83 U	87 U		79 U				
SAFROLE					83 U	87 U		79 U				
Energetics (mg/kg)												
1,3,5-TRINITROBENZENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,3-DINITROBENZENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4,6-TRINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-NITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3-NITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-AMINO-2,6-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-NITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
NITROBENZENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
RDX	0.25 U		0.25 U	0.44 J	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
TETRYL	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Herbicides (ug/kg)												
HEXACHLOROPHENE					0.75 U	0.75 U		0.71 U				
PENTACHLOROPHENOL					0.56 U	0.58 U		2.1 J				
PCBs (ug/kg)												
AROCLOR-1016												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	01	01	01	01	01	01	01	01	01
LOCATION	13SW/SD01	13SW/SD01	13SW/SD02	13SW/SD03	13SW/SD04	13SW/SD05	13SW/SD05	13SW/SD06	13SW/SD07	13SW/SD08	13SW/SD09	13SW/SD10
SAMPLE NUMBER	13SD0101	13SD0102	13SD0201	13SD0301	13SD0401	13SD0501	13SD0501-D	13SD0601	13SD0701	13SD0801	13SD0901	13SD1001
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003	3/29/2003
AROCLOR-1221												
AROCLOR-1232												
AROCLOR-1242												
AROCLOR-1248												
AROCLOR-1254												
AROCLOR-1260												
Petroleum Hydrocarbons (mg/kg)												
DIESEL RANGE ORGANICS												
GASOLINE RANGE ORGANICS												
OIL RANGE ORGANICS (C24-C40)												
Field PCB Results (mg/kg)												
TOTAL PCBS AS AROCLOR-1254												
Inorganics (mg/kg)												
ALUMINUM	9280	9230 J	8580 J	10900	4250 J	7000 J	4760 J	3920 J	4810	5550 J	6430	1480
ANTIMONY	1.8 J	2.2 J	0.38 U	0.27 U	0.51 U	0.19 U	0.74 U	0.8 J	0.27 U	0.34 U	0.45 U	0.16 U
ARSENIC	6.5 J	24.8 J	6.5 J	8.2 J	10.7 J	5.7 J	6.4 J	5.7 J	3.7 J	9.1 J	6.1 J	3.7 J
BARIUM	364 J	693 J	79.7 J	97.4 J	34.4 J	61.4 J	76.4 J	45.1 J	28.5 J	62.5 J	49.6 J	104 J
BERYLLIUM	0.52 U	0.65 U	0.79 J	0.67 J	1.3 J	0.63 J	0.38 U	0.37 U	0.18 U	0.71 J	0.74 J	0.88 J
CADMIUM	3.5 J	3.9 J	0.55 J	0.45 U	0.36 U	0.35 U	0.65 J	0.41 J	0.66 J	0.62 J	0.43 J	0.36 U
CALCIUM	38500 J	66000 J	2140 J	2020 J	1120 J	1490 J	116000 J	71000 J	45700 J	14800 J	6720 J	977 J
CHROMIUM	156 J	165 J	12.1 J	15.2 J	18 J	9 J	18 J	11.6 J	9.2 J	14.8 J	12.4 J	7.9 J
COBALT	8.1 J	11.1 J	10.9 J	18.5 J	9.3 J	15.9 J	9.6 J	10 J	3.5 J	8.2 J	11.7 J	10.3 J
COPPER	52.1 J	25.9 J	13.9 J	11.7 J	13.7 J	10.6 J	17.4 J	12.7 J	16.6 J	19.2 J	11.9 J	7 J
IRON	21300 J	55500 J	16700 J	22200 J	46100 J	20800 J	15600 J	17500 J	9900 J	26100 J	34800 J	1990 J
LEAD	471 J	521 J	18.6 J	21.4 J	15 J	11.7 J	64.9 J	23.9 J	31.4 J	17 J	17.6 J	11 J
LITHIUM	8.1 J		7.8 J	8.2 J	2.1 J	6.4 J	5.5 J	4.1 J	4.3 J	3.6 J	7.3 J	10.1 J
MAGNESIUM	3830 J	6640 J	969 J	1200 J	292 J	908 J	7490 J	4810 J	7540 J	2120 J	2450 J	983 J
MANGANESE	204 J	249 J	641 J	1580 J	302 J	747 J	570 J	773 J	147 J	591 J	284 J	67.5 J
MERCURY	0.16 J	0.076 U	0.044 U	0.037 J	0.01 U	0.024 U	0.022 U	0.015 U	0.015 J	0.036 U	0.013 J	0.029 J
NICKEL	16.1 J	17.6 J	11.3 J	12.8 J	13.5 J	13.5 J	13.6 J	10.4 J	7.9 J	12 J	13.5 J	19.3 J
POTASSIUM	614 J	806 J	394 J	561 J	417 J	319 J	303 J	252 J	317 J	451 J	413 J	442 J
SELENIUM	0.56 J	0.37 U	0.51 J	0.55 J	0.11 U	0.27 U	0.26 U	0.16 U	0.18 J	0.33 U	0.21 J	0.3 J
SILVER	0.1 U	0.07 U	0.39 U	0.03 U	0.08 U	0.06 U	0.04 U	0.13 U	0.02 UJ	0.09 U	0.02 UJ	0.02 UJ
SODIUM	41.9 U	79.6 U	75.9 U	126 U	25.2 U	29.7 U	126 J	81.3 J	334 J	71.4 U	22.6 U	25.8 U
STRONTIUM	39.9 J		7.3 J	6.5 J	4.5 J	5.5 J	122 J	70.2 J	52.5 J	18.1 J	8.5 J	5.5 J
THALLIUM	0.12 U	0.11 U	0.27 U	0.15 U	0.09 U	0.13 U	0.08 U	0.09 U	0.06 U	0.08 U	0.05 U	0.14 U
TIN	11.4 J	4.7 J	0.64 U	0.57 U	0.31 U	0.49 U	0.47 U	0.4 U	0.52 J	0.61 U	2 J	0.45 U
TITANIUM	68.1 J		93.1 J	92.4 J	27.4 J	91.5 J	84.5 J	67.2 J	78.2 J	52 J	42.8 J	68.6 J
VANADIUM	23.3 J	28.8 J	21.5 J	28.2 J	24.8 J	17.4 J	18.7 J	13.9 J	11.8 J	18.7 J	20.5 J	15.5 J
ZINC	541 J	490 J	67.8 J	41.4 J	40 J	97.2 J	52.9 J	43.1 J	58.1 J	78 J	386 U	37.7 J
AVS/SEM Parameters (UMO/G)												
ACID VOLATILE SULFIDE, SEM			0.49 J			0.88 J	0.85 J			0.62 J		

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**
SAMPLING ROUND	**01**	**03**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**
LOCATION	**13SW/SD01**	**13SW/SD01**	**13SW/SD02**	**13SW/SD03**	**13SW/SD04**	**13SW/SD05**	**13SW/SD05**	**13SW/SD06**	**13SW/SD07**	**13SW/SD08**	**13SW/SD09**	**13SW/SD10**
SAMPLE NUMBER	**13SD0101**	**13SD0102**	**13SD0201**	**13SD0301**	**13SD0401**	**13SD0501**	**13SD0501-D**	**13SD0601**	**13SD0701**	**13SD0801**	**13SD0901**	**13SD1001**
SAMPLE CODE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**ORIG**	**DUP**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
DEPTH RANGE	**0 - 0.3**	**0 - 0.33**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**
SAMPLE DATE	**3/29/2003**	**10/7/2004**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**
CADMIUM, SEM			0.002 U			0.001 U	0.004			0.004		
COPPER, SEM			0.131 J			0.07 J	0.173 J			2.223 J		
LEAD, SEM			0.067 J			0.03 J	0.196 J			0.061 J		
MERCURY, SEM			0.00007 J			0.00004 J	0.00018 J			0.00004 UJ		
NICKEL, SEM			0.048			0.111	0.041			0.028		
SEM/AVS, SEM (S.U.)			1.54			0.7	0.49			3.74		
ZINC, SEM			0.503 J			0.407 J	0.296 U			0.426 U		
Miscellaneous Parameters												
CATION EXCHANGE CAPACITY (MEQ/1)			15			9.9	10			12		
PH (S.U.)			7.2			5	7.6			7.4		
TOTAL ORGANIC CARBON (mg/kg)			15000 J			19000 J	3200 J			4400 J		

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	01	01	01	01	01	01	01	01	01	01	01
LOCATION	13SD11	13SW/SD12	13SW/SD13	13SW/SD14	13SW/SD15	13SW/SD16	13SD17	13SD17	13SW/SD18	13SW/SD19	13SW/SD20	13SD21
SAMPLE NUMBER	13SD1101	13SD1201	13SD1301	13SD1401	13SD1501	13SD1601	13SD1701	13SD1701-D	13SD1801	13SD1901	13SD2001	13SD2101
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/29/2003	3/29/2003	3/29/2003	3/30/2003	3/30/2003	3/30/2003
Semivolatile Organics (ug/kg)												
1,2,4,5-TETRACHLOROBENZENE												
1,2,4-TRICHLOROBENZENE												
1,2-DICHLOROBENZENE												
1,3-DICHLOROBENZENE												
1,4-DICHLOROBENZENE												
1,4-NAPHTHOQUINONE												
1,4-PHENYLENEDIAMINE												
1-NAPHTHYLAMINE												
2,2'-OXYBIS(1-CHLOROPROPANE)												
2,3,4,6-TETRACHLOROPHENOL												
2,4,5-TRICHLOROPHENOL												
2,4,6-TRICHLOROPHENOL												
2,4-DICHLOROPHENOL												
2,4-DIMETHYLPHENOL												
2,4-DINITROPHENOL												
2,6-DICHLOROPHENOL												
2-ACETYLAMINOFLUORENE												
2-CHLORONAPHTHALENE												
2-CHLOROPHENOL												
2-METHYLNAPHTHALENE												
2-METHYLPHENOL												
2-NAPHTHYLAMINE												
2-NITROANILINE												
2-NITROPHENOL												
2-PICOLINE												
3&4-METHYLPHENOL												
3,3'-DICHLOROBENZIDINE												
3,3'-DIMETHYLBENZIDINE												
3-METHYLCHOLANTHRENE												
3-NITROANILINE												
4,6-DINITRO-2-METHYLPHENOL												
4-AMINOBIPHENYL												
4-BROMOPHENYL PHENYL ETHER												
4-CHLORO-3-METHYLPHENOL												
4-CHLOROANILINE												
4-CHLOROPHENYL PHENYL ETHER												
4-NITROANILINE												
4-NITROPHENOL												
4-NITROQUINOLINE-1-OXIDE												
5-NITRO-O-TOLUIDINE												
7,12-DIMETHYLBENZ(A)ANTHRACENE												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	01	01	01	01	01	01	01	01	01	01	01
LOCATION	13SD11	13SW/SD12	13SW/SD13	13SW/SD14	13SW/SD15	13SW/SD16	13SD17	13SD17	13SW/SD18	13SW/SD19	13SW/SD20	13SD21
SAMPLE NUMBER	13SD1101	13SD1201	13SD1301	13SD1401	13SD1501	13SD1601	13SD1701	13SD1701-D	13SD1801	13SD1901	13SD2001	13SD2101
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/29/2003	3/29/2003	3/29/2003	3/30/2003	3/30/2003	3/30/2003
A,A-DIMETHYLPHENETHYLAMINE												
ACENAPHTHENE												
ACENAPHTHYLENE												
ACETOPHENONE												
ANILINE												
ANTHRACENE												
ARAMITE												
BENZO(A)ANTHRACENE												
BENZO(A)PYRENE												
BENZO(B)FLUORANTHENE												
BENZO(G,H,I)PERYLENE												
BENZO(K)FLUORANTHENE												
BENZYL ALCOHOL												
BIS(2-CHLOROETHOXY)METHANE												
BIS(2-CHLOROETHYL)ETHER												
BIS(2-ETHYLHEXYL)PHTHALATE												
BUTYL BENZYL PHTHALATE												
CHLOROBENZILATE												
CHRYSENE												
DI-N-BUTYL PHTHALATE												
DI-N-OCTYL PHTHALATE												
DIALLATE												
DIBENZO(A,H)ANTHRACENE												
DIBENZOFURAN												
DIETHYL PHTHALATE												
DIMETHYL PHTHALATE												
DIPHENYLAMINE												
ETHYL METHANE SULFONATE												
FLUORANTHENE												
FLUORENE												
HEXACHLOROBENZENE												
HEXACHLOROBUTADIENE												
HEXACHLOROCYCLOPENTADIENE												
HEXACHLOROETHANE												
HEXACHLOROPROPENE												
INDENO(1,2,3-CD)PYRENE												
ISODRIN												
ISOPHORONE												
ISOSAFROLE												
KEPONE												
METHAPYRILENE												
METHYL METHANE SULFONATE												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	01	01	01	01	01	01	01	01	01	01	01
LOCATION	13SD11	13SW/SD12	13SW/SD13	13SW/SD14	13SW/SD15	13SW/SD16	13SD17	13SD17	13SW/SD18	13SW/SD19	13SW/SD20	13SD21
SAMPLE NUMBER	13SD1101	13SD1201	13SD1301	13SD1401	13SD1501	13SD1601	13SD1701	13SD1701-D	13SD1801	13SD1901	13SD2001	13SD2101
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/29/2003	3/29/2003	3/29/2003	3/30/2003	3/30/2003	3/30/2003
N-NITROSO-DI-N-BUTYLAMINE												
N-NITROSO-DI-N-PROPYLAMINE												
N-NITROSODIETHYLAMINE												
N-NITROSODIMETHYLAMINE												
N-NITROSOMETHYLETHYLAMINE												
N-NITROSOMORPHOLINE												
N-NITROSOPIPERIDINE												
N-NITROSOPYRROLIDINE												
NAPHTHALENE												
O,O,O-TRIETHYL PHOSPHOROTHIOATE												
O-TOLUIDINE												
P-(DIMETHYLAMINO)AZOBENZENE												
PENTACHLOROBENZENE												
PENTACHLOROETHANE												
PENTACHLORONITROBENZENE												
PHENACETIN												
PHENANTHRENE												
PHENOL												
PRONAMIDE												
PYRENE												
PYRIDINE												
SAFROLE												
Energetics (mg/kg)												
1,3,5-TRINITROBENZENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,3-DINITROBENZENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4,6-TRINITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4-DINITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-DINITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-NITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3-NITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-AMINO-2,6-DINITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-NITROTOLUENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	1.9 J	0.8 J	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
NITROBENZENE	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
RDX	2.2	0.25 U	0.25 U	0.25 U	0.71 J	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
TETRYL	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Herbicides (ug/kg)												
HEXACHLOROPHENE												
PENTACHLOROPHENOL												
PCBs (ug/kg)												
AROCLOR-1016												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	01	01	01	01	01	01	01	01	01	01	01
LOCATION	13SD11	13SW/SD12	13SW/SD13	13SW/SD14	13SW/SD15	13SW/SD16	13SD17	13SD17	13SW/SD18	13SW/SD19	13SW/SD20	13SD21
SAMPLE NUMBER	13SD1101	13SD1201	13SD1301	13SD1401	13SD1501	13SD1601	13SD1701	13SD1701-D	13SD1801	13SD1901	13SD2001	13SD2101
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/30/2003	3/29/2003	3/29/2003	3/29/2003	3/30/2003	3/30/2003	3/30/2003
AROCLOR-1221												
AROCLOR-1232												
AROCLOR-1242												
AROCLOR-1248												
AROCLOR-1254												
AROCLOR-1260												
Petroleum Hydrocarbons (mg/kg)												
DIESEL RANGE ORGANICS												
GASOLINE RANGE ORGANICS												
OIL RANGE ORGANICS (C24-C40)												
Field PCB Results (mg/kg)												
TOTAL PCBS AS AROCLOR-1254												
Inorganics (mg/kg)												
ALUMINUM	9260 J	6860	5010	4160 J	10300	9140	10200 J	9800	7650	16200	7090 J	6600
ANTIMONY	0.52 U	0.55 U	0.47 U	0.13 U	0.26 U	0.25 U	0.24 U	0.21 U	0.35 U	0.23 U	0.23 U	0.29 U
ARSENIC	9.4 J	11.7 J	17.5 J	0.53 U	16.9 J	11.4 J	6.2 J	7 J	8.2 J	7.5 J	11 J	8 J
BARIUM	67.6 J	257 J	152 J	148 J	65.4 J	113 J	94.1 J	109 J	79.5 J	102 J	77.9 J	102 J
BERYLLIUM	0.63 J	1 J	0.96 J	0.53 J	1.4 J	1.4 J	0.7 J	0.79 J	0.93 J	1.6 J	0.95 J	0.77 J
CADMIUM	0.91 J	0.81 J	4.1 J	0.17 U	0.25 U	0.37 U	0.38 U	0.5 J	0.39 U	0.45 U	0.46 J	0.52 J
CALCIUM	33200 J	35400 J	89700 J	998 J	1650 J	767 J	6640 J	4220 J	1050 J	2440 J	1360 J	1560 J
CHROMIUM	15.4 J	32.7 J	49.6 J	16.2 J	24.9 J	21.5 J	11.3 J	16.1 J	24.9 J	13.5 J	36.5 J	10.3 J
COBALT	6.8 J	20.6 J	20 J	1.8 J	15 J	18.9 J	11.8 J	13.2 J	17.9 J	107 J	18.2 J	16 J
COPPER	12.5 J	10.7 J	11.3 J	8.9 J	24.1 J	13.6 J	11.5 J	14.9 J	11.8 J	12.2 J	14.9 J	13.2 J
IRON	25900 J	46300 J	83600 J	18400 J	25900 J	26900 J	18300 J	24800 J	24900 J	33100 J	36500 J	14900 J
LEAD	20 J	21.4 J	38.1 J	4.2 J	14.8 J	20.5 J	13.7 J	15.5 J	19.2 J	20.1 J	20.7 J	19.2 J
LITHIUM	7.2 J	6.5 J	4 J	4.3 J	28.4 J	17.5 J	7.7 J	7.7 J	6.1 J	38.8 J	9.7 J	5.3 J
MAGNESIUM	2080 J	1450 J	5620 J	757 J	1840 J	1410 J	1990 J	1650 J	943 J	1050 J	717 J	825 J
MANGANESE	372 J	6130 J	1760 J	65.3 J	247 J	1790 J	724 J	834 J	1290 J	2960 J	819 J	1440 J
MERCURY	0.028 U	0.032 J	0.019 J	0.01 U	0.022 J	0.041 J	0.028 U	0.022 J	0.028 J	0.036 J	0.029 U	0.03 J
NICKEL	8.6 J	14.9 J	13.6 J	8.6 J	35.5 J	33 J	12.8 J	15 J	13 J	45.5 J	18.6 J	11.7 J
POTASSIUM	2260 J	1130 J	538 J	1660 J	2390 J	807 J	523 J	563 J	392 J	599 J	482 J	367 J
SELENIUM	0.29 U	0.3 J	0.22 J	0.02 U	0.34 J	0.51 J	0.27 U	0.36 J	0.43 J	0.54 J	0.45 J	0.38 J
SILVER	0.05 U	0.02 UJ	0.02 UJ	0.03 U	0.02 UJ	0.02 UJ	0.07 U	0.02 U	0.08 U	0.03 U	0.06 U	0.02 UJ
SODIUM	113 J	47.1 U	39 U	38.8 U	53.5 U	26.2 U	30.7 U	29 U	43.8 U	63.6 U	48.3 U	62.5 U
STRONTIUM	77.1 J	28.2 J	64.2 J	10.3 J	10.1 J	6.3 J	11 J	7.6 J	4.1 J	7.4 J	6.4 J	5.2 J
THALLIUM	0.11 U	0.15 U	0.06 U	0.09 U	0.11 U	0.13 U	0.15 U	0.14 U	0.13 U	0.17 U	0.12 U	0.13 U
TIN	0.53 U	12 J	0.46 U	0.75 J	0.66 J	0.5 U	0.52 U	0.51 J	0.46 U	0.46 U	0.4 U	0.42 U
TITANIUM	62.7 J	60.2 J	67.9 J	72 J	13.8 J	45.1 J	110 J	81.4 J	72.3 J	67 J	66.6 J	77.4 J
VANADIUM	23 J	39.1 J	44 J	16.2 J	17.6 J	21.7 J	21.9 J	25 J	26.1 J	21.5 J	26.2 J	19.7 J
ZINC	116 J	138 U	216 U	7.9 J	65.3 J	46.3 J	62 J	77.1 J	31.7 J	75.9 J	40.4 J	33.4 U
AVS/SEM Parameters (UMO/G)												
ACID VOLATILE SULFIDE, SEM	0.25 J			0.66 J			0.67 J				0.23 J	

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**	**GULLY**
SAMPLING ROUND	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**	**01**
LOCATION	**13SD11**	**13SW/SD12**	**13SW/SD13**	**13SW/SD14**	**13SW/SD15**	**13SW/SD16**	**13SD17**	**13SD17**	**13SW/SD18**	**13SW/SD19**	**13SW/SD20**	**13SD21**
SAMPLE NUMBER	**13SD1101**	**13SD1201**	**13SD1301**	**13SD1401**	**13SD1501**	**13SD1601**	**13SD1701**	**13SD1701-D**	**13SD1801**	**13SD1901**	**13SD2001**	**13SD2101**
SAMPLE CODE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**ORIG**	**DUP**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
DEPTH RANGE	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**	**0 - 0.3**
SAMPLE DATE	**3/30/2003**	**3/30/2003**	**3/30/2003**	**3/30/2003**	**3/30/2003**	**3/30/2003**	**3/29/2003**	**3/29/2003**	**3/29/2003**	**3/30/2003**	**3/30/2003**	**3/30/2003**
CADMIUM, SEM	0.002			0.0014 U			0.001 U				0.001 U	
COPPER, SEM	0.055 J			0.036 J			0.061 J				0.075 J	
LEAD, SEM	0.033 J			0.006 U			0.035 J				0.047 J	
MERCURY, SEM	0.00003 UJ			0.00054 J			0.00005 J				0.00009 J	
NICKEL, SEM	0.021			0.022			0.02				0.078	
SEM/AVS, SEM (S.U.)	2.6			0.09			0.17				0.87	
ZINC, SEM	0.538 J			0.031 U			0.285 U				0.113 U	
Miscellaneous Parameters												
CATION EXCHANGE CAPACITY (MEQ/1)	18			13			16				12	
PH (S.U.)	7.9			7.1			7.8				7.2	
TOTAL ORGANIC CARBON (mg/kg)	2600 J			2500 J			17000 J				2600 J	

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	02	02	02	02	02	02	02	02
LOCATION	13SW/SD22	13SW/SD22	13SD23	13SW/SD24	13SW/SD25	13SW/SD26	13SW/SD27	13SW/SD29	13SW/SD29	13SW/SD32	13SW/SD32
SAMPLE NUMBER	13SD2201	13SD2202	13SD2301	13SD2401	13SD2501	13SD2601	13SD2701	13SD2901	13SD2901-D	13SD3201	13SD3201-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	10/23/2003	10/23/2003	10/23/2003	10/23/2003	10/22/2003	10/22/2003	10/24/2003	10/24/2003
Semivolatile Organics (ug/kg)											
1,2,4,5-TETRACHLOROBENZENE											
1,2,4-TRICHLOROBENZENE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
1,4-NAPHTHOQUINONE											
1,4-PHENYLENEDIAMINE											
1-NAPHTHYLAMINE											
2,2'-OXYBIS(1-CHLOROPROPANE)											
2,3,4,6-TETRACHLOROPHENOL											
2,4,5-TRICHLOROPHENOL											
2,4,6-TRICHLOROPHENOL											
2,4-DICHLOROPHENOL											
2,4-DIMETHYLPHENOL											
2,4-DINITROPHENOL											
2,6-DICHLOROPHENOL											
2-ACETYLAMINOFLUORENE											
2-CHLORONAPHTHALENE											
2-CHLOROPHENOL											
2-METHYLNAPHTHALENE					6 J					4.4 U	4.5 U
2-METHYLPHENOL											
2-NAPHTHYLAMINE											
2-NITROANILINE											
2-NITROPHENOL											
2-PICOLINE											
3&4-METHYLPHENOL											
3,3'-DICHLOROBENZIDINE											
3,3'-DIMETHYLBENZIDINE											
3-METHYLCHOLANTHRENE											
3-NITROANILINE											
4,6-DINITRO-2-METHYLPHENOL											
4-AMINOBIPHENYL											
4-BROMOPHENYL PHENYL ETHER											
4-CHLORO-3-METHYLPHENOL											
4-CHLOROANILINE											
4-CHLOROPHENYL PHENYL ETHER											
4-NITROANILINE											
4-NITROPHENOL											
4-NITROQUINOLINE-1-OXIDE											
5-NITRO-O-TOLUIDINE											
7,12-DIMETHYLBENZ(A)ANTHRACENE											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	02	02	02	02	02	02	02	02
LOCATION	13SW/SD22	13SW/SD22	13SD23	13SW/SD24	13SW/SD25	13SW/SD26	13SW/SD27	13SW/SD29	13SW/SD29	13SW/SD32	13SW/SD32
SAMPLE NUMBER	13SD2201	13SD2202	13SD2301	13SD2401	13SD2501	13SD2601	13SD2701	13SD2901	13SD2901-D	13SD3201	13SD3201-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	10/23/2003	10/23/2003	10/23/2003	10/23/2003	10/22/2003	10/22/2003	10/24/2003	10/24/2003
A,A-DIMETHYLPHENETHYLAMINE											
ACENAPHTHENE					4.3 U					4.4 U	4.5 U
ACENAPHTHYLENE					4.3 U					4.4 U	4.5 U
ACETOPHENONE											
ANILINE											
ANTHRACENE					4.3 U					4.4 U	4.5 U
ARAMITE											
BENZO(A)ANTHRACENE					10					19	25
BENZO(A)PYRENE					12					23	34
BENZO(B)FLUORANTHENE					21					32	44
BENZO(G,H,I)PERYLENE					12					19	27
BENZO(K)FLUORANTHENE					7 J					10 J	18 J
BENZYL ALCOHOL											
BIS(2-CHLOROETHOXY)METHANE											
BIS(2-CHLOROETHYL)ETHER											
BIS(2-ETHYLHEXYL)PHTHALATE											
BUTYL BENZYL PHTHALATE											
CHLOROBENZILATE											
CHRYSENE					15					24	39
DI-N-BUTYL PHTHALATE											
DI-N-OCTYL PHTHALATE											
DIALLATE											
DIBENZO(A,H)ANTHRACENE					4.3 U					4.4 U	4.5 U
DIBENZOFURAN											
DIETHYL PHTHALATE											
DIMETHYL PHTHALATE											
DIPHENYLAMINE											
ETHYL METHANE SULFONATE											
FLUORANTHENE					29					54	72
FLUORENE					4.3 U					4.4 U	4.5 U
HEXACHLOROBENZENE											
HEXACHLOROBUTADIENE											
HEXACHLOROCYCLOPENTADIENE											
HEXACHLOROETHANE											
HEXACHLOROPROPENE											
INDENO(1,2,3-CD)PYRENE					9					16	20
ISODRIN											
ISOPHORONE											
ISOSAFROLE											
KEPONE											
METHAPYRILENE											
METHYL METHANE SULFONATE											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	02	02	02	02	02	02	02	02
LOCATION	13SW/SD22	13SW/SD22	13SD23	13SW/SD24	13SW/SD25	13SW/SD26	13SW/SD27	13SW/SD29	13SW/SD29	13SW/SD32	13SW/SD32
SAMPLE NUMBER	13SD2201	13SD2202	13SD2301	13SD2401	13SD2501	13SD2601	13SD2701	13SD2901	13SD2901-D	13SD3201	13SD3201-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	10/23/2003	10/23/2003	10/23/2003	10/23/2003	10/22/2003	10/22/2003	10/24/2003	10/24/2003
N-NITROSO-DI-N-BUTYLAMINE											
N-NITROSO-DI-N-PROPYLAMINE											
N-NITROSODIETHYLAMINE											
N-NITROSODIMETHYLAMINE											
N-NITROSOMETHYLETHYLAMINE											
N-NITROSOMORPHOLINE											
N-NITROSOPIPERIDINE											
N-NITROSOPYRROLIDINE											
NAPHTHALENE					4.3 U					4.4 U	4.5 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE											
O-TOLUIDINE											
P-(DIMETHYLAMINO)AZOBENZENE											
PENTACHLOROBENZENE											
PENTACHLOROETHANE											
PENTACHLORONITROBENZENE											
PHENACETIN											
PHENANTHRENE					17					24	29
PHENOL											
PRONAMIDE											
PYRENE					25					47	71
PYRIDINE											
SAFROLE											
Energetics (mg/kg)											
1,3,5-TRINITROBENZENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
1,3-DINITROBENZENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
2,4,6-TRINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
2,4-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
2,6-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
2-AMINO-4,6-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
2-NITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
3-NITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
4-AMINO-2,6-DINITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
4-NITROTOLUENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
HMX	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
NITROBENZENE	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
RDX	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
TETRYL	0.25 U		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U		
Herbicides (ug/kg)											
HEXACHLOROPHENE											
PENTACHLOROPHENOL											
PCBs (ug/kg)											
AROCLOR-1016											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	02	02	02	02	02	02	02	02
LOCATION	13SW/SD22	13SW/SD22	13SD23	13SW/SD24	13SW/SD25	13SW/SD26	13SW/SD27	13SW/SD29	13SW/SD29	13SW/SD32	13SW/SD32
SAMPLE NUMBER	13SD2201	13SD2202	13SD2301	13SD2401	13SD2501	13SD2601	13SD2701	13SD2901	13SD2901-D	13SD3201	13SD3201-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	10/23/2003	10/23/2003	10/23/2003	10/23/2003	10/22/2003	10/22/2003	10/24/2003	10/24/2003
AROCLOR-1221											
AROCLOR-1232											
AROCLOR-1242											
AROCLOR-1248											
AROCLOR-1254											
AROCLOR-1260											
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS											
GASOLINE RANGE ORGANICS											
OIL RANGE ORGANICS (C24-C40)											
Field PCB Results (mg/kg)											
TOTAL PCBS AS AROCLOR-1254											
Inorganics (mg/kg)											
ALUMINUM	18500	14400 J	11900	14100 J	13900 J	12500 J	8820 J	10300 J	12700 J		
ANTIMONY	1.2 J	0.9 J	0.48 U	2.3 J	1.6 J	1.3 J	0.97 J	0.89 J	1.3 J		
ARSENIC	35.6 J	16.7 J	10.2 J	58.2 J	33.8 J	32.1 J	37.6 J	25.9 J	40.6 J		
BARIUM	203 J	113 J	165 J	101 J	121 J	154 J	202 J	129 J	132 J		
BERYLLIUM	4.3 J	1.4 J	0.95 J	2.9 J	3.6 J	3.3 J	1.8 J	1.9 J	3.1 J		
CADMIUM	1.8 J	0.65 J	0.82 J	1.1 J	0.88 J	0.95 J	0.54 J	0.66 J	0.81 J		
CALCIUM	2310 J	1630 J	3400 J	766 J	1170 J	2670 J	892 J	1280 J	1300 J		
CHROMIUM	140 J	35.4 J	12.7 J	228 J	57.6 J	86.9 J	46.7 J	37.7 J	80.6 J		
COBALT	70.2 J	58.1 J	28.5 J	24.2 J	63.5 J	68.7 J	34.6 J	36.9 J	37.3 J		
COPPER	32.4 J	12.1 J	17.8 J	21.6 J	19.7 J	18.3 J	17.6 J	14.4 J	18.7 J		
IRON	171000 J	41900 J	19900 J	195000 J	121000 J	135000 J	81000 J	74300 J	123000 J		
LEAD	87.7 J	46.5 J	34.8 J	54.8 J	49.5 J	46.6 J	46.2 J	32.9 J	43.8 J		
LITHIUM	10.9 J		9.2 J								
MAGNESIUM	1110 J	1260 J	1290 J	457 J	823 J	735 J	513 J	825 J	693 J		
MANGANESE	4580 J	2980 J	4220 J	2220 J	4000 J	3580 J	3040 J	2700 J	3160 J		
MERCURY	0.031 J	0.059 U	0.042 J	0.044 J	0.043 J	0.024 J	0.04 J	0.045 J	0.049 J		
NICKEL	83.9 J	28.7 J	19.3 J	28.1 J	63.9 J	65.3 J	38.6 J	45.4 J	50.5 J		
POTASSIUM	482 J	1130 J	629 J	622 J	1050 J	831 J	729 J	971 J	844 J		
SELENIUM	0.69 J	0.71 J	0.45 J	1.1 J	0.98 J	0.91 J	0.96 J	0.98 J	1.4 J		
SILVER	0.23 U	0.05 U	0.06 U	0.04 U	0.01 U	0.03 U	0.02 U	0.01 U	0.01 U		
SODIUM	58.2 U	43.5 U	26.3 U	28.1 U	31.9 U	43 J	21.8 U	31.7 J	27.5 U		
STRONTIUM	8.6 J		8.5 J								
THALLIUM	0.34 U	0.19 U	0.19 U	0.13 U	0.19 U	0.21 U	0.28 U	0.16 U	0.18 U		
TIN	0.82 J	0.43 U	0.82 J	0.38 U	0.46 U	0.3 U	0.31 U	0.39 U	0.38 U		
TITANIUM	112 J		62.3 J	164 J	76.8 J	62.9 J	40.9 J	42.6 J	53.1 J		
VANADIUM	115 J	45.6 J	24.6 J	144 J	59.7 J	70.8 J	43.3 J	43.4 J	66.3 J		
ZINC	273 U	120 J	64.5 J	68.4 J	142 J	151 J	69.5 J	139 J	175 J		
AVS/SEM Parameters (UMO/G)											
ACID VOLATILE SULFIDE, SEM											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SAMPLING ROUND	01	03	01	02	02	02	02	02	02	02	02
LOCATION	13SW/SD22	13SW/SD22	13SD23	13SW/SD24	13SW/SD25	13SW/SD26	13SW/SD27	13SW/SD29	13SW/SD29	13SW/SD32	13SW/SD32
SAMPLE NUMBER	13SD2201	13SD2202	13SD2301	13SD2401	13SD2501	13SD2601	13SD2701	13SD2901	13SD2901-D	13SD3201	13SD3201-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
SAMPLE DATE	3/29/2003	10/7/2004	3/29/2003	10/23/2003	10/23/2003	10/23/2003	10/23/2003	10/22/2003	10/22/2003	10/24/2003	10/24/2003
CADMIUM, SEM											
COPPER, SEM											
LEAD, SEM											
MERCURY, SEM											
NICKEL, SEM											
SEM/AVS, SEM (S.U.)											
ZINC, SEM											
Miscellaneous Parameters											
CATION EXCHANGE CAPACITY (MEQ/1)											
PH (S.U.)											
TOTAL ORGANIC CARBON (mg/kg)											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	GULLY	GULLY	MAINSTREAM	MAINSTREAM	MAINSTREAM
SAMPLING ROUND	02	03	03	03	03	02	03	02	03	03
LOCATION	13SW/SD30	13SW/SD30	13SW/SD33	13SW/SD34	13SW/SD35	13SW/SD28	13SW/SD28	13SW/SD31	13SW/SD31	13SW/SD31
SAMPLE NUMBER	13SD3001	13SD3002	13SD3301	13SD3401	13SD3501	13SD2801	13SD2802	13SD3101	13SD3102	13SD3102-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.33
SAMPLE DATE	10/22/2003	10/6/2004	10/6/2004	10/6/2004	10/6/2004	10/22/2003	10/6/2004	10/22/2003	10/6/2004	10/6/2004
Semivolatile Organics (ug/kg)										
1,2,4,5-TETRACHLOROBENZENE										
1,2,4-TRICHLOROBENZENE										
1,2-DICHLOROBENZENE										
1,3-DICHLOROBENZENE										
1,4-DICHLOROBENZENE										
1,4-NAPHTHOQUINONE										
1,4-PHENYLENEDIAMINE										
1-NAPHTHYLAMINE										
2,2'-OXYBIS(1-CHLOROPROPANE)										
2,3,4,6-TETRACHLOROPHENOL										
2,4,5-TRICHLOROPHENOL										
2,4,6-TRICHLOROPHENOL										
2,4-DICHLOROPHENOL										
2,4-DIMETHYLPHENOL										
2,4-DINITROPHENOL										
2,6-DICHLOROPHENOL										
2-ACETYLAMINOFLUORENE										
2-CHLORONAPHTHALENE										
2-CHLOROPHENOL										
2-METHYLNAPHTHALENE										
2-METHYLPHENOL										
2-NAPHTHYLAMINE										
2-NITROANILINE										
2-NITROPHENOL										
2-PICOLINE										
3&4-METHYLPHENOL										
3,3'-DICHLOROBENZIDINE										
3,3'-DIMETHYLBENZIDINE										
3-METHYLCHOLANTHRENE										
3-NITROANILINE										
4,6-DINITRO-2-METHYLPHENOL										
4-AMINOBIPHENYL										
4-BROMOPHENYL PHENYL ETHER										
4-CHLORO-3-METHYLPHENOL										
4-CHLOROANILINE										
4-CHLOROPHENYL PHENYL ETHER										
4-NITROANILINE										
4-NITROPHENOL										
4-NITROQUINOLINE-1-OXIDE										
5-NITRO-O-TOLUIDINE										
7,12-DIMETHYLBENZ(A)ANTHRACENE										

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	GULLY	GULLY	MAINSTREAM	MAINSTREAM	MAINSTREAM
SAMPLING ROUND	02	03	03	03	03	02	03	02	03	03
LOCATION	13SW/SD30	13SW/SD30	13SW/SD33	13SW/SD34	13SW/SD35	13SW/SD28	13SW/SD28	13SW/SD31	13SW/SD31	13SW/SD31
SAMPLE NUMBER	13SD3001	13SD3002	13SD3301	13SD3401	13SD3501	13SD2801	13SD2802	13SD3101	13SD3102	13SD3102-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.33
SAMPLE DATE	10/22/2003	10/6/2004	10/6/2004	10/6/2004	10/6/2004	10/22/2003	10/6/2004	10/22/2003	10/6/2004	10/6/2004
A,A-DIMETHYLPHENETHYLAMINE										
ACENAPHTHENE										
ACENAPHTHYLENE										
ACETOPHENONE										
ANILINE										
ANTHRACENE										
ARAMITE										
BENZO(A)ANTHRACENE										
BENZO(A)PYRENE										
BENZO(B)FLUORANTHENE										
BENZO(G,H,I)PERYLENE										
BENZO(K)FLUORANTHENE										
BENZYL ALCOHOL										
BIS(2-CHLOROETHOXY)METHANE										
BIS(2-CHLOROETHYL)ETHER										
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYL BENZYL PHTHALATE										
CHLOROBENZILATE										
CHRYSENE										
DI-N-BUTYL PHTHALATE										
DI-N-OCTYL PHTHALATE										
DIALLATE										
DIBENZO(A,H)ANTHRACENE										
DIBENZOFURAN										
DIETHYL PHTHALATE										
DIMETHYL PHTHALATE										
DIPHENYLAMINE										
ETHYL METHANE SULFONATE										
FLUORANTHENE										
FLUORENE										
HEXACHLOROBENZENE										
HEXACHLOROBUTADIENE										
HEXACHLOROCYCLOPENTADIENE										
HEXACHLOROETHANE										
HEXACHLOROPROPENE										
INDENO(1,2,3-CD)PYRENE										
ISODRIN										
ISOPHORONE										
ISOSAFROLE										
KEPONE										
METHAPYRILENE										
METHYL METHANE SULFONATE										

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	GULLY	GULLY	MAINSTREAM	MAINSTREAM	MAINSTREAM
SAMPLING ROUND	02	03	03	03	03	02	03	02	03	03
LOCATION	13SW/SD30	13SW/SD30	13SW/SD33	13SW/SD34	13SW/SD35	13SW/SD28	13SW/SD28	13SW/SD31	13SW/SD31	13SW/SD31
SAMPLE NUMBER	13SD3001	13SD3002	13SD3301	13SD3401	13SD3501	13SD2801	13SD2802	13SD3101	13SD3102	13SD3102-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.33
SAMPLE DATE	10/22/2003	10/6/2004	10/6/2004	10/6/2004	10/6/2004	10/22/2003	10/6/2004	10/22/2003	10/6/2004	10/6/2004
N-NITROSO-DI-N-BUTYLAMINE										
N-NITROSO-DI-N-PROPYLAMINE										
N-NITROSODIETHYLAMINE										
N-NITROSODIMETHYLAMINE										
N-NITROSOMETHYLETHYLAMINE										
N-NITROSOMORPHOLINE										
N-NITROSOPIPERIDINE										
N-NITROSOPYRROLIDINE										
NAPHTHALENE										
O,O,O-TRIETHYL PHOSPHOROTHIOATE										
O-TOLUIDINE										
P-(DIMETHYLAMINO)AZOBENZENE										
PENTACHLOROBENZENE										
PENTACHLOROETHANE										
PENTACHLORONITROBENZENE										
PHENACETIN										
PHENANTHRENE										
PHENOL										
PRONAMIDE										
PYRENE										
PYRIDINE										
SAFROLE										
Energetics (mg/kg)										
1,3,5-TRINITROBENZENE	0.25 U					0.25 U		0.25 U		
1,3-DINITROBENZENE	0.25 U					0.25 U		0.25 U		
2,4,6-TRINITROTOLUENE	0.25 U					0.25 U		0.25 U		
2,4-DINITROTOLUENE	0.25 U					0.25 U		0.25 U		
2,6-DINITROTOLUENE	0.25 U					0.25 U		0.25 U		
2-AMINO-4,6-DINITROTOLUENE	0.25 U					0.25 U		0.25 U		
2-NITROTOLUENE	0.25 U					0.25 U		0.25 U		
3-NITROTOLUENE	0.25 U					0.25 U		0.25 U		
4-AMINO-2,6-DINITROTOLUENE	0.25 U					0.25 U		0.25 U		
4-NITROTOLUENE	0.25 U					0.25 U		0.25 U		
HMX	0.25 U					0.25 U		0.28 J		
NITROBENZENE	0.25 U					0.25 U		0.25 U		
RDX	0.25 U					0.25 U		0.25 U		
TETRYL	0.25 U					0.25 U		0.25 U		
Herbicides (ug/kg)										
HEXACHLOROPHENE										
PENTACHLOROPHENOL										
PCBs (ug/kg)										
AROCLOR-1016										

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	GULLY	GULLY	MAINSTREAM	MAINSTREAM	MAINSTREAM
SAMPLING ROUND	02	03	03	03	03	02	03	02	03	03
LOCATION	13SW/SD30	13SW/SD30	13SW/SD33	13SW/SD34	13SW/SD35	13SW/SD28	13SW/SD28	13SW/SD31	13SW/SD31	13SW/SD31
SAMPLE NUMBER	13SD3001	13SD3002	13SD3301	13SD3401	13SD3501	13SD2801	13SD2802	13SD3101	13SD3102	13SD3102-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.33
SAMPLE DATE	10/22/2003	10/6/2004	10/6/2004	10/6/2004	10/6/2004	10/22/2003	10/6/2004	10/22/2003	10/6/2004	10/6/2004
AROCLOR-1221										
AROCLOR-1232										
AROCLOR-1242										
AROCLOR-1248										
AROCLOR-1254										
AROCLOR-1260										
Petroleum Hydrocarbons (mg/kg)										
DIESEL RANGE ORGANICS										
GASOLINE RANGE ORGANICS										
OIL RANGE ORGANICS (C24-C40)										
Field PCB Results (mg/kg)										
TOTAL PCBS AS AROCLOR-1254										
Inorganics (mg/kg)										
ALUMINUM	11600 J	12100 J	12700 J	11500 J	13700 J	13400 J	17100 J	14400 J	22100 J	21300 J
ANTIMONY	4.7 J	2 J	2.2 J	2.1 J	1.9 J	1.1 J	0.98 J	2.1 J	1.8 J	1.7 J
ARSENIC	56.9 J	43.4 J	36.7 J	42 J	23.9 J	22.2 J	28.7 J	25.6 J	33.3 J	34.6 J
BARIUM	125 J	207 J	83.8 J	77.4 J	169 J	199 J	129 J	90.8 J	137 J	178 J
BERYLLIUM	3.7 J	3.4 J	3 J	3.1 J	1.9 J	2.1 J	2 J	2 J	2.3 J	2.3 J
CADMIUM	17.1 J	9.4 J	14.6 J	10.3 J	10.4 J	0.63 J	0.59 J	4.3 J	1.8 J	2.4 J
CALCIUM	1290 J	1850 J	1510 J	1320 J	12200 J	799 J	845 J	2010 J	2500 J	19500 J
CHROMIUM	192 J	124 J	95.7 J	150 J	51.7 J	38.7 J	55 J	49.1 J	77.2 J	45.5 J
COBALT	19 J	28.6 J	22.9 J	22.5 J	29.9 J	40.7 J	31.3 J	27.5 J	20.4 J	33.6 J
COPPER	16.4 J	18.4 J	17.1 J	18.3 J	17.1 J	27.8 J	17.3 J	18.4 J	22 J	25 J
IRON	299000 J	210000 J	243000 J	202000 J	89600 J	112000 J	93700 J	121000 J	120000 J	69200 J
LEAD	45.6 J	39.1 J	38.9 J	40.6 J	25.6 J	35.7 J	37.2 J	20.6 J	25.2 J	34.5 J
LITHIUM										
MAGNESIUM	610 J	707 J	702 J	611 J	2110 J	1470 J	1580 J	1490 J	1940 J	6620 J
MANGANESE	2140 J	3960 J	1550 J	1450 J	2610 J	3240 J	2570 J	1330 J	1250 J	2020 J
MERCURY	0.016 J	0.034 U	0.044 U	0.026 U	0.039 U	0.026 J	0.057 U	0.021 J	0.052 U	0.049 U
NICKEL	42.2 J	47.8 J	35.8 J	44.5 J	41.2 J	33.5 J	36.6 J	54.1 J	41.5 J	42.1 J
POTASSIUM	452 J	664 J	763 J	695 J	1680 J	1340 J	2000 J	2080 J	3190 J	3520 J
SELENIUM	0.62 J	0.96 J	0.63 J	1.5 J	0.74 J	0.56 J	0.61 J	0.48 J	0.85 J	0.81 J
SILVER	0.02 U	0.06 U	0.08 U	0.06 U	0.049 U	0.01 U	0.044 U	0.02 U	0.052 U	0.07 U
SODIUM	28.4 U	144 J	298 J	91.1 J	77.4 U	31.6 J	183 J	92.3 J	126 J	158 J
STRONTIUM										
THALLIUM	0.12 U	0.2 U	0.1 U	0.09 U	0.17 U	0.21 U	0.19 U	0.18 U	0.21 U	0.22 U
TIN	0.42 U	0.41 U	0.44 U	0.39 U	1.1 U	0.4 U	0.53 U	0.46 U	0.55 U	0.54 U
TITANIUM	65.6 J					40.9 J		26.4 J		
VANADIUM	101 J	67.5 J	74.8 J	75.8 J	48.3 J	46.2 J	53.8 J	47.6 J	61.6 J	44.4 J
ZINC	186 J	152 J	195 J	152 J	121 J	72.8 J	79.7 J	98.3 J	73.1 J	77.6 J
AVS/SEM Parameters (UMO/G)										
ACID VOLATILE SULFIDE, SEM										

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	MAINSTREAM	GULLY	GULLY	MAINSTREAM	MAINSTREAM	MAINSTREAM
SAMPLING ROUND	02	03	03	03	03	02	03	02	03	03
LOCATION	13SW/SD30	13SW/SD30	13SW/SD33	13SW/SD34	13SW/SD35	13SW/SD28	13SW/SD28	13SW/SD31	13SW/SD31	13SW/SD31
SAMPLE NUMBER	13SD3001	13SD3002	13SD3301	13SD3401	13SD3501	13SD2801	13SD2802	13SD3101	13SD3102	13SD3102-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG	DUP
DEPTH RANGE	0 - 0.3	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.3	0 - 0.33	0 - 0.33
SAMPLE DATE	10/22/2003	10/6/2004	10/6/2004	10/6/2004	10/6/2004	10/22/2003	10/6/2004	10/22/2003	10/6/2004	10/6/2004
CADMIUM, SEM										
COPPER, SEM										
LEAD, SEM										
MERCURY, SEM										
NICKEL, SEM										
SEM/AVS, SEM (S.U.)										
ZINC, SEM										
Miscellaneous Parameters										
CATION EXCHANGE CAPACITY (MEQ/1)										
PH (S.U.)										
TOTAL ORGANIC CARBON (mg/kg)										

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - TURKEY CREEK
SAMPLING ROUND	05	05	05	05	05	05	05	05	05
LOCATION	13SW/SD36	13SW/SD36	13SW/SD37	13SW/SD38	13SW/SD39	13SW/SD40	13SW/SD41	13SW/SD42	13SW/SD43
SAMPLE NUMBER	13SD3601	13SD3601-D	13SD3701	13SD3801	13SD3901	13SD4001	13SD4101	13SD4201	13SD4301
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33
SAMPLE DATE	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005
Semivolatile Organics (ug/kg)									
1,2,4,5-TETRACHLOROBENZENE									
1,2,4-TRICHLOROBENZENE									
1,2-DICHLOROBENZENE									
1,3-DICHLOROBENZENE									
1,4-DICHLOROBENZENE									
1,4-NAPHTHOQUINONE									
1,4-PHENYLENEDIAMINE									
1-NAPHTHYLAMINE									
2,2'-OXYBIS(1-CHLOROPROPANE)									
2,3,4,6-TETRACHLOROPHENOL									
2,4,5-TRICHLOROPHENOL									
2,4,6-TRICHLOROPHENOL									
2,4-DICHLOROPHENOL									
2,4-DIMETHYLPHENOL									
2,4-DINITROPHENOL									
2,6-DICHLOROPHENOL									
2-ACETYLAMINOFLUORENE									
2-CHLORONAPHTHALENE									
2-CHLOROPHENOL									
2-METHYLNAPHTHALENE									
2-METHYLPHENOL									
2-NAPHTHYLAMINE									
2-NITROANILINE									
2-NITROPHENOL									
2-PICOLINE									
3&4-METHYLPHENOL									
3,3'-DICHLOROBENZIDINE									
3,3'-DIMETHYLBENZIDINE									
3-METHYLCHOLANTHRENE									
3-NITROANILINE									
4,6-DINITRO-2-METHYLPHENOL									
4-AMINOBIPHENYL									
4-BROMOPHENYL PHENYL ETHER									
4-CHLORO-3-METHYLPHENOL									
4-CHLOROANILINE									
4-CHLOROPHENYL PHENYL ETHER									
4-NITROANILINE									
4-NITROPHENOL									
4-NITROQUINOLINE-1-OXIDE									
5-NITRO-O-TOLUIDINE									
7,12-DIMETHYLBENZ(A)ANTHRACENE									

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - TURKEY CREEK
SAMPLING ROUND	05	05	05	05	05	05	05	05	05
LOCATION	13SW/SD36	13SW/SD36	13SW/SD37	13SW/SD38	13SW/SD39	13SW/SD40	13SW/SD41	13SW/SD42	13SW/SD43
SAMPLE NUMBER	13SD3601	13SD3601-D	13SD3701	13SD3801	13SD3901	13SD4001	13SD4101	13SD4201	13SD4301
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33
SAMPLE DATE	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005
A,A-DIMETHYLPHENETHYLAMINE									
ACENAPHTHENE									
ACENAPHTHYLENE									
ACETOPHENONE									
ANILINE									
ANTHRACENE									
ARAMITE									
BENZO(A)ANTHRACENE									
BENZO(A)PYRENE									
BENZO(B)FLUORANTHENE									
BENZO(G,H,I)PERYLENE									
BENZO(K)FLUORANTHENE									
BENZYL ALCOHOL									
BIS(2-CHLOROETHOXY)METHANE									
BIS(2-CHLOROETHYL)ETHER									
BIS(2-ETHYLHEXYL)PHTHALATE									
BUTYL BENZYL PHTHALATE									
CHLOROBENZILATE									
CHRYSENE									
DI-N-BUTYL PHTHALATE									
DI-N-OCTYL PHTHALATE									
DIALLATE									
DIBENZO(A,H)ANTHRACENE									
DIBENZOFURAN									
DIETHYL PHTHALATE									
DIMETHYL PHTHALATE									
DIPHENYLAMINE									
ETHYL METHANE SULFONATE									
FLUORANTHENE									
FLUORENE									
HEXACHLOROBENZENE									
HEXACHLOROBUTADIENE									
HEXACHLOROCYCLOPENTADIENE									
HEXACHLOROETHANE									
HEXACHLOROPROPENE									
INDENO(1,2,3-CD)PYRENE									
ISODRIN									
ISOPHORONE									
ISOSAFROLE									
KEPONE									
METHAPYRILENE									
METHYL METHANE SULFONATE									

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - TURKEY CREEK
SAMPLING ROUND	05	05	05	05	05	05	05	05	05
LOCATION	13SW/SD36	13SW/SD36	13SW/SD37	13SW/SD38	13SW/SD39	13SW/SD40	13SW/SD41	13SW/SD42	13SW/SD43
SAMPLE NUMBER	13SD3601	13SD3601-D	13SD3701	13SD3801	13SD3901	13SD4001	13SD4101	13SD4201	13SD4301
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33
SAMPLE DATE	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005
N-NITROSO-DI-N-BUTYLAMINE									
N-NITROSO-DI-N-PROPYLAMINE									
N-NITROSODIETHYLAMINE									
N-NITROSODIMETHYLAMINE									
N-NITROSOMETHYLETHYLAMINE									
N-NITROSOMORPHOLINE									
N-NITROSOPIPERIDINE									
N-NITROSOPYRROLIDINE									
NAPHTHALENE									
O,O,O-TRIETHYL PHOSPHOROTHIOATE									
O-TOLUIDINE									
P-(DIMETHYLAMINO)AZOBENZENE									
PENTACHLOROBENZENE									
PENTACHLOROETHANE									
PENTACHLORONITROBENZENE									
PHENACETIN									
PHENANTHRENE									
PHENOL									
PRONAMIDE									
PYRENE									
PYRIDINE									
SAFROLE									
Energetics (mg/kg)									
1,3,5-TRINITROBENZENE									
1,3-DINITROBENZENE									
2,4,6-TRINITROTOLUENE									
2,4-DINITROTOLUENE									
2,6-DINITROTOLUENE									
2-AMINO-4,6-DINITROTOLUENE									
2-NITROTOLUENE									
3-NITROTOLUENE									
4-AMINO-2,6-DINITROTOLUENE									
4-NITROTOLUENE									
HMX									
NITROBENZENE									
RDX									
TETRYL									
Herbicides (ug/kg)									
HEXACHLOROPHENE									
PENTACHLOROPHENOL									
PCBs (ug/kg)									
AROCLOR-1016									

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - TURKEY CREEK
SAMPLING ROUND	05	05	05	05	05	05	05	05	05
LOCATION	13SW/SD36	13SW/SD36	13SW/SD37	13SW/SD38	13SW/SD39	13SW/SD40	13SW/SD41	13SW/SD42	13SW/SD43
SAMPLE NUMBER	13SD3601	13SD3601-D	13SD3701	13SD3801	13SD3901	13SD4001	13SD4101	13SD4201	13SD4301
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33
SAMPLE DATE	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005
AROCLOR-1221									
AROCLOR-1232									
AROCLOR-1242									
AROCLOR-1248									
AROCLOR-1254									
AROCLOR-1260									
Petroleum Hydrocarbons (mg/kg)									
DIESEL RANGE ORGANICS									
GASOLINE RANGE ORGANICS									
OIL RANGE ORGANICS (C24-C40)									
Field PCB Results (mg/kg)									
TOTAL PCBS AS AROCLOR-1254									
Inorganics (mg/kg)									
ALUMINUM	4370 J	10200 J	10700 J	7640 J	8320 J	9680 J	5470 J	4020 J	30500 J
ANTIMONY	0.21 U	0.28 U	1.4 J	0.86 U	0.47 U	0.73 U	0.44 U	0.67 U	1.1 U
ARSENIC	6.8 J	7.3 J	8.8 J	11.7 J	9.8 J	8.9 J	5.9 J	7.9 J	10.5 J
BARIUM	30.6 J	48.5 J	64.8 J	77.5 J	51.9 J	71.3 J	45.4 J	39.2 J	127 J
BERYLLIUM	0.48 J	0.65	1	0.9	0.99	0.89	0.52 J	0.65	1.4
CADMIUM	0.12 J	0.15 J	0.31 J	5.1	0.61	1.8	0.83	1.1	8.4
CALCIUM	1120 J	1250 J	1090 J	1980 J	942 J	1260 J	497 J	367 J	1920 J
CHROMIUM	15.3 J	17.8 J	24.6 J	25.6 J	29.5 J	28.9 J	15.6 J	19.6 J	38.4 J
COBALT	7.8 J	12.2 J	17.3 J	17.8 J	10.5 J	13.7 J	7.2 J	10.4 J	11.8 J
COPPER	5.9 J	5.8 J	10.8 J	9.5 J	8.4 J	13.3 J	4.7 J	7.1 J	245 J
IRON	18700 J	22800 J	25700 J	33600 J	31200 J	24100 J	16600 J	24500 J	36000 J
LEAD	7.5 J	12.1 J	19.9 J	16.8 J	12.7 J	24.3 J	8.3 J	11.5 J	35.6 J
LITHIUM	#N/A								
MAGNESIUM	386 J	579 J	913 J	861 J	706 J	908 J	479 J	336 J	2660 J
MANGANESE	490	812	380	1090	456	728	470	721	524
MERCURY	#N/A								
NICKEL	10.5 J	14.6 J	21.6 J	20.4 J	17.4 J	17.7 J	11.1 J	12.9 J	31.7 J
POTASSIUM	548 J	730 J	1140 J	1090 J	895 J	1160 J	679 J	456 J	3740 J
SELENIUM	0.19 J	0.26 J	0.35 J	0.31 J	0.31 J	0.33 J	0.15 J	0.17 J	0.49 J
SILVER	0.055 U	0.055 U	1.9	0.057 U	0.14 J	1	0.06 J	0.06 J	0.78 J
SODIUM	4.24 U	4.23 U	24.2 J	7.2 J	9.6 J	23.9 J	8.5 J	4.14 U	61.9 J
STRONTIUM	#N/A								
THALLIUM	0.1 U	0.13 J	0.17 J	0.13 J	0.12 J	0.16 J	0.08 U	0.07 U	0.43 J
TIN	0.37 U	0.44 U	0.6 U	0.46 U	0.51 U	1.1 U	0.48 U	0.46 U	3 J
TITANIUM	#N/A								
VANADIUM	14.8 J	19.1 J	26.7 J	26.7 J	28.8 J	23.8 J	16.4 J	17.9 J	46.8 J
ZINC	23.6 J	29.2 J	45.9 J	53.3 J	35.4 J	175 J	28.2 J	38.4 J	262 J
AVS/SEM Parameters (UMO/G)									
ACID VOLATILE SULFIDE, SEM									

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	UPSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - BOGGS CREEK	DOWNSTREAM - TURKEY CREEK
SAMPLING ROUND	05	05	05	05	05	05	05	05	05
LOCATION	13SW/SD36	13SW/SD36	13SW/SD37	13SW/SD38	13SW/SD39	13SW/SD40	13SW/SD41	13SW/SD42	13SW/SD43
SAMPLE NUMBER	13SD3601	13SD3601-D	13SD3701	13SD3801	13SD3901	13SD4001	13SD4101	13SD4201	13SD4301
SAMPLE CODE	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33
SAMPLE DATE	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005	5/17/2005
CADMIUM, SEM									
COPPER, SEM									
LEAD, SEM									
MERCURY, SEM									
NICKEL, SEM									
SEM/AVS, SEM (S.U.)									
ZINC, SEM									
Miscellaneous Parameters									
CATION EXCHANGE CAPACITY (MEQ/1)									
PH (S.U.)									
TOTAL ORGANIC CARBON (mg/kg)									

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	DOWNSTREAM - TURKEY CREEK	UPSTREAM - TURKEY CREEK									
SAMPLING ROUND	05	05	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SW/SD44	13SW/SD45	13SD46	13SD48	13SD48	13SD49	13SD50	13SD51	13SD51	13SD52	13SD52
SAMPLE NUMBER	13SD4401	13SD4501	13SD460024	13SD480006	13SD480612	13SD490012	13SD500012	13SD510024	13SD512448	13SD520024	13SD520024-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
DEPTH RANGE	0 - 0.33	0 - 0.33	0 - 2	0 - 0.5	0.5 - 1	0 - 1	0 - 1	0 - 2	2 - 4	0 - 2	0 - 2
SAMPLE DATE	5/17/2005	5/17/2005	6/5/2006	6/5/2006	8/25/2006	6/5/2006	6/5/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
Semivolatile Organics (ug/kg)											
1,2,4,5-TETRACHLOROBENZENE											
1,2,4-TRICHLOROBENZENE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
1,4-NAPHTHOQUINONE											
1,4-PHENYLENEDIAMINE											
1-NAPHTHYLAMINE											
2,2'-OXYBIS(1-CHLOROPROPANE)											
2,3,4,6-TETRACHLOROPHENOL											
2,4,5-TRICHLOROPHENOL											
2,4,6-TRICHLOROPHENOL											
2,4-DICHLOROPHENOL											
2,4-DIMETHYLPHENOL											
2,4-DINITROPHENOL											
2,6-DICHLOROPHENOL											
2-ACETYLAMINOFLUORENE											
2-CHLORONAPHTHALENE											
2-CHLOROPHENOL											
2-METHYLNAPHTHALENE											
2-METHYLPHENOL											
2-NAPHTHYLAMINE											
2-NITROANILINE											
2-NITROPHENOL											
2-PICOLINE											
3&4-METHYLPHENOL											
3,3'-DICHLOROBENZIDINE											
3,3'-DIMETHYLBENZIDINE											
3-METHYLCHOLANTHRENE											
3-NITROANILINE											
4,6-DINITRO-2-METHYLPHENOL											
4-AMINOBIPHENYL											
4-BROMOPHENYL PHENYL ETHER											
4-CHLORO-3-METHYLPHENOL											
4-CHLOROANILINE											
4-CHLOROPHENYL PHENYL ETHER											
4-NITROANILINE											
4-NITROPHENOL											
4-NITROQUINOLINE-1-OXIDE											
5-NITRO-O-TOLUIDINE											
7,12-DIMETHYLBENZ(A)ANTHRACENE											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	**DOWNSTREAM - TURKEY CREEK**	**UPSTREAM - TURKEY CREEK**									
SAMPLING ROUND	**05**	**05**	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	**13SW/SD44**	**13SW/SD45**	13SD46	13SD48	13SD48	13SD49	13SD50	13SD51	13SD51	13SD52	13SD52
SAMPLE NUMBER	**13SD4401**	**13SD4501**	13SD460024	13SD480006	13SD480612	13SD490012	13SD500012	13SD510024	13SD512448	13SD520024	13SD520024-D
SAMPLE CODE	**NORMAL**	**NORMAL**	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
DEPTH RANGE	**0 - 0.33**	**0 - 0.33**	0 - 2	0 - 0.5	0.5 - 1	0 - 1	0 - 1	0 - 2	2 - 4	0 - 2	0 - 2
SAMPLE DATE	**5/17/2005**	**5/17/2005**	6/5/2006	6/5/2006	8/25/2006	6/5/2006	6/5/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
A,A-DIMETHYLPHENETHYLAMINE											
ACENAPHTHENE											
ACENAPHTHYLENE											
ACETOPHENONE											
ANILINE											
ANTHRACENE											
ARAMITE											
BENZO(A)ANTHRACENE											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(G,H,I)PERYLENE											
BENZO(K)FLUORANTHENE											
BENZYL ALCOHOL											
BIS(2-CHLOROETHOXY)METHANE											
BIS(2-CHLOROETHYL)ETHER											
BIS(2-ETHYLHEXYL)PHTHALATE											
BUTYL BENZYL PHTHALATE											
CHLOROBENZILATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
DI-N-OCTYL PHTHALATE											
DIALLATE											
DIBENZO(A,H)ANTHRACENE											
DIBENZOFURAN											
DIETHYL PHTHALATE											
DIMETHYL PHTHALATE											
DIPHENYLAMINE											
ETHYL METHANE SULFONATE											
FLUORANTHENE											
FLUORENE											
HEXACHLOROBENZENE											
HEXACHLOROBUTADIENE											
HEXACHLOROCYCLOPENTADIENE											
HEXACHLOROETHANE											
HEXACHLOROPROPENE											
INDENO(1,2,3-CD)PYRENE											
ISODRIN											
ISOPHORONE											
ISOSAFROLE											
KEPONE											
METHAPYRILENE											
METHYL METHANE SULFONATE											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	DOWNSTREAM - TURKEY CREEK	UPSTREAM - TURKEY CREEK									
SAMPLING ROUND	05	05	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SW/SD44	13SW/SD45	13SD46	13SD48	13SD48	13SD49	13SD50	13SD51	13SD51	13SD52	13SD52
SAMPLE NUMBER	13SD4401	13SD4501	13SD460024	13SD480006	13SD480612	13SD490012	13SD500012	13SD510024	13SD512448	13SD520024	13SD520024-D
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
DEPTH RANGE	0 - 0.33	0 - 0.33	0 - 2	0 - 0.5	0.5 - 1	0 - 1	0 - 1	0 - 2	2 - 4	0 - 2	0 - 2
SAMPLE DATE	5/17/2005	5/17/2005	6/5/2006	6/5/2006	8/25/2006	6/5/2006	6/5/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
N-NITROSO-DI-N-BUTYLAMINE											
N-NITROSO-DI-N-PROPYLAMINE											
N-NITROSODIETHYLAMINE											
N-NITROSODIMETHYLAMINE											
N-NITROSOMETHYLETHYLAMINE											
N-NITROSOMORPHOLINE											
N-NITROSOPIPERIDINE											
N-NITROSOPYRROLIDINE											
NAPHTHALENE											
O,O,O-TRIETHYL PHOSPHOROTHIOATE											
O-TOLUIDINE											
P-(DIMETHYLAMINO)AZOBENZENE											
PENTACHLOROBENZENE											
PENTACHLOROETHANE											
PENTACHLORONITROBENZENE											
PHENACETIN											
PHENANTHRENE											
PHENOL											
PRONAMIDE											
PYRENE											
PYRIDINE											
SAFROLE											
Energetics (mg/kg)											
1,3,5-TRINITROBENZENE											
1,3-DINITROBENZENE											
2,4,6-TRINITROTOLUENE											
2,4-DINITROTOLUENE											
2,6-DINITROTOLUENE											
2-AMINO-4,6-DINITROTOLUENE											
2-NITROTOLUENE											
3-NITROTOLUENE											
4-AMINO-2,6-DINITROTOLUENE											
4-NITROTOLUENE											
HMX											
NITROBENZENE											
RDX											
TETRYL											
Herbicides (ug/kg)											
HEXACHLOROPHENE											
PENTACHLOROPHENOL											
PCBs (ug/kg)											
AROCLOR-1016			11.4 U	120 U	200 U	612 U	14.3 U	110 U	108 U	11.2 U	11.2 UJ

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	**DOWNSTREAM - TURKEY CREEK**	**UPSTREAM - TURKEY CREEK**									
SAMPLING ROUND	**05**	**05**	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	**13SW/SD44**	**13SW/SD45**	13SD46	13SD48	13SD48	13SD49	13SD50	13SD51	13SD51	13SD52	13SD52
SAMPLE NUMBER	**13SD4401**	**13SD4501**	13SD460024	13SD480006	13SD480612	13SD490012	13SD500012	13SD510024	13SD512448	13SD520024	13SD520024-D
SAMPLE CODE	**NORMAL**	**NORMAL**	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
DEPTH RANGE	**0 - 0.33**	**0 - 0.33**	0 - 2	0 - 0.5	0.5 - 1	0 - 1	0 - 1	0 - 2	2 - 4	0 - 2	0 - 2
SAMPLE DATE	**5/17/2005**	**5/17/2005**	6/5/2006	6/5/2006	8/25/2006	6/5/2006	6/5/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
AROCLOR-1221			11.4 U	120 U	200 U	612 U	14.3 U	110 U	108 U	11.2 U	11.2 UJ
AROCLOR-1232			11.4 U	120 U	200 U	612 U	14.3 U	110 U	108 U	11.2 U	11.2 UJ
AROCLOR-1242			11.4 U	120 U	200 U	612 U	14.3 U	110 U	108 U	11.2 U	11.2 UJ
AROCLOR-1248			11.4 U	1700	200 U	8000 J	36000	1200	800 J	17000 J	46000 J
AROCLOR-1254			11.4 U	120 U	200 U	612 U	14.3 U	110 U	108 U	11.2 U	11.2 UJ
AROCLOR-1260			11.4 U	120 U	1900	612 U	14.3 U	110 U	108 U	11.2 U	11.2 UJ
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS								240	46	3.12 U	
GASOLINE RANGE ORGANICS								17	12	3.12 U	
OIL RANGE ORGANICS (C24-C40)								240	46	12.5 U	
Field PCB Results (mg/kg)											
TOTAL PCBS AS AROCLOR-1254					3.28						
Inorganics (mg/kg)											
ALUMINUM	5520 J	5360 J									
ANTIMONY	0.2 U	0.18 U									
ARSENIC	5 J	4.5 J									
BARIUM	51.6 J	52.1 J									
BERYLLIUM	0.49 J	0.43 J									
CADMIUM	0.19 J	0.17 J									
CALCIUM	835 J	703 J									
CHROMIUM	12.1 J	11.8 J									
COBALT	11.3 J	7 J									
COPPER	7.5 J	6.3 J									
IRON	15700 J	14100 J									
LEAD	10.6 J	9.4 J									
LITHIUM											
MAGNESIUM	612 J	565 J									
MANGANESE	564	444									
MERCURY											
NICKEL	13.7 J	10.7 J									
POTASSIUM	788 J	748 J									
SELENIUM	0.16 J	0.13 J									
SILVER	0.053 U	0.052 U									
SODIUM	4.1 U	3.97 U									
STRONTIUM											
THALLIUM	0.09 U	0.1 U									
TIN	0.38 U	0.35 U									
TITANIUM											
VANADIUM	14.5 J	14 J									
ZINC	32 J	27.2 J									
AVS/SEM Parameters (UMO/G)											
ACID VOLATILE SULFIDE, SEM											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER	**DOWNSTREAM - TURKEY CREEK**	**UPSTREAM - TURKEY CREEK**									
SAMPLING ROUND	**05**	**05**	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	**13SW/SD44**	**13SW/SD45**	13SD46	13SD48	13SD48	13SD49	13SD50	13SD51	13SD51	13SD52	13SD52
SAMPLE NUMBER	**13SD4401**	**13SD4501**	13SD460024	13SD480006	13SD480612	13SD490012	13SD500012	13SD510024	13SD512448	13SD520024	13SD520024-D
SAMPLE CODE	**NORMAL**	**NORMAL**	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
DEPTH RANGE	**0 - 0.33**	**0 - 0.33**	0 - 2	0 - 0.5	0.5 - 1	0 - 1	0 - 1	0 - 2	2 - 4	0 - 2	0 - 2
SAMPLE DATE	**5/17/2005**	**5/17/2005**	6/5/2006	6/5/2006	8/25/2006	6/5/2006	6/5/2006	6/6/2006	6/6/2006	6/6/2006	6/6/2006
CADMIUM, SEM											
COPPER, SEM											
LEAD, SEM											
MERCURY, SEM											
NICKEL, SEM											
SEM/AVS, SEM (S.U.)											
ZINC, SEM											
Miscellaneous Parameters											
CATION EXCHANGE CAPACITY (MEQ/1)											
PH (S.U.)											
TOTAL ORGANIC CARBON (mg/kg)											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER											
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD52	13SD53	13SD53	13SD54	13SD55	13SD55	13SD56	13SD57	13SD59	13SD59	13SD60
SAMPLE NUMBER	13SD522448	13SD530024	13SD532436	13SD540006	13SD550012	13SD551224	13SD560012	13SD570006	13SD590012	13SD591224	13SD600012
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	2 - 4	0 - 2	2 - 3	0 - 0.5	0 - 1	1 - 2	0 - 1	0 - 0.5	0 - 1	1 - 2	0 - 1
SAMPLE DATE	6/6/2006	6/6/2006	6/6/2006	6/5/2006	8/25/2006	8/25/2006	8/25/2006	8/24/2006	8/23/2006	8/23/2006	8/23/2006
Semivolatile Organics (ug/kg)											
1,2,4,5-TETRACHLOROBENZENE											
1,2,4-TRICHLOROBENZENE											
1,2-DICHLOROBENZENE											
1,3-DICHLOROBENZENE											
1,4-DICHLOROBENZENE											
1,4-NAPHTHOQUINONE											
1,4-PHENYLENEDIAMINE											
1-NAPHTHYLAMINE											
2,2'-OXYBIS(1-CHLOROPROPANE)											
2,3,4,6-TETRACHLOROPHENOL											
2,4,5-TRICHLOROPHENOL											
2,4,6-TRICHLOROPHENOL											
2,4-DICHLOROPHENOL											
2,4-DIMETHYLPHENOL											
2,4-DINITROPHENOL											
2,6-DICHLOROPHENOL											
2-ACETYLAMINOFLUORENE											
2-CHLORONAPHTHALENE											
2-CHLOROPHENOL											
2-METHYLNAPHTHALENE											
2-METHYLPHENOL											
2-NAPHTHYLAMINE											
2-NITROANILINE											
2-NITROPHENOL											
2-PICOLINE											
3&4-METHYLPHENOL											
3,3'-DICHLOROBENZIDINE											
3,3'-DIMETHYLBENZIDINE											
3-METHYLCHOLANTHRENE											
3-NITROANILINE											
4,6-DINITRO-2-METHYLPHENOL											
4-AMINOBIPHENYL											
4-BROMOPHENYL PHENYL ETHER											
4-CHLORO-3-METHYLPHENOL											
4-CHLOROANILINE											
4-CHLOROPHENYL PHENYL ETHER											
4-NITROANILINE											
4-NITROPHENOL											
4-NITROQUINOLINE-1-OXIDE											
5-NITRO-O-TOLUIDINE											
7,12-DIMETHYLBENZ(A)ANTHRACENE											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER											
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD52	13SD53	13SD53	13SD54	13SD55	13SD55	13SD56	13SD57	13SD59	13SD59	13SD60
SAMPLE NUMBER	13SD522448	13SD530024	13SD532436	13SD540006	13SD550012	13SD551224	13SD560012	13SD570006	13SD590012	13SD591224	13SD600012
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	2 - 4	0 - 2	2 - 3	0 - 0.5	0 - 1	1 - 2	0 - 1	0 - 0.5	0 - 1	1 - 2	0 - 1
SAMPLE DATE	6/6/2006	6/6/2006	6/6/2006	6/5/2006	8/25/2006	8/25/2006	8/25/2006	8/24/2006	8/23/2006	8/23/2006	8/23/2006
A,A-DIMETHYLPHENETHYLAMINE											
ACENAPHTHENE											
ACENAPHTHYLENE											
ACETOPHENONE											
ANILINE											
ANTHRACENE											
ARAMITE											
BENZO(A)ANTHRACENE											
BENZO(A)PYRENE											
BENZO(B)FLUORANTHENE											
BENZO(G,H,I)PERYLENE											
BENZO(K)FLUORANTHENE											
BENZYL ALCOHOL											
BIS(2-CHLOROETHOXY)METHANE											
BIS(2-CHLOROETHYL)ETHER											
BIS(2-ETHYLHEXYL)PHTHALATE											
BUTYL BENZYL PHTHALATE											
CHLOROBENZILATE											
CHRYSENE											
DI-N-BUTYL PHTHALATE											
DI-N-OCTYL PHTHALATE											
DIALLATE											
DIBENZO(A,H)ANTHRACENE											
DIBENZOFURAN											
DIETHYL PHTHALATE											
DIMETHYL PHTHALATE											
DIPHENYLAMINE											
ETHYL METHANE SULFONATE											
FLUORANTHENE											
FLUORENE											
HEXACHLOROBENZENE											
HEXACHLOROBUTADIENE											
HEXACHLOROCYCLOPENTADIENE											
HEXACHLOROETHANE											
HEXACHLOROPROPENE											
INDENO(1,2,3-CD)PYRENE											
ISODRIN											
ISOPHORONE											
ISOSAFROLE											
KEPONE											
METHAPYRILENE											
METHYL METHANE SULFONATE											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER											
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD52	13SD53	13SD53	13SD54	13SD55	13SD55	13SD56	13SD57	13SD59	13SD59	13SD60
SAMPLE NUMBER	13SD522448	13SD530024	13SD532436	13SD540006	13SD550012	13SD551224	13SD560012	13SD570006	13SD590012	13SD591224	13SD600012
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	2 - 4	0 - 2	2 - 3	0 - 0.5	0 - 1	1 - 2	0 - 1	0 - 0.5	0 - 1	1 - 2	0 - 1
SAMPLE DATE	6/6/2006	6/6/2006	6/6/2006	6/5/2006	8/25/2006	8/25/2006	8/25/2006	8/24/2006	8/23/2006	8/23/2006	8/23/2006
N-NITROSO-DI-N-BUTYLAMINE											
N-NITROSO-DI-N-PROPYLAMINE											
N-NITROSODIETHYLAMINE											
N-NITROSODIMETHYLAMINE											
N-NITROSOMETHYLETHYLAMINE											
N-NITROSOMORPHOLINE											
N-NITROSOPIPERIDINE											
N-NITROSOPYRROLIDINE											
NAPHTHALENE											
O,O,O-TRIETHYL PHOSPHOROTHIOATE											
O-TOLUIDINE											
P-(DIMETHYLAMINO)AZOBENZENE											
PENTACHLOROBENZENE											
PENTACHLOROETHANE											
PENTACHLORONITROBENZENE											
PHENACETIN											
PHENANTHRENE											
PHENOL											
PRONAMIDE											
PYRENE											
PYRIDINE											
SAFROLE											
Energetics (mg/kg)											
1,3,5-TRINITROBENZENE											
1,3-DINITROBENZENE											
2,4,6-TRINITROTOLUENE											
2,4-DINITROTOLUENE											
2,6-DINITROTOLUENE											
2-AMINO-4,6-DINITROTOLUENE											
2-NITROTOLUENE											
3-NITROTOLUENE											
4-AMINO-2,6-DINITROTOLUENE											
4-NITROTOLUENE											
HMX											
NITROBENZENE											
RDX											
TETRYL											
Herbicides (ug/kg)											
HEXACHLOROPHENE											
PENTACHLOROPHENOL											
PCBs (ug/kg)											
AROCLOR-1016	237 U	12 U	118 U	134 U				30000 U	800 U		1000 U

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER											
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD52	13SD53	13SD53	13SD54	13SD55	13SD55	13SD56	13SD57	13SD59	13SD59	13SD60
SAMPLE NUMBER	13SD522448	13SD530024	13SD532436	13SD540006	13SD550012	13SD551224	13SD560012	13SD570006	13SD590012	13SD591224	13SD600012
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	2 - 4	0 - 2	2 - 3	0 - 0.5	0 - 1	1 - 2	0 - 1	0 - 0.5	0 - 1	1 - 2	0 - 1
SAMPLE DATE	6/6/2006	6/6/2006	6/6/2006	6/5/2006	8/25/2006	8/25/2006	8/25/2006	8/24/2006	8/23/2006	8/23/2006	8/23/2006
AROCLOR-1221	237 U	12 U	118 U	134 U				30000 U	800 U		1000 U
AROCLOR-1232	237 U	12 U	118 U	134 U				30000 U	800 U		1000 U
AROCLOR-1242	237 U	12 U	118 U	134 U				30000 U	800 U		1000 U
AROCLOR-1248	2400	17000 J	1300 J	1100				36000 J	2700 J		12000 J
AROCLOR-1254	237 U	12 U	118 U	134 U				30000 U	800 U		1000 U
AROCLOR-1260	237 U	12 U	118 U	134 U				30000 U	800 U		1000 U
Petroleum Hydrocarbons (mg/kg)											
DIESEL RANGE ORGANICS	3.23 U										
GASOLINE RANGE ORGANICS	3.23 U										
OIL RANGE ORGANICS (C24-C40)	12.9 U										
Field PCB Results (mg/kg)											
TOTAL PCBS AS AROCLOR-1254					0.5 U	0.5 U	0.5 U	3.47	0.64	0.5 U	3.95
Inorganics (mg/kg)											
ALUMINUM											
ANTIMONY											
ARSENIC											
BARIUM											
BERYLLIUM											
CADMIUM											
CALCIUM											
CHROMIUM											
COBALT											
COPPER											
IRON											
LEAD											
LITHIUM											
MAGNESIUM											
MANGANESE											
MERCURY											
NICKEL											
POTASSIUM											
SELENIUM											
SILVER											
SODIUM											
STRONTIUM											
THALLIUM											
TIN											
TITANIUM											
VANADIUM											
ZINC											
AVS/SEM Parameters (UMO/G)											
ACID VOLATILE SULFIDE, SEM											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER											
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD52	13SD53	13SD53	13SD54	13SD55	13SD55	13SD56	13SD57	13SD59	13SD59	13SD60
SAMPLE NUMBER	13SD522448	13SD530024	13SD532436	13SD540006	13SD550012	13SD551224	13SD560012	13SD570006	13SD590012	13SD591224	13SD600012
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	2 - 4	0 - 2	2 - 3	0 - 0.5	0 - 1	1 - 2	0 - 1	0 - 0.5	0 - 1	1 - 2	0 - 1
SAMPLE DATE	6/6/2006	6/6/2006	6/6/2006	6/5/2006	8/25/2006	8/25/2006	8/25/2006	8/24/2006	8/23/2006	8/23/2006	8/23/2006
CADMIUM, SEM											
COPPER, SEM											
LEAD, SEM											
MERCURY, SEM											
NICKEL, SEM											
SEM/AVS, SEM (S.U.)											
ZINC, SEM											
Miscellaneous Parameters											
CATION EXCHANGE CAPACITY (MEQ/1)											
PH (S.U.)											
TOTAL ORGANIC CARBON (mg/kg)											

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER												
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD60	13SD61	13SD62	13SD62	13SD63	13SD63	13SD63	13SD64	13SD64	13SD64	13SD65	13SD65
SAMPLE NUMBER	13SD601224	13SD610012	13SD620012	13SD621224	13SD630006	13SD630612	13SD631224	13SD640006	13SD640612	13SD641224	13SD650006	13SD650612
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 1	0 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1
SAMPLE DATE	8/23/2006	8/24/2006	8/24/2006	8/24/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006
Semivolatile Organics (ug/kg)												
1,2,4,5-TETRACHLOROBENZENE												
1,2,4-TRICHLOROBENZENE												
1,2-DICHLOROBENZENE												
1,3-DICHLOROBENZENE												
1,4-DICHLOROBENZENE												
1,4-NAPHTHOQUINONE												
1,4-PHENYLENEDIAMINE												
1-NAPHTHYLAMINE												
2,2'-OXYBIS(1-CHLOROPROPANE)												
2,3,4,6-TETRACHLOROPHENOL												
2,4,5-TRICHLOROPHENOL												
2,4,6-TRICHLOROPHENOL												
2,4-DICHLOROPHENOL												
2,4-DIMETHYLPHENOL												
2,4-DINITROPHENOL												
2,6-DICHLOROPHENOL												
2-ACETYLAMINOFLUORENE												
2-CHLORONAPHTHALENE												
2-CHLOROPHENOL												
2-METHYLNAPHTHALENE												
2-METHYLPHENOL												
2-NAPHTHYLAMINE												
2-NITROANILINE												
2-NITROPHENOL												
2-PICOLINE												
3&4-METHYLPHENOL												
3,3'-DICHLOROBENZIDINE												
3,3'-DIMETHYLBENZIDINE												
3-METHYLCHOLANTHRENE												
3-NITROANILINE												
4,6-DINITRO-2-METHYLPHENOL												
4-AMINOBIPHENYL												
4-BROMOPHENYL PHENYL ETHER												
4-CHLORO-3-METHYLPHENOL												
4-CHLOROANILINE												
4-CHLOROPHENYL PHENYL ETHER												
4-NITROANILINE												
4-NITROPHENOL												
4-NITROQUINOLINE-1-OXIDE												
5-NITRO-O-TOLUIDINE												
7,12-DIMETHYLBENZ(A)ANTHRACENE												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER												
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD60	13SD61	13SD62	13SD62	13SD63	13SD63	13SD63	13SD64	13SD64	13SD64	13SD65	13SD65
SAMPLE NUMBER	13SD601224	13SD610012	13SD620012	13SD621224	13SD630006	13SD630612	13SD631224	13SD640006	13SD640612	13SD641224	13SD650006	13SD650612
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 1	0 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1
SAMPLE DATE	8/23/2006	8/24/2006	8/24/2006	8/24/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006
A,A-DIMETHYLPHENETHYLAMINE												
ACENAPHTHENE												
ACENAPHTHYLENE												
ACETOPHENONE												
ANILINE												
ANTHRACENE												
ARAMITE												
BENZO(A)ANTHRACENE												
BENZO(A)PYRENE												
BENZO(B)FLUORANTHENE												
BENZO(G,H,I)PERYLENE												
BENZO(K)FLUORANTHENE												
BENZYL ALCOHOL												
BIS(2-CHLOROETHOXY)METHANE												
BIS(2-CHLOROETHYL)ETHER												
BIS(2-ETHYLHEXYL)PHTHALATE												
BUTYL BENZYL PHTHALATE												
CHLOROBENZILATE												
CHRYSENE												
DI-N-BUTYL PHTHALATE												
DI-N-OCTYL PHTHALATE												
DIALLATE												
DIBENZO(A,H)ANTHRACENE												
DIBENZOFURAN												
DIETHYL PHTHALATE												
DIMETHYL PHTHALATE												
DIPHENYLAMINE												
ETHYL METHANE SULFONATE												
FLUORANTHENE												
FLUORENE												
HEXACHLOROBENZENE												
HEXACHLOROBUTADIENE												
HEXACHLOROCYCLOPENTADIENE												
HEXACHLOROETHANE												
HEXACHLOROPROPENE												
INDENO(1,2,3-CD)PYRENE												
ISODRIN												
ISOPHORONE												
ISOSAFROLE												
KEPONE												
METHAPYRILENE												
METHYL METHANE SULFONATE												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER												
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD60	13SD61	13SD62	13SD62	13SD63	13SD63	13SD63	13SD64	13SD64	13SD64	13SD65	13SD65
SAMPLE NUMBER	13SD601224	13SD610012	13SD620012	13SD621224	13SD630006	13SD630612	13SD631224	13SD640006	13SD640612	13SD641224	13SD650006	13SD650612
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 1	0 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1
SAMPLE DATE	8/23/2006	8/24/2006	8/24/2006	8/24/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006
N-NITROSO-DI-N-BUTYLAMINE												
N-NITROSO-DI-N-PROPYLAMINE												
N-NITROSODIETHYLAMINE												
N-NITROSODIMETHYLAMINE												
N-NITROSOMETHYLETHYLAMINE												
N-NITROSOMORPHOLINE												
N-NITROSOPIPERIDINE												
N-NITROSOPYRROLIDINE												
NAPHTHALENE												
O,O,O-TRIETHYL PHOSPHOROTHIOATE												
O-TOLUIDINE												
P-(DIMETHYLAMINO)AZOBENZENE												
PENTACHLOROBENZENE												
PENTACHLOROETHANE												
PENTACHLORONITROBENZENE												
PHENACETIN												
PHENANTHRENE												
PHENOL												
PRONAMIDE												
PYRENE												
PYRIDINE												
SAFROLE												
Energetics (mg/kg)												
1,3,5-TRINITROBENZENE												
1,3-DINITROBENZENE												
2,4,6-TRINITROTOLUENE												
2,4-DINITROTOLUENE												
2,6-DINITROTOLUENE												
2-AMINO-4,6-DINITROTOLUENE												
2-NITROTOLUENE												
3-NITROTOLUENE												
4-AMINO-2,6-DINITROTOLUENE												
4-NITROTOLUENE												
HMX												
NITROBENZENE												
RDX												
TETRYL												
Herbicides (ug/kg)												
HEXACHLOROPHENE												
PENTACHLOROPHENOL												
PCBs (ug/kg)												
AROCLOR-1016			11 UJ	11 UJ	190 U			3900 U				

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER												
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD60	13SD61	13SD62	13SD62	13SD63	13SD63	13SD63	13SD64	13SD64	13SD64	13SD65	13SD65
SAMPLE NUMBER	13SD601224	13SD610012	13SD620012	13SD621224	13SD630006	13SD630612	13SD631224	13SD640006	13SD640612	13SD641224	13SD650006	13SD650612
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 1	0 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1
SAMPLE DATE	8/23/2006	8/24/2006	8/24/2006	8/24/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006
AROCLOR-1221			11 UJ	11 UJ	190 U			3900 U				
AROCLOR-1232			11 UJ	11 UJ	190 U			3900 U				
AROCLOR-1242			11 UJ	11 UJ	190 U			3900 U				
AROCLOR-1248			23 J	11 UJ	470 J			17000 J				
AROCLOR-1254			11 UJ	11 UJ	190 U			3900 U				
AROCLOR-1260			11 UJ	11 UJ	190 U			3900 U				
Petroleum Hydrocarbons (mg/kg)												
DIESEL RANGE ORGANICS												
GASOLINE RANGE ORGANICS												
OIL RANGE ORGANICS (C24-C40)												
Field PCB Results (mg/kg)												
TOTAL PCBS AS AROCLOR-1254	0.5 U	0.5 U	0.5 U	0.02 J	0.5 U	0.5 U	0.5 U	3.45	0.5 U	0.5 U	0.5 U	0.5 U
Inorganics (mg/kg)												
ALUMINUM												
ANTIMONY												
ARSENIC												
BARIUM												
BERYLLIUM												
CADMIUM												
CALCIUM												
CHROMIUM												
COBALT												
COPPER												
IRON												
LEAD												
LITHIUM												
MAGNESIUM												
MANGANESE												
MERCURY												
NICKEL												
POTASSIUM												
SELENIUM												
SILVER												
SODIUM												
STRONTIUM												
THALLIUM												
TIN												
TITANIUM												
VANADIUM												
ZINC												
AVS/SEM Parameters (UMO/G)												
ACID VOLATILE SULFIDE, SEM												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER												
SAMPLING ROUND	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB	PCB
LOCATION	13SD60	13SD61	13SD62	13SD62	13SD63	13SD63	13SD63	13SD64	13SD64	13SD64	13SD65	13SD65
SAMPLE NUMBER	13SD601224	13SD610012	13SD620012	13SD621224	13SD630006	13SD630612	13SD631224	13SD640006	13SD640612	13SD641224	13SD650006	13SD650612
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 1	0 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1	1 - 2	0 - 0.5	0.5 - 1
SAMPLE DATE	8/23/2006	8/24/2006	8/24/2006	8/24/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006	8/26/2006
CADMIUM, SEM												
COPPER, SEM												
LEAD, SEM												
MERCURY, SEM												
NICKEL, SEM												
SEM/AVS, SEM (S.U.)												
ZINC, SEM												
Miscellaneous Parameters												
CATION EXCHANGE CAPACITY (MEQ/1)												
PH (S.U.)												
TOTAL ORGANIC CARBON (mg/kg)												

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER				
SAMPLING ROUND	PCB	PCB	PCB	PCB
LOCATION	13SD65	13SD66	13SD67	13SD68
SAMPLE NUMBER	13SD651224	13SD660006	13SD670006	13SD680006
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5
SAMPLE DATE	8/26/2006	8/27/2006	8/28/2006	8/28/2006
Semivolatile Organics (ug/kg)				
1,2,4,5-TETRACHLOROBENZENE				
1,2,4-TRICHLOROBENZENE				
1,2-DICHLOROBENZENE				
1,3-DICHLOROBENZENE				
1,4-DICHLOROBENZENE				
1,4-NAPHTHOQUINONE				
1,4-PHENYLENEDIAMINE				
1-NAPHTHYLAMINE				
2,2'-OXYBIS(1-CHLOROPROPANE)				
2,3,4,6-TETRACHLOROPHENOL				
2,4,5-TRICHLOROPHENOL				
2,4,6-TRICHLOROPHENOL				
2,4-DICHLOROPHENOL				
2,4-DIMETHYLPHENOL				
2,4-DINITROPHENOL				
2,6-DICHLOROPHENOL				
2-ACETYLAMINOFLUORENE				
2-CHLORONAPHTHALENE				
2-CHLOROPHENOL				
2-METHYLNAPHTHALENE				
2-METHYLPHENOL				
2-NAPHTHYLAMINE				
2-NITROANILINE				
2-NITROPHENOL				
2-PICOLINE				
3&4-METHYLPHENOL				
3,3'-DICHLOROBENZIDINE				
3,3'-DIMETHYLBENZIDINE				
3-METHYLCHOLANTHRENE				
3-NITROANILINE				
4,6-DINITRO-2-METHYLPHENOL				
4-AMINOBIPHENYL				
4-BROMOPHENYL PHENYL ETHER				
4-CHLORO-3-METHYLPHENOL				
4-CHLOROANILINE				
4-CHLOROPHENYL PHENYL ETHER				
4-NITROANILINE				
4-NITROPHENOL				
4-NITROQUINOLINE-1-OXIDE				
5-NITRO-O-TOLUIDINE				
7,12-DIMETHYLBENZ(A)ANTHRACENE				

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER				
SAMPLING ROUND	PCB	PCB	PCB	PCB
LOCATION	13SD65	13SD66	13SD67	13SD68
SAMPLE NUMBER	13SD651224	13SD660006	13SD670006	13SD680006
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5
SAMPLE DATE	8/26/2006	8/27/2006	8/28/2006	8/28/2006
A,A-DIMETHYLPHENETHYLAMINE				
ACENAPHTHENE				
ACENAPHTHYLENE				
ACETOPHENONE				
ANILINE				
ANTHRACENE				
ARAMITE				
BENZO(A)ANTHRACENE				
BENZO(A)PYRENE				
BENZO(B)FLUORANTHENE				
BENZO(G,H,I)PERYLENE				
BENZO(K)FLUORANTHENE				
BENZYL ALCOHOL				
BIS(2-CHLOROETHOXY)METHANE				
BIS(2-CHLOROETHYL)ETHER				
BIS(2-ETHYLHEXYL)PHTHALATE				
BUTYL BENZYL PHTHALATE				
CHLOROBENZILATE				
CHRYSENE				
DI-N-BUTYL PHTHALATE				
DI-N-OCTYL PHTHALATE				
DIALLATE				
DIBENZO(A,H)ANTHRACENE				
DIBENZOFURAN				
DIETHYL PHTHALATE				
DIMETHYL PHTHALATE				
DIPHENYLAMINE				
ETHYL METHANE SULFONATE				
FLUORANTHENE				
FLUORENE				
HEXACHLOROBENZENE				
HEXACHLOROBUTADIENE				
HEXACHLOROCYCLOPENTADIENE				
HEXACHLOROETHANE				
HEXACHLOROPROPENE				
INDENO(1,2,3-CD)PYRENE				
ISODRIN				
ISOPHORONE				
ISOSAFROLE				
KEPONE				
METHAPYRILENE				
METHYL METHANE SULFONATE				

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER				
SAMPLING ROUND	PCB	PCB	PCB	PCB
LOCATION	13SD65	13SD66	13SD67	13SD68
SAMPLE NUMBER	13SD651224	13SD660006	13SD670006	13SD680006
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5
SAMPLE DATE	8/26/2006	8/27/2006	8/28/2006	8/28/2006
N-NITROSO-DI-N-BUTYLAMINE				
N-NITROSO-DI-N-PROPYLAMINE				
N-NITROSODIETHYLAMINE				
N-NITROSODIMETHYLAMINE				
N-NITROSOMETHYLETHYLAMINE				
N-NITROSOMORPHOLINE				
N-NITROSOPIPERIDINE				
N-NITROSOPYRROLIDINE				
NAPHTHALENE				
O,O,O-TRIETHYL PHOSPHOROTHIOATE				
O-TOLUIDINE				
P-(DIMETHYLAMINO)AZOBENZENE				
PENTACHLOROBENZENE				
PENTACHLOROETHANE				
PENTACHLORONITROBENZENE				
PHENACETIN				
PHENANTHRENE				
PHENOL				
PRONAMIDE				
PYRENE				
PYRIDINE				
SAFROLE				
Energetics (mg/kg)				
1,3,5-TRINITROBENZENE				
1,3-DINITROBENZENE				
2,4,6-TRINITROTOLUENE				
2,4-DINITROTOLUENE				
2,6-DINITROTOLUENE				
2-AMINO-4,6-DINITROTOLUENE				
2-NITROTOLUENE				
3-NITROTOLUENE				
4-AMINO-2,6-DINITROTOLUENE				
4-NITROTOLUENE				
HMX				
NITROBENZENE				
RDX				
TETRYL				
Herbicides (ug/kg)				
HEXACHLOROPHENE				
PENTACHLOROPHENOL				
PCBs (ug/kg)				
AROCLOR-1016		4000 U		

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER				
SAMPLING ROUND	PCB	PCB	PCB	PCB
LOCATION	13SD65	13SD66	13SD67	13SD68
SAMPLE NUMBER	13SD651224	13SD660006	13SD670006	13SD680006
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5
SAMPLE DATE	8/26/2006	8/27/2006	8/28/2006	8/28/2006
AROCLOR-1221		4000 U		
AROCLOR-1232		4000 U		
AROCLOR-1242		4000 U		
AROCLOR-1248		7700 J		
AROCLOR-1254		4000 U		
AROCLOR-1260		4000 U		
Petroleum Hydrocarbons (mg/kg)				
DIESEL RANGE ORGANICS				
GASOLINE RANGE ORGANICS				
OIL RANGE ORGANICS (C24-C40)				
Field PCB Results (mg/kg)				
TOTAL PCBS AS AROCLOR-1254	0.5 U	1.15	0.31 J	0.18 J
Inorganics (mg/kg)				
ALUMINUM				
ANTIMONY				
ARSENIC				
BARIUM				
BERYLLIUM				
CADMIUM				
CALCIUM				
CHROMIUM				
COBALT				
COPPER				
IRON				
LEAD				
LITHIUM				
MAGNESIUM				
MANGANESE				
MERCURY				
NICKEL				
POTASSIUM				
SELENIUM				
SILVER				
SODIUM				
STRONTIUM				
THALLIUM				
TIN				
TITANIUM				
VANADIUM				
ZINC				
AVS/SEM Parameters (UMO/G)				
ACID VOLATILE SULFIDE, SEM				

TABLE G-4

SUMMARY OF ANALYTIC RESULTS
SEDIMENT SAMPLES ROUNDS 1 THROUGH 3, ROUND 5, AND PCB DELINEATION
SWMU 13 (MINE FILL B)
NSWC CRANE
CRANE, INDIANA

STREAM ORDER				
SAMPLING ROUND	PCB	PCB	PCB	PCB
LOCATION	13SD65	13SD66	13SD67	13SD68
SAMPLE NUMBER	13SD651224	13SD660006	13SD670006	13SD680006
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL
DEPTH RANGE	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5
SAMPLE DATE	8/26/2006	8/27/2006	8/28/2006	8/28/2006
CADMIUM, SEM				
COPPER, SEM				
LEAD, SEM				
MERCURY, SEM				
NICKEL, SEM				
SEM/AVS, SEM (S.U.)				
ZINC, SEM				
Miscellaneous Parameters				
CATION EXCHANGE CAPACITY (MEQ/1)				
PH (S.U.)				
TOTAL ORGANIC CARBON (mg/kg)				

APPENDIX TABLE G-5
RESULTS FOR CHEMICALS ANALYZED IN ALL SUMP SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Sampling Round Location Sample Number Sample Code Sample Date	02 08SU001 08SU00101 ORIG 6/7/2005	02 08SU001 08SU00101-D DUP 6/7/2005	02 08SU001 08SU00101-F NORMAL 6/7/2005
Volatile Organics (ug/L)			
1,1,1,2-TETRACHLOROETHANE	0.3 U		
1,1,1-TRICHLOROETHANE	3.5		
1,1,2,2-TETRACHLOROETHANE	0.3 U		
1,1,2-TRICHLOROETHANE	0.3 U		
1,1-DICHLOROETHANE	2.7		
1,1-DICHLOROETHENE	0.3 U		
1,2,3-TRICHLOROPROPANE	0.3 U		
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U		
1,2-DIBROMOETHANE	0.3 U		
1,2-DICHLOROETHANE	0.3 U		
1,2-DICHLOROPROPANE	0.3 U		
2-BUTANONE	0.5 U		
2-HEXANONE	0.5 U		
3-CHLOROPROPENE	0.5 U		
4-METHYL-2-PENTANONE	0.5 U		
ACETONE	0.8 J		
ACETONITRILE	20 UR		
ACROLEIN	0.5 UR		
ACRYLONITRILE	0.5 U		
BENZENE	0.3 U		
BROMODICHLOROMETHANE	0.3 U		
BROMOFORM	0.3 U		
BROMOMETHANE	0.3 UJ		
CARBON DISULFIDE	0.3 U		
CARBON TETRACHLORIDE	0.3 U		
CHLOROBENZENE	0.3 U		
CHLORODIBROMOMETHANE	0.3 U		
CHLOROETHANE	1.1		
CHLOROFORM	0.3 U		
CHLOROMETHANE	0.3 U		
CHLOROPRENE	0.5 U		
CIS-1,2-DICHLOROETHENE	1.7		
CIS-1,3-DICHLOROPROPENE	0.3 U		
DIBROMOMETHANE	0.3 U		
DICHLORODIFLUOROMETHANE	0.3 UJ		
ETHYL METHACRYLATE	0.5 U		
ETHYLBENZENE	0.3 U		
ISOBUTANOL	20 UR		
METHACRYLONITRILE	0.3 U		
METHYL IODIDE	0.5 U		
METHYL METHACRYLATE	0.5 U		
METHYL TERT-BUTYL ETHER	0.5 U		
METHYLENE CHLORIDE	0.3 UJ		
PROPIONITRILE	20 UR		
STYRENE	0.3 U		
TETRACHLOROETHENE	0.3 U		
TOLUENE	0.3 U		
TOTAL XYLENES	0.3 U		
TRANS-1,2-DICHLOROETHENE	0.3 U		
TRANS-1,3-DICHLOROPROPENE	0.3 U		
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U		
TRICHLOROETHENE	1.4		
TRICHLOROFLUOROMETHANE	0.3 U		
VINYL ACETATE	0.5 U		
VINYL CHLORIDE	0.3 U		
Semivolatile Organics (ug/L)			
1,2,4,5-TETRACHLOROBENZENE	1.03 U		
1,2,4-TRICHLOROBENZENE	1.03 U		
1,2-DICHLOROBENZENE	1.03 U		
1,3-DICHLOROBENZENE	1.03 U		
1,4-DICHLOROBENZENE	1.03 U		
1,4-DIOXANE	2 J		
1,4-NAPHTHOQUINONE	1.03 U		
1,4-PHENYLENEDIAMINE	1.03 U		

APPENDIX TABLE G-5
RESULTS FOR CHEMICALS ANALYZED IN ALL SUMP SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Sampling Round	02	02	02
Location	08SU001	08SU001	08SU001
Sample Number	08SU00101	08SU00101-D	08SU00101-F
Sample Code	ORIG	DUP	NORMAL
Sample Date	6/7/2005	6/7/2005	6/7/2005
1-NAPHTHYLAMINE	1.03 U		
2,2'-OXYBIS(1-CHLOROPROPANE)	1.03 U		
2,3,4,6-TETRACHLOROPHENOL	1.03 U		
2,4,5-TRICHLOROPHENOL	1.03 U		
2,4,6-TRICHLOROPHENOL	1.03 U		
2,4-DICHLOROPHENOL	1.03 U		
2,4-DIMETHYLPHENOL	1.03 U		
2,4-DINITROPHENOL	1.03 U		
2,6-DICHLOROPHENOL	1.03 U		
2-ACETYLAMINOFLUORENE	1.03 U		
2-CHLORONAPHTHALENE	1.03 U		
2-CHLOROPHENOL	1.03 U		
2-METHYLPHENOL	1.03 U		
2-NAPHTHYLAMINE	1.03 U		
2-NITROANILINE	1.03 U		
2-NITROPHENOL	1.03 U		
2-PICOLINE	1.03 U		
3&4-METHYLPHENOL	1.03 U		
3,3'-DICHLOROBENZIDINE	1.03 U		
3,3'-DIMETHYLBENZIDINE	1.03 U		
3-METHYLCHOLANTHRENE	1.03 U		
3-NITROANILINE	1.03 U		
4,6-DINITRO-2-METHYLPHENOL	1.03 U		
4-AMINOBIPHENYL	1.03 U		
4-BROMOPHENYL PHENYL ETHER	1.03 U		
4-CHLORO-3-METHYLPHENOL	1.03 U		
4-CHLOROANILINE	1.03 U		
4-CHLOROPHENYL PHENYL ETHER	1.03 U		
4-NITROANILINE	1.03 U		
4-NITROPHENOL	1.03 U		
4-NITROQUINOLINE-1-OXIDE	1.03 UR		
5-NITRO-O-TOLUIDINE	1.03 U		
7,12-DIMETHYLBENZ(A)ANTHRACENE	1.03 U		
A,A-DIMETHYLPHENETHYLAMINE	1.03 U		
ACETOPHENONE	1.03 U		
ANILINE	1.03 U		
ARAMITE	1.03 U		
BENZYL ALCOHOL	1.03 U		
BIS(2-CHLOROETHOXY)METHANE	1.03 U		
BIS(2-CHLOROETHYL)ETHER	1.03 U		
BIS(2-ETHYLHEXYL)PHTHALATE	2 J		
BUTYL BENZYL PHTHALATE	1.03 U		
CHLOROBENZILATE	1.03 U		
DI-N-BUTYL PHTHALATE	1.03 U		
DI-N-OCTYL PHTHALATE	1.03 U		
DIALLATE	1.03 U		
DIBENZOFURAN	1.03 U		
DIETHYL PHTHALATE	1.03 U		
DIMETHYL PHTHALATE	1.03 U		
DIPHENYLAMINE	1.03 U		
ETHYL METHANE SULFONATE	1.03 U		
HEXACHLOROBENZENE	1.03 U		
HEXACHLOROBUTADIENE	1.03 U		
HEXACHLOROCYCLOPENTADIENE	1.03 UJ		
HEXACHLOROETHANE	1.03 U		
HEXACHLOROPROPENE	1.03 U		
ISODRIN	1.03 U		
ISOPHORONE	1.03 U		
ISOSAFROLE	1.03 U		
KEPONE	1.03 UR		
METHAPYRILENE	1.03 U		
METHYL METHANE SULFONATE	1.03 U		
N-NITROSO-DI-N-BUTYLAMINE	1.03 U		
N-NITROSO-DI-N-PROPYLAMINE	1.03 U		
N-NITROSODIETHYLAMINE	1.03 U		

APPENDIX TABLE G-5
RESULTS FOR CHEMICALS ANALYZED IN ALL SUMP SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Sampling Round Location Sample Number Sample Code Sample Date	02 08SU001 08SU00101 ORIG 6/7/2005	02 08SU001 08SU00101-D DUP 6/7/2005	02 08SU001 08SU00101-F NORMAL 6/7/2005
N-NITROSODIMETHYLAMINE	1.03 U		
N-NITROSODIPHENYLAMINE	1.03 U		
N-NITROSOMETHYLETHYLAMINE	1.03 U		
N-NITROSOMORPHOLINE	1.03 U		
N-NITROSOPIPERIDINE	1.03 U		
N-NITROSOPYRROLIDINE	1.03 U		
O,O,O-TRIETHYL PHOSPHOROTHIOATE	1.03 U		
O-TOLUIDINE	1.03 U		
P-(DIMETHYLAMINO)AZOBENZENE	1.03 U		
PENTACHLOROBENZENE	1.03 U		
PENTACHLOROETHANE	1.03 U		
PENTACHLORONITROBENZENE	1.03 U		
PHENACETIN	1.03 U		
PHENOL	1.03 U		
PRONAMIDE	1.03 U		
PYRIDINE	1.03 U		
SAFROLE	1.03 U		
Total Metals (ug/L)			
ALUMINUM	25.1 U		
ANTIMONY	0.26 U		
ARSENIC	0.91 J		
BARIUM	62.1 J		
BERYLLIUM	0.02 U		
CADMIUM	0.29 J		
CALCIUM	57300 J		
CHROMIUM	0.47 J		
COBALT	0.7 J		
COPPER	3.3 U		
IRON	813		
LEAD	0.37 J		
MAGNESIUM	7080		
MANGANESE	209		
MERCURY	0.03 U		
NICKEL	1.6		
POTASSIUM	3720		
SELENIUM	0.16 J		
SILVER	0.04 U		
SODIUM	22900 J		
THALLIUM	0.11 U		
TIN	0.12 U		
VANADIUM	1.14 U		
ZINC	30.9 J		
Dissolved Metals (ug/L)			
ALUMINUM, FILTERED			8.35 U
ANTIMONY, FILTERED			0.14 U
ARSENIC, FILTERED			0.78 J
BARIUM, FILTERED			26 J
BERYLLIUM, FILTERED			0.02 U
CADMIUM, FILTERED			0.12 U
CALCIUM, FILTERED			57300 J
CHROMIUM, FILTERED			0.33 J
COBALT, FILTERED			0.73 J
COPPER, FILTERED			2.1 U
IRON, FILTERED			560
LEAD, FILTERED			0.2 J
MAGNESIUM, FILTERED			7130
MANGANESE, FILTERED			230
MERCURY, FILTERED			0.03 U
NICKEL, FILTERED			1.7
POTASSIUM, FILTERED			3710
SELENIUM, FILTERED			0.13 J
SILVER, FILTERED			0.028 U
SODIUM, FILTERED			23100 J
THALLIUM, FILTERED			0.07 U
TIN, FILTERED			0.07 U

APPENDIX TABLE G-5
RESULTS FOR CHEMICALS ANALYZED IN ALL SUMP SAMPLES
SWMU 08 (BUILDING 106 POND AREA)
NSWC CRANE
CRANE, INDIANA

Sampling Round	02	02	02
Location	08SU001	08SU001	08SU001
Sample Number	08SU00101	08SU00101-D	08SU00101-F
Sample Code	ORIG	DUP	NORMAL
Sample Date	6/7/2005	6/7/2005	6/7/2005
VANADIUM, FILTERED			1.14 U
ZINC, FILTERED			19.4 J
Miscellaneous Parameters			
TOTAL COLIFORM (CFU/100 mL)	2419.2 >	2419.2 >	

(1) - All locations are downgradient, no upgradient locations could be identified.
Data qualifiers (e.g., U, J) are defined in section 3 of the text.
ug/L - micrograms per liter
MPN - most probable number
NA - No applicable criteria

APPENDIX H

DATA QUALITY REVIEW

APPENDIX H. DATA QUALITY REVIEW AND DATA REDUCTION METHODS

This appendix contains a description of the data review processes used to determine whether analytical laboratory data were of acceptable technical quality for use in decision making. It presents interpretations of tallies of data quality indicators. Because the fourth round of data involved relatively few samples, and because it occurred toward the end of the RFI, the data were not incorporated into the data quality tallies produced for Rounds 1 through 3. Instead, the Round 4 data quality is described in text and quantitative measures of data quality are also incorporated into the text.

The data review began with data validation, which is a comparison of data quality indicators (DQIs) against prescribed acceptance criteria. The DQIs used are measures to assess the bias and precision of the analytical calibrations and sample analyses. The output of this review has a set of alphabetic flags such as "U," "J," "R," or combinations thereof, that may have been assigned to individual results based on the validation effort. These flags were used to infer the general quality of the data. The data validation was followed by a summary of quantitative data quality measures to provide the user with a more quantitative estimate of any bias or imprecision associated with the data. Also evaluated were the measures of data completeness, sensitivity, comparability and representativeness.

Sections H.1 and H.2 provide an overview of the data validation process, Section H.3 presents an evaluation of the data quality beyond data validation. Appendix G contains a printout of all qualified and unqualified data and the applicable qualifier flags.

H.1 DATA VALIDATION PROCESS

Data were generated for this RFI report in four rounds. Field analytical data and sampling location coordinates were reviewed both in the field and after completing the field event to assure data users that the results and sampling location coordinates were accurate. Calibration logs and QC check sample results were reviewed for accuracy. In addition, field data were reviewed for comparability among sampling locations and consistency with expectations. These evaluations were based, in part, on professional judgment. Well stabilization parameters were required to represent stable sampling conditions (manifested as reproducible measurements) prior to sample collection but were not required to compare well to field test kit results.

All of the TtNUS results from analytical laboratory samples were validated by TtNUS according to several specifications. Assignment of data qualification flags by TtNUS conformed to U.S. EPA Region 5 Standard Operating Procedures for Validation of Contract Laboratory Program Organic Data (U.S. EPA, 1993c); to Region 5 Standard Operating Procedures for Validation of Contract Laboratory Program

Inorganic Data (U.S. EPA, 1993d); to the U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (U.S. EPA, 1994a); and to U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (U.S. EPA, 1994b) to the greatest extent practicable for non-contract laboratory program data.

Data validation specifications require that various data qualifiers be assigned when a deficiency is detected or when a result is less than its detection limit. If no qualifier is assigned to a result that has been validated, the data user is assured that no technical deficiencies were identified during validation. The qualification flags used are defined below:

U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

UJ – Indicates that the chemical was not detected; however, the detection limit (sample-specific detection limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

UR – Indicates that the chemical may or may not be present. The non-detected analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies (i.e., holding times missed by a factor of two times the specified time limit, severe calibration non-compliances, and extremely low analyte recoveries).

R – Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies.

BU - Indicates that the associated organic chemical was detected in the affected sample as well as the associated laboratory method blank, but has been qualified as non-detected because the concentration was less than the blank level after adjustment for uncertainties (i.e., the blank action level) per the validation guidelines.

BJ - Indicates that the associated organic chemical was detected in the affected sample as well as the associated method blank and rather than being considered a non-detect, is considered to be an estimate because the concentration is in excess of the blank action level. The use of "B" qualifiers is a U.S. EPA Region 5-specific requirement.

> - Indicates that the true value is probably greater than the reported value. This "qualifier flag" is used to identify reported values that exceed the calibration range of field measurements but could not be re-analyzed for various reasons. This qualifier is used for field data and laboratory coliform data only.

The preceding data qualifiers may be categorized as indicative of major or minor problems. Major problems are defined as deficiencies that result in the rejection of data and qualification with UR or R data validation qualifiers. These data are not used for risk assessment decision making purposes unless they are used in a qualitative way and the use is justified and documented. Minor problems are defined as deficiencies resulting in the estimation of data, and qualification with U, J, B, BJ, BU, and UJ data validation qualifiers. Estimated analytical results are considered to be suitable for all decision-making purposes unless the data use requirements are very stringent and the qualifier indicates a deficiency that is incompatible with the intended data use. It is noteworthy that a U qualifier does not necessarily indicate that a data deficiency exists because all non-detect values are flagged with the U qualifier regardless of whether a quality deficiency has been detected.

H.2 DATA VALIDATION OUTPUTS

After data were validated, a list was developed of non-conformities requiring data qualifier flags that were used to alert the data user to inaccurate or imprecise data. For situations in which several QC criteria were out of specification, the data validator made professional judgments and/or comments on the validity of the overall data package. The reviewer then prepared a technical memorandum presenting qualification of the data, if necessary, and the rationale for making such qualifications. The net result was a data package that had been carefully reviewed for its adherence to prescribed technical requirements. Validators incorporated data qualifiers into the electronic database and submitted the information to the data management group. A complete printout of the data with validation flags is presented in Appendix G. Pertinent quality estimates are summarized in a more quantitative format in the following section.

H.3 GENERAL DATA QUALITY REVIEW

The data quality was generally satisfactory except for a major discrepancy between original and field duplicate VOC results at soil boring 08SB51 during the Round 4 (October 2006) sampling. Some phenols that were not detected at the site had data quality indicators with an extremely low bias. The sit, however, was not necessarily expected to have been contaminated with phenols and no phenols

unaffected by the extreme low bias were detected. Hence, this extreme poor performance for a few phenols was viewed to be an anomaly and of little significance.

Two Building 106 Pond sediment samples (08SD004010006 and 08SD005010006) in the 0- to 6-inch depth interval were not collected as designated in the QAPP. Instead, those samples were combined with the 6 to 12 inch dept interval to yield a single sample spanning the 0 to 12-inch interval at each of the two designated locations. This is not viewed as a deficiency because the samples that were collected (08SD004010012 and 08SD0050100012) were adequately representative of sediment conditions in the Building 106 Pond. Therefore, for completeness tallies, the original intent to collect tow separate depth intervals within the 0 to 12-inch depth was ignored.

Sample 08SL001010006 also was not collected and is not included in the completeness tallies for sampling rounds 1 through 3. This sump sediment sample could not be collected because there was no sediment in the designated sump. No sump samples were collected in Round 4. Table 2-3 lists the samples collected during each sampling round. Overall data quality is summarized in Section 3.0. A more detailed accounting of data quality is provided below. The data quality indicators are discussed in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity. Within each of these categories individual performance for analytical fractions in aqueous and solid sample matrices are described, when appropriate.

H.3.1 Completeness

Completeness is a measure of the number of valid samples or measurements that are available relative to the number of samples or measurements that were intended to be generated. For this project, completeness was measured on three different bases: samples collected, field measurements, and laboratory measurements.

- Sample collection completeness was a measure of the usable samples collected as compared to those intended to be collected.

- Field measurement completeness was a measure of the usable field measurements made relative to those intended to be made.

- Laboratory measurement completeness was a measure of the amount of usable, valid laboratory measurements per matrix obtained for each target analyte.

Usable, valid samples (or results) were those judged, after data assessment, to represent the sampling populations and to have not been disqualified for use through data validation or additional data review. The total number of samples (or results) planned to be collected or generated are those listed in the SWMU 15 QAPP (TtNUS, 2004). Completeness was determined using the following equation:

$$\%C = \frac{V}{T} \times 100$$

where %C = percent completeness
V = number of samples (or results) determined to be valid
T = total number of planned samples (or results)

H.3.1.1 Sample Collection Completeness

Table H-1 compares the samples collected and analyzed to the samples proposed for collection and analysis for all samples collected prior to 2006. The tallies are presented for each analytical fraction and in some cases for individual parameters. The numerators represent samples for which results were generated; the denominators represent total numbers of samples that should have been analyzed, based on the QAPP (TtNUS, 2004). Two different tallies are presented. The tally incorporates all samples scheduled for collection except samples explicitly identified in Section H.3, discretionary samples, and soil samples that could not be collected because refusal was encountered. The discretionary samples include those samples scheduled as extract and hold "E&H" in the QAPP (TtNUS, 2004). There can be no risk from exposure to soil where soil does not exist and the decision not to analyze select E&H samples is an indication that the analyses were not needed. Therefore, the exclusion of those samples is not considered to be a deficiency. The second tally excludes the same samples excluded for Part I of the table, as well as surface water samples that could not be collected because drainage channels were dry, or groundwater samples that could not be collected because wells did not produce enough water for sampling. While these samples could not be collected under sampling conditions in effect at the time of sampling, it might be possible to collect samples at the designated locations under different conditions.

Table H-1 was divided this way because, depending on the data use, a lack of data may be considered to be a deficiency or not. In particular, having no data at intended locations may encumber the delineation of the extent of contamination and to assess risks, yet, if surface water, for example, was not present, this is an indication that exposure potential may not be as significant as it would if water were more prevalent at the intended sampling locations. Furthermore, sediments, which act as contamination accumulators can serve as surrogates for surface water when evaluating the extent of contamination. Samples that

were filtered because turbidity exceeded 10 nephelometric turbidity units (NTUs) were included in the collected samples tally.

A significant deviation from the intended sampling scheme occurred for coliform analyses in the surface water, sump and seep samples but the deviation turned out not to have a negative impact on the project. A sewer-like odor was detected in the sump near the pond. Therefore, fecal coliform analysis was intended for four Round 1 groundwater samples plus a field duplicate, a Round 2 sump water sample plus field duplicate, four Round 2 seep water samples plus field duplicate, and a Round 2 sump sediment sample. In Round 1 fecal coliform analyses were requested, as intended, for the groundwater samples. In Round 2, however, total coliform analyses were requested instead of fecal coliform analyses. Fecal coliforms is a subset of total coliforms so the results, while related, are not comparable and can not be interconverted. A sanitary sewer break upgradient of the Building 106 pond was later discovered to have been the source of the odor. The sewer had been fixed before the sampling events. Because the sewer break is independent of the Building 106 or 107 military operations, the failure to analyze the Round 2 samples for fecal rather than total coliforms had not consequence to the project.

The attainment of the 90 percent completeness goal varies with the way the tallies are done. The first tally yields a lesser frequency of attaining the 90 percent goal because it considers surface water and well water samples that could not be collected to be data gaps. The second tally is more forgiving and does not consider the uncollected surface water and groundwater samples to be data gaps. The differences in the way the tallies are generated must be considered when an interpreting the data. The actual percent complete will have varying degrees of effect depending on the data use and the lack of data in select locations must be considered when evaluating the data.

The scheduled 2006 samples were collected as planned unless the material to be sampled was not available. This occurred when bedrock was shallower than the scheduled sampling interval and at soil borings where water was not available at the bedrock-overburden interface. Therefore sample collection completeness for the 2006 VOC samples is 100 percent. All scheduled analyses were performed on the samples that were collected. Soil boring 08GWTW12, however, yielded only enough water to perform the VOC analyses and the scheduled SVOC analyses were not performed.

H.3.1.2 Field Measurement Completeness

The percent completeness for field measurements, including well stabilization measurements, was 100.

H.3.1.3 Laboratory Measurement Completeness

Under ideal conditions, the laboratory completeness objective would be 100 percent. That is, 100 percent of all results would be valid for all samples analyzed. However, samples can be rendered unusable during shipping and preparation (e.g., bottles broken or extracts accidentally destroyed) or analysis (e.g., loss of instrument sensitivity, strong matrix effects). Some results are rejected during data validation because of serious quality deficiencies. Some compounds, in particular, consistently exhibited low analytical response factors. This indicates that the analytical sensitivity is low for these compounds. The laboratory completeness objective was 90 percent. This objective was satisfied for each analytical fraction, however, the analytical fraction typically comprises many analytes. Therefore, it is possible to meet this objective while the number of valid results per analyte may not meet this objective. Table H-2 presents a summary of percent completeness for all analytical fractions.

Several analytical results were rejected in all sampling rounds. The same organic compounds were consistently rejected in several samples across multiple matrices, although not all results for these parameters were necessarily rejected in each matrix (See Table H-3) or each sampling round. Explosives compounds, 3-nitroluene, HMX, and RDX were rejected only in aqueous field blanks. The matrix below summarizes whether a particular compound was rejected in aqueous or solid matrices. An "X" indicates that at least one result for a parameter was rejected in the indicated matrix.

Parameter	Aqueous	Solid
2,3,4,6-TETRACHLOROPHENOL	X	
2,4,5-TRICHLOROPHENOL	X	
2,4,6-TRICHLOROPHENOL	X	
2,4-DICHLOROPHENOL	X	
2,4-DIMETHYLPHENOL	X	X
2,4-DINITROPHENOL	X	
2,6-DICHLOROPHENOL	X	
2-CHLOROPHENOL	X	
2-METHYLPHENOL	X	
2-NITROPHENOL	X	
3&4-METHYLPHENOL	X	
3-NITROTOLUENE	X	
3,3'-DICHLOROBENZIDINE		X
4,6-DINITRO-2-METHYLPHENOL	X	
4-CHLORO-3-METHYLPHENOL	X	
4-CHLOROANILINE		X
4-NITROPHENOL	X	
4-NITROQUINOLINE-1-OXIDE	X	X
ACETONE		X
ACETONITRILE	X	X
ACROLEIN	X	X
DICHLORODIFLUOROMETHANE		X
HMX	X	
ISOBUTANOL	X	X
KEPONE	X	X
PHENOL	X	
PROPIONITRILE	X	X
RDX	X	

Aside from the phenolic compounds the compounds in the list above are of little potential importance to this project and therefore represent little negative impact to the project by having been rejected. Furthermore, relatively few rejections were identified compared to the number of results generated and the completeness goal was met for all analytes in all matrices (soil, surface water, sump water, sediment, and groundwater) and for all analytical fractions, despite the rejections. The phenolic compounds are

more significant because there are so many similar compounds that were rejected. Whereas these compounds may not have been used a SWMU 8, the frequent inability to recover the phenolic compounds lessens that confidence with which failure to detect those compounds can be used as an indication that the compounds are not present.

Table H-3 lists all rejected results and the reasons for rejection in pre-October 2006 sampling. In October 20006, acrolein results were rejected in every soil and groundwater sample that was collected. Benzoic acid, kepone, and 4-nitroquinoline-1-oxide were rejected in every groundwater sample. No other results were rejected in Round 4. The lack of a significant amount of phenolic compound results must be considered when evaluating the data. The matrix below shows the total number of results the number of rejections, and the percent of results rejected for aqueous and solid matrices for pre-October 2006 results. October 2006 results were not included because of the limited number of rejections and limited number of samples involved. The completeness rate is 0 percent for acrolein, benzoic acid, kepone, and 4-nitroquinoline-1-oxide in October 2006 samples. Because the number of analytes is high in the VOC and SVOC fractions, however, the overall completeness rate is 98 percent for Round 4 based on number of results obtained relative to number planned for collected samples.

		SVOC			VOC		
Parameter	Matrix	Results	Rejects	Percent Rejected	Results	Rejects	Percent Rejected
2,3,4,6-TETRACHLOROPHENOL	Aqueous	27	3	11.1			
2,4,5-TRICHLOROPHENOL	Aqueous	27	3	11.1			
2,4,6-TRICHLOROPHENOL	Aqueous	27	3	11.1			
2,4-DICHLOROPHENOL	Aqueous	27	3	11.1			
2,4-DIMETHYLPHENOL	Aqueous	27	3	11.1			
	Solid	56	1	1.8			
2,4-DINITROPHENOL	Aqueous	27	14	51.9			
2,6-DICHLOROPHENOL	Aqueous	27	3	11.1			
2-CHLOROPHENOL	Aqueous	27	3	11.1			
2-METHYLPHENOL	Aqueous	27	3	11.1			
2-NITROPHENOL	Aqueous	27	3	11.1			
3&4-METHYLPHENOL	Aqueous	24	3	12.5			
3,3'-DICHLOROBENZIDINE	Solid	56	2	3.6			
4,6-DINITRO-2-METHYLPHENOL	Aqueous	27	3	11.1			
4-CHLORO-3-METHYLPHENOL	Aqueous	27	3	11.1			
4-CHLOROANILINE	Solid	56	2	3.6			
4-NITROPHENOL	Aqueous	27	4	14.8			
4-NITROQUINOLINE-1-OXIDE	Aqueous	27	27	100.0			
	Solid	56	56	100.0			
ACETONE	Solid				132	12	9.1
ACETONITRILE	Aqueous				92	92	100.0
	Solid				113	113	100.0
ACROLEIN	Aqueous				92	92	100.0
	Solid				113	113	100.0
DICHLORODIFLUOROMETHANE	Solid				132	16	12.1
ISOBUTANOL	Aqueous				92	92	100.0
	Solid				113	113	100.0
KEPONE	Aqueous	27	12	44.4			
	Solid	56	30	53.6			
PHENOL	Aqueous	25	3	12.0			
PROPIONITRILE	Aqueous				92	92	100.0
	Solid				113	113	100.0

H.3.2 Sensitivity

For pre-October 2006 data, Tables H-4 through H-9 display a comparison of the observed minimum and maximum non-detect values during laboratory analyses to the target laboratory reporting limits contained in Table 1-5 of the SWMU 8 QAPP (TtNUS, 2004) for soil, sediment, surface water, sump water, groundwater, and seep water, respectively. Sensitivity in October of 2006 was comparable to the sensitivity observed previously and is not discussed further.

At the outset of the project, it was known that the concentrations of several chemicals could not be measured at concentrations that were as low as the RBTLs; however, the analytical methods selected are standard methods used throughout the environmental industry. Development of methods with greater sensitivity was not practicable nor was it required for the chemicals of primary interest (e.g., PAHs, pesticides, and other potentially site-related parameters such as metals). Yellow (or gray, if printed in black and white) highlight in the tables indicates those parameters for which at least one non-detect value exceeded the RBTL or the laboratory TV or RL. Although many analytical fractions had at least one such exceedance, most nondetected results were less than the target limits and in many cases, non-detect values that exceeded the target limits were within three to four times the limit or the detection limit can not reasonably be reduced.

To understand the impact of not having achieved RBTLs, it is important to understand the convention used for reporting non-detect values. Concentrations of organic analytes that were less than their MDLs were reported as the threshold value (not the MDL) followed by a "U" qualifier. The threshold values were generally less than typical laboratory reporting limits, but were typically greater than MDLs. This convention was used in response to the need to try to measure concentrations as low as the RBTLs, when practicable. If a measured organic analyte concentration exceeded the MDL but was less than the reporting limit, the reported concentration was the measured concentration followed by a "J" qualifier. The "J" qualifier signified that the reported concentration had a high degree of uncertainty even though there was a high level of confidence that the analyte had been detected in the sample. Concentrations less than the TV for inorganic chemicals were reported as the TV with a "U" qualifier. Inorganic chemical concentrations between the TV and RL were reported with no qualifier. Concentrations of organic and inorganic chemicals that exceeded reporting limits were not qualified unless a data quality deficiency was identified. These reporting conventions are summarized below:

Analyte Non-Detect Reporting

Measured Concentration	Reported Concentration	Qualifier*
<MDL	TV (inorganics)	U
<TV	TV (organics)	U
>MDL and <RL	Measured concentration (organics)	J
>TV and <RL	Measured concentration (inorganics)	No qualifier
>RL	Measured concentration	No qualifier

Tables H-4 through H-9 show the nominal TVs and the minimum and maximum non-detect values for each analyte in particular matrices (one table per matrix). The nominal TVs represent TVs as estimated by the laboratory without any adjustments for sample-specific conditions such as moisture content or sample dilutions. In some cases (e.g., when samples are diluted), the nominal TV may be less than the RBTL whereas the actual non-detect value exceeds the RBTL.

The elevated detection limits that were incurred are viewed to be the consequence of uncontrollable, sample-specific factors and reflect normal laboratory performance. An example would be elevated detection limits that were incurred because there was such a high TCE concentration in a sample that the sample was diluted manifold to prevent down time on the analytical instrumentation used for analysis. The elevated detection limits did not prevent the use of the data for decision making, however, the inability to achieve RBTLs must be considered when using the data for risk screening and risk assessment. It is also important to understand that the RBTLs may have changed between the time the QAPP was written and this report was generated. The risk assessments are conducted on the most recent risk-based values but the data quality was assessed relative to limits that were in effect at the time the project was planned.

H.3.3 Laboratory Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference value. Accuracy measurements are designed to detect biases resulting from sample handling and analysis. This parameter is assessed by measuring spiked samples (e.g., MSs) or well-characterized samples of certified analyte concentrations (e.g., LCSs) and by measuring blanks. Bias can be either positive or negative. A low (i.e., negative) bias indicates a potential not detecting an analyte when it is present near detection limit levels and for reporting concentrations that are less than the actual site concentration. A high (i.e., positive) bias indicates that reported concentrations are likely to be greater than actual site concentrations. With a high bias there is no effect on the detectability of analytes that have concentrations near detection limits levels.

Accuracy requirements for field measurements are typically ensured through control over the sample collection and handling and through routine instrument calibration. Field accuracies were monitored through the use of blanks to detect cross-contamination and by monitoring adherence to procedures that prevent sample contamination or degradation. Source water blanks were collected from analyte-free water and potable water sources to assess the water sources used for decontaminating sampling equipment. Equipment rinsate blanks were collected for this investigation to assess cross-contamination via sample collection equipment. These blanks were obtained under representative field conditions by collecting the rinse water generated by running analyte-free water through sample collection equipment after decontamination and before use. Rinsate blanks were obtained for each type of sampling equipment for each day that the sampling equipment was decontaminated. Where pre-cleaned, dedicated sampling equipment was used, one rinsate blank was collected as a "batch blank". Rinsate blanks were analyzed for the same chemical constituents as the associated environmental samples.

Accuracy in the laboratory is measured through the comparison of a spiked sample or LCS result to a known or calculated value and is expressed as a percent recovery (%R). It was also assessed by monitoring the analytical recovery of select surrogate compounds added to samples that are analyzed by organic chromatographic methods. LCSs were used to assess the accuracy of laboratory operations with minimal sample matrix effects. MS and surrogate compound analyses measure the combined accuracy effects of the sample matrix, sample preparation, and sample measurement. Spiking concentrations equaled or approximated the default concentrations detailed in the applicable sample preparation or analysis SOPs. LCS and MS analyses were performed at a frequency of one per 20 associated samples of like matrix as required by the SWMU 8 QAPP (TtNUS, 2004). Laboratory accuracy was assessed by comparing calculated %R values to accuracy control limits specified in the SWMUs 8 and 15 QAPP (TtNUS, 2004).

Percent recovery is calculated using the following equation:

$$\%R = \frac{Ss - So}{S} \times 100$$

where %R = percent recovery
Ss = result of spiked sample
So = result of non-spiked sample
S = concentration of spiked amount.

Absence of bias is represented as a recovery of 100 percent. Mean recovery values less than 100 percent indicate a low bias, and recovery values greater than 100 percent indicate a high bias.

Because measurement uncertainty exists in all bias estimates, a bias is not considered to be significant unless it falls outside the range of 100 percent ± 25 percent. The more extreme the bias value, the more significant the bias.

Accuracy data are compiled in Tables H-10 (solid samples) and H-11 (aqueous samples) fro pre-October 2006 data. The minimum, average, and maximum percent recovery values are presented in the table for each parameter. In addition, the number of QC samples represented by these statistics is provided. This count of QC values provides some insight into the magnitude of influence on the mean value caused by values that are outside the 75 to 125 percent target range. Percent recoveries that are invalid because the native sample concentration was more than four times the spike amount are excluded from the table. Data qualifiers assigned during data validation because of non-compliant bias indicators are presented in Appendix G.

Explosives and Perchlorate in Soils and Sediment

For explosives other than perchlorate, mean LCS/MS/MSD recoveries were within the 75 to 125 percent reference range with the exception of tetryl. The mean MS recovery was 73.4 percent and the mean MSD recovery was 74.4 percent for tetryl. The lowest individual tetryl MS recovery was 42 percent and the lowest MSD recovery was 38 percent. In addition, these recoveries were associated with the same parent sample (18SS0090002). Excluding these two results the range of MS/MSD recoveries is 68 percent to 103 percent. This represents a relatively narrow range and an in-control analytical process. No significant bias is expected for explosives in soil or sediment.

Only one individual recovery out of 15 LCS/MS/MSD samples exceeded 125% for perchlorate. No more detail is provided in this data quality review section for this parameter.

Explosives and Perchlorate in Groundwater and Surface Water

For explosives other than perchlorate, all mean LCS/MS/MSD recoveries were within the 75 to 125 percent reference range. Only three individual recoveries out of 120 points were below 75 percent. In addition, no individual recoveries were greater than 125 percent. The lowest individual LCS recovery (3-nitrotoluene) was 74 percent, the lowest MS recovery (2,4-dinitrotoluene) was 62 percent, and the lowest MSD recovery (2,4-dinitrotoluene) was 74 percent. This represents a relatively narrow range and an in control analytical process.

No data quality problems were identified for perchlorate. No more detail is provided in this data quality review section for this parameter.

Herbicides in Soil and Sediment

Mean recoveries for hexachlorophene and dinoseb were well below the reference range of 75 to 125 percent in the MSs and MSDs. The individual hexachlorophene recoveries ranged from 19 to 58 percent and the individual dinoseb recoveries ranged from 36 to 58 percent in MSs and MSDs in solid samples. Generally, the analytical performance for these compounds were precise (i.e., PRD values within expectations) but with moderate to severe low bias in solid matrices. Individual MS and MSD recoveries of all target compounds ranged from 19 to 133 percent in solid matrices. The low end of this range represents a severe low bias but fortunately, this degree of bias was rather limited in scope. In addition, the surrogate (2,4-dichlorophenylacetic acid) associated with these analytes had mean recoveries that exceeded 125% in LCSs, MSs, and MSDs. Generally, the analytical performance for the surrogate was precise but with moderate high bias in solid matrices.

Pesticides and PCBs in Soil and Sediment

Mean LCS recoveries for all pesticide target analytes were within the 75 to 125 percent reference range for pesticides and PCBs. The mean endrin aldehyde recovery (approximately 72 percent) was slightly less than the low limit of 75 percent and represents a minor deviation. Individual LCS recoveries also tended to lie within the 75 to 125 percent range.

With one exception, all mean target analyte recoveries in MS and MSDs were greater than 70 percent but several individual recoveries were less than 70%. This represents a slight low bias. The exception was endrin aldehyde, which had a mean recovery of 53.8 in MSs and 50.8 in MSDs. This represents a moderate low bias. Except for endrin aldehyde, individual recoveries in MSs and MSDs did not drop below 58 percent. The lowest endrin aldehyde MS and MSD recoveries were 36 and 37 percent, respectively.

In summary, there is no significant bias for pesticide results except for a moderately low bias associated with endrin aldehyde concentrations. The degree of bias may vary with concentration level.

Pesticides and PCBs in Groundwater and Surface Water

The mean groundwater and surface water LCS, MS, and MSD percent recoveries across all sample groups ranged from 61.4 to 116.8 percent for all pesticides and PCBs (Table H-11). This narrow recovery range represents a narrow range that is slightly less than the low end of the reference range (75 to 125 percent). Few individual recoveries were outside the 75 to 125 percent reference range (See Table H-11). The two notable exceptions were endrin aldehyde (individual recoveries ranging from 61 to 95 percent) and the surrogate compound, tetrachloro-meta-xylene (individual recoveries ranging from 55 to

81 percent). These exceptions, however, are minor. This indicates that there was no significant laboratory bias associated with the pesticide analysis process, except for a slight low bias for endrin aldehyde. The degree of bias may be sensitive to concentration level.

Semivolatile Organic Compounds (Including PAHs) in Soil and Sediment

The majority of semivolatile compound mean LCS, MS, and MSD recoveries were within the expected range (Table H-10) of 75 to 125 percent or were moderately outside the range on the low side. The compounds 3,3'-dichlorobenzidine, 4-chloroaniline, and hexachlorocyclopentadiene were particularly notable exceptions with markedly low mean recoveries as compared to the rest of the group. For example, the recoveries of 4-chloroaniline in 28 MSs ranged from 0 to 28 percent and in MSDs ranged from 0 to 27 percent. In addition, while the mean recoveries for 2,4-dimethylphenol were not markedly low (40.0% for MSs and 40.8% for MSDs), there were several severely low (<20%) individual points. The following chemicals had at least one individual recovery less than 20 percent (number of values less than 20 percent is shown in parentheses): 2-methylphenol (1 MS), 2,4-dimethylphenol (4 MSs and 4 MSDs), 3&4-methylphenol (1 MS), 3,3'-dichlorobenzidine (7 MSs and 7 MSDs), 4-chloroaniline (8 MSs and 7 MSDs), diphenylamine (1 MSD), and hexachlorocyclopentadiene (3 MSs and 3 MSDs). The analytes with the greatest number of individual low MS and MSD recoveries are the same three compounds with low mean recoveries and 2,4-dimethylphenol. This performance is typical of SVOCs on soil and sediment and does not represent a significant analytical deficiency because the affected compounds are not of particular importance for this project. Several results were rejected because of the low recoveries (See Table H-3). In addition, all non-detected results reported from the parent sample associated with an MS/MSD recovery <10% were rejected. Positive results were qualified as estimated. The rejections are more significant than the low bias because they indicate a potential for not detecting the rejected analytes at concentrations near detection limit levels.

The mean recoveries of the solid LCSs range from 39.7% to 95.9%. One LCS recovery each for naphthalene, 2-methylnaphthalene, and the surrogate 1-fluoronaphthalene were 0%. These all occurred in the same sample. These low recoveries were considered to be an anomaly because this was the only occurrence of a 0% recovery for a surrogate in the SVOC fraction for soils. In addition, the error occurred in a field QC sample and not in any environmental samples.

In summary, the semivolatile compounds generally show a slight to moderate low bias with some exceptions (See Table H-10). The following compounds exhibited a severe low bias: 3,3'-dichlorobenzidene, 4-chloroaniline, and hexachlorocyclopentadiene. The other compounds specifically identified above also exhibited very low biases in some solid matrix samples.

Semivolatile Organic Compounds (Including PAHs) in Ground Water and Surface Water

Percent recoveries for LCSs, MSs, and MSDs in pre-October 2006 samples were generally higher for aqueous samples than for solid samples. Mean recoveries ranged from 25.6 to 184.3 percent across these samples with similar performance in all three types of samples (LCSs, MSs, and MSDs). The minimum individual MS/MSD recovery across all compounds and samples was 0 percent. This occurred for 2,4-dinitrophenol, 2-nitrophenol, 3,3-dichlorobenzidine, 4,6-dinitro-2-methylphenol, and 4-nitrophenol. The surrogate compound, 2-fluorophenol, also exhibited two very low individual recovery values of 6 and 12 percent twelve MS/MSDs. The other MS and MSD recoveries were 24 percent to 80 percent for this compound. Several results were rejected because of poor spike recoveries or calibration non-compliances (see Table H-3). Overall, the SVOC data indicate a slight to moderate low bias for most compounds in aqueous samples. Results for 2,4-dinitrophenol, 2-nitrophenol, 3,3-dichlorobenzidine, 4,6-dinitro-2-methylphenol, and 4-nitrophenol exhibit a moderate to severe low bias (See Table H-11). In addition, all non-detected results reported from the parent sample associated with an MS/MSD recovery <10% were rejected. Positive results were qualified as estimated.

For the October 2006 MSs and MSDs nineteen MS or MSD recoveries were less than the 75 percent lower target limit and eight were greater than the 125 percent upper target limit. Eighty percent (109 out of 136) of MS and MSD recoveries were within the 75 to 125 percent target range. Results for the analytes with high recoveries (i.e., a potential high bias) were not qualified because the analytes were not detected in any samples. The lowest individual recovery was 35 percent for hexacyclopentadiene in an MSD sample. Other low recoveries occurred, typically for phenolic compounds. Surrogate compound recoveries were within the 75 to 125 target range except for a 23 percent recovery value for 2-fluorobiphenyl and a 61 percent recovery for terphenyl-d14 in sample 08GWTW13, and 63 percent recovery for 2,4,6-trinitrophenol in sample 08GWTW17. Overall, surrogate recoveries trended toward the low end of the 75 to 125 percent target range, hence, the surrogate recoveries indicate the potential for slight but probably insignificant low bias. This performance was comparable to or slightly better than the performance in the previous data collection rounds, with less of an overall negative bias.

Total Metals in Soil and Sediment

If a matrix spike did not increase the native sample concentration by at least 25 percent, the spike was considered to be invalid and is not discussed in this section. It was also removed from calculations of percent recovery statistics presented in Table H-10. In some cases, it was not clear by how much the matrix spike increased the native sample concentration because the spike amounts are not reported on a per sample basis and many samples naturally contain detectable levels of metals. In those cases, the result was retained.

The mean soil and sediment LCS percent recoveries across all sample groups ranged from 96.8 to 116.7 percent (Table H-10). The narrow LCS recovery range nearly that was nearly centered on the theoretically perfect value of 100 percent indicates that there was no significant laboratory bias associated with the metals analysis process.

Whereas the LCS recoveries were acceptable and varied over a small range or percentages, the soil and sediment sample MS recoveries were more erratic. Barium (196.4 percent), copper (244.6 percent), lead (233.4 percent), magnesium (186.2 percent), vanadium (181.3 percent), and zinc (188.3 percent), in particular, exhibited some exceptionally high recoveries for individual matrix spikes. Individual barium and magnesium recoveries were generally erratic. There is no explanation for the erratic barium recoveries. Individual copper recoveries ranged from 64.4 to 114.4 after excluding the single high value (244.6 percent). The single high value is therefore viewed to be an anomaly and not representative of typical copper recoveries. It is most likely a an indication of significant sample heterogeneity. Lead recoveries ranged from and 78.2 to 114.7 percent, after excluding the single low value (41.2 percent) and the single high value (233.4 percent). After excluding the single low value (34.2 percent) and the single high value (181.3 percent), vanadium recoveries ranged from 70.2 to 102.2 percent. Thus, analytical performance for lead and vanadium analyses appears to be stable but with a potential for an occasional high bias, presumably attributable to sample heterogeneity. After excluding the single high value (186.9 percent) and the single low value (-78.1 percent), the zinc recoveries ranged from 73.5 to 120.5, indicating an overall slight high bias with a tendency toward high recoveries. Wile the single low recovery is considered severely low, it is not considered to be an analytical deficiency because the concentration in the parent sample was just below 4X the spiked concentration. After excluding the two high values (186.2 and 162.6 percent) the magnesium recoveries ranged from 72.4 percent to 98.9 percent. Thus, analytical performance for magnesium analyses appears to be stable but with a potential for an occasional high bias.

In general, the worst recovery values (those that are furthest outside the 75 to 125 percent range) appear to represent a high bias. It is believed that a slight high bias may exist for zinc, but no significant bias is expected for other metals. This assertion is made, in part, based on the recovery values for aqueous samples where sample heterogeneity is not as pronounced. The aqueous percent recoveries are discussed below. On average, no significant bias was exhibited for metal concentrations in soils and sediments, but the effect of sample heterogeneity is apparent. This is discussed further in the next section.

Total and Dissolved Metals in Ground Water and Surface Water

If a matrix spike did not increase the native sample concentration by at least 25 percent, the spike was considered to be invalid and is not discussed in this section.

The mean groundwater and surface water LCS, MS, and MSD percent recoveries across all sample groups ranged from 87.3 to 117.5 percent for all metals (Table H-11). This narrow recovery range is within the 75 to 125 reference range. In addition, few individual recoveries were outside the 75 to 125 percent reference range (See Table H-11). This indicates that there was no significant laboratory bias associated with the metals analysis process.

Total Organic Carbon in Soils and Sediment

This parameter was measured in one sample (See Table 2-3). No data quality problems were identified. No more detail is provided in this data quality review section for this parameter.

Volatile Organic Compounds in Soil

Mean LCS recoveries were within the 75 to 125 percent reference range for all target analytes and surrogate compounds in all four rounds of sampling The lowest individual volatile compound LCS recovery was 42 percent (dichlorodifluoromethane) and the highest was 166 percent (acetone). This represents a relatively narrow range of values, in general, and an in-control analytical process.

In MSs and MSDs, the mean recovery range was 63.2 to 117.1 percent across all analytes. This is a relatively narrow range. The overall mean recovery for solid samples across all analytes was 82.1 percent and for MSDs it was 76.6 percent. As expected, the individual recoveries spanned a wider range (18 to 327 percent). However, several high percent recoveries (14 of 18 recoveries >150%) were all associated with the same MS (19SS0070002MS), indicating that the matrix effects particular to that sample or poor analytical performance associated with that sample was occurring. Otherwise, the recoveries indicate no bias to a moderate bias, depending on the analyte (See Table H-10). The low individual recoveries are more significant because they represent a potential for not detecting an analyte when it is present at detection limits levels. Based on the available QC data, this potential is sporadic and not a persistent problem.

Percent recovery values for MS/MSDs ranged from 52 to 95 percent, except for acetone. The acetone recovery was 0 percent in both the MS and MSD. This is evidence of a moderate low bias in the reported concentrations for all analytes except acetone. The evidence for acetone is that the acetone was not recoverable from the samples, yet this is not true based on results reported for the data set. For VOC data from soil boring 08SB51 the highest reported concentrations were beyond the upper end of the calibration range. Results that are beyond the upper end of the calibration range often suffer from a low bias. The laboratory inadvertently discarded the remaining sample volume and therefore could not perform a re-analysis of the sample. Only the sample from soil boring 08SB51 was affected in this

manner; ethylbenzene and total xylenes were the only compounds with a concentration in excess of the upper end of the calibration range..

Surrogate recoveries for the 2006 data were within the acceptance limits with one exception: 1,2-toluene-d8 had a recovery of 119 percent which was outside the 85-115 percent acceptance range. There are three reasons why this is considered to be of little importance: 1) all other surrogate results were within their respective ranges for each environmental sample, 2) the result was biased high, indicating a potential high bias in the data which is a conservative estimate of concentrations, and 3) the deviation from the acceptance range was small.

Volatile Organic Compounds in Groundwater and Surface Water

With one notable exception, mean and individual recoveries for LCSs, MSs, and MSDs were generally within the 75 to 125 percent reference range for the first three rounds of sampling. The notable exception was bromomethane, which had mean recoveries for LCSs, MSs, and MSDs ranging from 121.5 to 134.9 percent. This indicates a slight high bias for bromomethane, however, bromomethane is not a compound of particular importance for this project which limits the significance of this bias. All other exceptions were of minor significance (See Table H-11). Therefore, no significant bias is indicated for VOCs in aqueous samples. In Round 4 only one LCS was analyzed and the recoveries ranged from 77 to 139 percent with all but two values within the 75 to 125 percent target range. Both values were biased high and the affected compounds (dichlorodiflluoromethane and trichlorofluoromethane) were not detected, hence the data quality is comparable to the quality of data for the first three sampling rounds.

For the October 2006 MSs and MSDs ten MS or MSD recoveries were less than the 75 percent lower target limit and none were greater than the 125 percent upper target limit. Eighty-eight percent (76/86) of MS and MSD recoveries were within the 75 to 125 percent target range. The lowest individual recovery was 59 percent for 1,1-dichloroethene in an MS. The corresponding MSD had a 62 percent recovery for this compound. This indicates a slight potential low bias for 1,1,-dichloroethene. Low recoveries also occurred for 1,1,1-trichloroethane and carbon tetrachloride. The low potential bias for these compounds appears to be slight to moderate because all recoveries were greater than 60 percent.

H.3.4 Laboratory Precision

Precision is a measure of the degree to which two or more measurements are in agreement and describes the reproducibility of measurements of the same parameter for samples analyzed under similar conditions.

Precision for chemical parameters is expressed as a Relative Percent Difference (RPD), which is defined as the ratio of the difference to the mean for the two values being evaluated. RPDs, typically expressed as percentages, are used to evaluate both field and laboratory duplicate precision and are calculated as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where RPD = relative percent difference

V1, V2 = two results obtained by analyzing duplicate samples

The precision estimates obtained from duplicate field samples encompass the combined uncertainty associated with sample collection, homogenization, splitting, handling, laboratory and field storage (as applicable), preparation for analysis, and analysis. In contrast, precision estimates obtained from analyzing duplicate laboratory samples incorporate only homogenization, subsampling, preparation for analysis, laboratory storage (if applicable), and analysis uncertainties. The VOC fraction of a sample is not homogenized because homogenization would cause a loss of the target analytes.

Field duplicates for SWMU 8 soils and sediments were collected as a single sample that was sampled in duplicate for VOCs, then homogenized, split into two portions, and placed into separate sample bottles for the non-VOC analyses. Each sample bottle was assigned a unique nomenclature so as to be "blind" to the laboratory. Field duplicates were collected during a single act of sampling and were analyzed for chemical constituents to measure the precision of the sampling and analysis program, as well as the natural sample heterogeneity.

Field duplicates were to be collected at a rate of one per 20 environmental samples. The number of duplicates collected was greater than these frequencies because the analytical suite is not identical for all samples. The number of duplicates collected corresponds to the number of samples collected for a particular analytical fraction. The number of duplicates per samples collected for all analytical fractions met the 5 percent frequency criterion specified in the SWMU 8 QAPP (TtNUS, 2004).

Laboratory precision QC samples [i.e., laboratory duplicates for inorganic chemicals and LCS/LCSD and matrix spike (MS) / matrix spike duplicate (MSD) samples for organic chemicals] were scheduled to be analyzed at a rate of one QC sample per 20 environmental samples. This 5 percent rate as specified in the SWMU 8 QAPP (TtNUS, 2004) was achieved for aqueous, soil, sediment, and seep samples.

Laboratory duplicates are usually analyzed during the metals and miscellaneous analyses as a check on the precision of the analyses. For organic compounds analyzed by chromatography, laboratory duplicates are commonly supplanted with MSDs because the organic compounds do not occur naturally in samples and precision can not be estimated from non-detect values.

During the RFI, laboratory precision was assessed by comparing calculated RPD values from duplicate samples to precision control limits specified in the SWMU 8 QAPP (TtNUS, 2004). RPD values greater than 50 percent for solid matrices and 30 percent for aqueous matrices are occasionally observed. In addition, values of this magnitude are often small compared to the concentration variability observed across site samples. This characteristic is important because it indicates that the uncertainty associated with decision making is often most affected by the overall site data variability and not as much by the local variability at any one location. Nevertheless, Tables H-12 and H-13 represent all exceedances of these reference points (aqueous 30% and solid 50%) for laboratory duplicates, field duplicates, LCS/LCSD, and MS/MSD RPDs. Field and laboratory precision values that did not exceed the reference points are not included in the discussions below. The table includes minimum, average, and maximum RPD values for each parameter that had at least one exceedance of the reference point (30 percent for aqueous samples; 50 percent for solid samples). The values that exceed these reference pints are highlighted.

Herbicides in Surface Water and Ground Water

One of five hexachlorophene precision estimates (31.0 percent RPD) exceeded the target range of 0 to 30 percent in the surface water samples. One of five pentachlorophenol precision estimates (132.0 percent RPD) exceeded this range in the surface water samples. The lone RPD exceedance for pentachlorophenol also caused the mean RPD (36.4 percent RPD) to exceed the 0 to 30 percent target range. Generally, the analytical performance for these compounds was acceptable with regard to precision. Because these compounds were not detected in any samples, there are no field precision measures for hexachlorophene and pentachlorophenol.

Semivolatiles (Including PAHs) in Soil and Sediment

RPDs for many different target compounds in MS/MSDs exceeded the 50 percent reference point (Table H-12). However, the mean RPD values are generally less than 25 percent, and the majority of RPD values are within the target range. The exceedances were therefore evidently not widespread and do not

indicate the existence of widespread precision problems. Instead, they indicate that precision is generally acceptable for soil sample SVOC analyses. The maximum RPD for 4-chloroaniline, 3,3'-dichlorobenzidine, and hexachlorocyclopentadiene was 200. These compounds have poor analytical response and had a 0 percent recovery in either the MS or MSD, used to compute the RPD (see Section H.3.3). These compounds are not likely to be detected at the site. The possibility for a typical to slightly greater than typical level of uncertainty exists for most SVOC compounds listed on Table H-12. Hexachlorocyclopentadiene, 4-chloroaniline, and 3,3'-dichlorobenzidine results are viewed to be especially uncertain.

Two field duplicate pairs had RPDs that exceeded the 50 percent reference point (Table H-12). It is possible that these two samples were affected by a "hot spot" due to the heterogeneity of soil samples. In addition, the high RPD for naphthalene was derived from concentrations that were nearing the laboratory reporting limit. While the concentrations for bis(2-ethylhexyl)phthalate were well above the reporting limit, the sample (08SD012010006) had a high percent moisture content and also was highly contaminated with organic compounds. However, while sample heterogeneity has an effect on precision in soil samples, there is also a perceived moderate uncertainty in the field duplicate precision.

Semivolatiles (Including PAHs) in Groundwater and Surface Water

Several (22) SVOC compounds had RPDs in excess of the 30 percent reference point ranging from 31% to 200% in the MS/MSD samples. All except four site samples were surface water samples. The maximum RPD for 2,4-dinitrophenol, 2-nitrophenol, 4,6-dinitro-2-methylphenol, and 4-nitrophenol was 200. These compounds have poor analytical response and had a 0 percent recovery in either the MS or MSD used to compute the RPD (see Section H.3.3). These compounds were not likely to be detected if they were present. The preponderance of evidence, however, is that phenolic compounds were not present at the site because phenols that were not affected by this extreme low bias were not present Round four precision was significantly better for all SVOCs, with the greatest MS/MSD RPD value being 12 percent. This is considerably less than the 30 percent upper limit of the RPD target range. For the first three sampling rounds, the possibility for a typical to slightly greater than typical level of uncertainty exists for most SVOC compounds listed on Table H-13 for the first three rounds of sampling. 2,4-dinitrophenol, 2-nitrophenol, 4,6-dinitro-2-methylphenol, and 4-nitrophenol results are viewed to be especially uncertain.

Total Metals in Soil and Sediment

RPDs for many different target compounds in laboratory duplicates exceeded the 50 percent reference point (Table H-12). However, the mean RPD values are generally less than 25 percent, with the majority of RPD values are within the target range. As expected, several metals also exceeded the reference

RPD range for field duplicate samples. The observed exceedances do not appear to be unusual and are interpreted to represent natural sample heterogeneity. A typical level of uncertainty was demonstrated for metals in sediment and soil replicate samples, however, the potential for occasional erratic results must be considered as evident from the matrix spike and laboratory duplicate samples.

Total and Dissolved Metals in Ground Water and Surface Water

Relatively few RPD values for groundwater and surface water samples exceeded the reference range of 0 to 30 percent (Table H-13) as compared to soil samples. In addition, several of the RPD results in excess of the 30 percent reference point were caused by results that were reported at or below the laboratory's reporting limit. Concentrations in this range tend to exhibit high RPD values only because they are near detection limits.

In general, the degree of heterogeneity observed for total and dissolved metals in aqueous samples appears to be normal.

Volatiles in Soil and Sediment

In sampling conducted prior to Round 4 (October 2006) several (21) VOC compounds had RPDs in excess of the 50 percent reference point ranging from 51% to 119% in the MS/MSD samples. However, the mean RPDs for all compounds were less than the 50% reference point with the highest (trichlorofluoromethane) being 30.3%. In addition, out of 35 total results that exceeded the reference point, nineteen were in sample 08SB0120206 and twelve were in sample 19SS0070002. This is indicative of a matrix effect or poor performance associated with individual samples and not a pervasive analytical deficiency. In October 2006 a single field duplicate was collected along with 17 environmental samples. RPDs were computed for the five detected compounds in the field duplicate. The RPDs ranged from 12.0 percent for acetone to 197 percent for ethylbenzene. The possible range of RPD values is 0 percent (perfect precision) to 200 percent (no agreement between values). Accordingly, this range of RPD values was cause for concern. The quality indicators (duplicate precision, MS, and MSD recoveries) were reviewed but no particular quality deficiency could not be found to explain the large discrepancy in concentration between the original and duplicate field samples. This is usually a sign of sample heterogeneity. The MS/MSD RPD values were all less than 30 percent which is acceptable for soil samples. Based on the data review, the higher concentrations at soil boring 08SB51 are believed to be representative of soils at that boring. Whether these reported concentrations are biased low is not clear but they probably are. The reasons for this are described in the Accuracy section above. The original analysis was beyond the upper end of the calibration range which is a region where results are typically biased low. Hence, one should assume that the highest reported concentrations are biased low for this

sample (08SB510204). An additional factor that accounts for increased RPDs is the heterogeneous nature of soil samples.

Volatiles in Groundwater and Surface Water

All volatile concentrations in duplicate samples were either less than threshold values which precluded the evaluation of RPD values, or the RPD values were within the reference range of 0 to 30 percent. This indicates that there were no particular precision problems identified for volatile analyses.

H.3.5 Comparability

Comparability is defined as the confidence with which one data set can be compared with another (e.g., among sampling points and among sampling events). Comparability was achieved by using standardized sampling and analysis methods, as well as standardized data reporting formats. Comparability of field data was ensured by following the SWMU 8 QAPP (TtNUS, 2004). Comparability of laboratory measurements was achieved primarily through the use and documentation of standard sampling and analytical methods. Results were reported in units that ensured comparability with previous data and with current state and federal standards and guidelines. Comparability of laboratory measurements was assessed primarily through the use of QC samples and through adherence to the QA plan. No comparability problems were detected.

The laboratory analyzed various QC samples along with the environmental samples to allow data users to assess the quality of the data. Tables H-14 through H-19 show the rates of data qualification that resulted from application of the data validation process for aqueous and solid samples, respectively, prior to October 2006. The numerical qualification rates presented in the table represent the percentage of data qualified as indicated for the indicated reason. An example using an excerpt form Table H-14 is the best way to explain how to interpret the table:

Parameter	Code	Validation Qualifier			
		J	U	UJ	UR
ARSENIC	A	3.3	0.0	0.0	0.0
	AF	30.0	0.0	0.0	0.0
	AI	66.7	0.0	0.0	0.0

The "3.3" in the "J" Validation Qualifier column indicates that 3.3 percent of the J-qualified data for arsenic were qualified that way because of reason "A" (Code = A). The second "30.0" in the J-qualifier column indicates that 30.0 percent of the J-qualified data were qualified that way for reasons "A" and "F" (Code

Al). The 66.7 in the J-qualifier column indicates that the remaining 66.7 percent of the J-qualified data were qualified that way for reasons "A" and "I" (Code Al). The sum of these percentages is 100, which indicates that all of the J-qualified aluminum data were qualified that way for these three reasons. The Codes are defined at the bottom of Tables H-14 through H-19.

All other values in the table are to be interpreted in a similar manner. Quantitative summaries of accuracy and precision are provided in Sections H.3.3 and H.3.4. Inability to achieve target detection limits or RBTLs in several cases should also be considered when using the data (See Section H.3.2).

Quality indicators such as precision and accuracy were comparable between pre-October 2006 and October 2006 data, therefore the data are viewed to be comparable in quality

H.3.6 Representativeness

Representativeness is an expression of the degree to which data accurately and precisely depict the actual characteristics of a population or environmental condition existing at an individual sampling point and is contingent on a good design for the sampling program. Ideally, for each environmental medium investigated, there would be two general populations - site and background. The site population(s) is the portion of a medium potentially contaminated as a result of site operations. Sampling of the site population was designed to directly support the project objectives of determining the nature and extent of contamination and evaluating human and ecological risks. The background population is that portion of a medium that is similar to the site population but expected or known not to be contaminated through site operations. A background population is a point of reference for understanding whether or not site chemical concentrations represent site-related contamination. For mobile media (sediment, surface water and ground water) the term upgradient, rather than background, is generally used to refer to locations unaffected by site operations. Background and upgradient data were not available for groundwater but they were available for soil, surface water, and sediment.

Data were collected from the locations specified in the SWMU 8 QAPP (TtNUS, 2004) with only minor modifications that reflect uncertainty in marking the locations in the field. The SWMU 8 QAPP (TtNUS, 2004) and the use of standardized sampling, sample handling, sample analysis, and data reporting procedures were designed so that the final data would be accurate representations of actual site conditions. It is believed that all reported data are adequately representative of site conditions with exceptions as noted below.

Theoretically, dissolved analyte concentration can not exceed the total metal concentration. Allowing for uncertainties in collecting, storing, preparing, and analyzing a sample, it is reasonable to expect that a dissolved metal concentration could be reported to be as much as 30% greater than the total metal

concentration without cause for concern. This "rule of thumb," however does not apply if results are near the non-detect levels because of the greater analytical uncertainties in that concentration range. If the total and dissolved metals results are significantly greater than detection limits, an exceedance of 30% difference is an indication of a potential data quality problem. Some of the SWMU 8 dissolved metal results exceeded this range and nickel and copper results were affected the most in this regard. However, this generally occurred when the results were near the detection limits, therefore, the discrepancies between dissolved and total metals do not appear to reflect any significant data quality problems. Total and dissolved metal concentrations are provided in the tables of Section 3.0 and Appendix G.

References for Appendix H

TtNUS, 2004. Quality Assurance Project Plan for RCRA Facility Investigation at Building 106 Pond (SWMU 8) Roads and Grounds Area (SWMU 15) and Environmental Indicator Investigation for SWMU 18 (Load and Fill Area Buildings), SWMU 19 (Pyrotechnic Test Area), SWMU 20 (Crane Army Ammunition Activity Quality Assurance/Quality Control Test Area), and the Old Gun Tub Storage Lot, September.

U.S. EPA, 1993c. U.S. EPA Region 5 Standard Operating Procedures for Validation of Contract Laboratory Program Organic Data;

U.S. EPA, 1993d. Region 5 Standard Operating Procedures for Validation of Contract Laboratory Program Inorganic Data;

U.S. EPA, 1994a. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review;

U.S. EPA, 1994b. U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review

List of acronyms, Appendix H

%R Percent recovery
DQI Data quality indicator
LCS Laboratory control sample
MDL Method detection limit
MS Matrix Spike
MSD Matrix spike duplicate
NTS Nephelometric turbidity unit
PAH Polycyclic aromatic hydrocarbon
PCB Polychlorinated biphenyl
QAPP Quality assurance project plan
QC Quality control
RBTL Risk-based target level
RFI Resource Conservation and Recovery Act Facility investigation
RL Laboratory reporting limit
RPD Relative percent difference
SVOC Semivolatile organic compound

SWMU Solid Waste Management Unit

TOC Total organic carbon

TtNUS Tetra Tech NUS, Inc.

TV Threshold value

VOC Volatile organic compound

TABLE H-1

PERCENT COMPLETENESS BY FRACTION FOR SAMPLES PROPOSED (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Analytical Fraction	SOIL [1] (collected/ proposed) [2]	SW (collected/ proposed) [2,3]	SD (collected/ proposed) [2]	GW (collected/ proposed) [2,3]	SP (collected/ proposed) [2,3]
Part I. Tallies With Uncollectable Samples Counted in Total Number of Samples.					
Explosives	18/18 (100%)	10/11 (91%)	11/13 (85%)	4/4 (100%)	NA
Perchlorate	18/18 (100%)	10/11 (91%)	11/13 (85%)	4/4 (100%)	NA
Herbicides	8/8 (100%)	NA	NA	NA	NA
Metals, Total	27/27 (100%)	19/25 (76%)	5/5 (100%)	15/18 (83%)	2/5 (40%)
Metals, Filtered [4]	NA	19/24 (79%)	NA	6/7 (86%)	1/4 (25%)
Semivolatiles except PAHs	27/27 (100%)	19/22 (86%)	11/13 (85%)	4/4 (100%)	NA
1,4-Dioxane only	28/28 (100%)	19/25 (76%)	12/12 (100%)	28/30 (93%)	1/4 (25%)
8260 Volatile Organic Compounds	89/89 (100%)	30/38 (79%)	16/18 (89%)	30/32 (94%)	2/8 (25%)
Polycyclic Aromatic Hydrocarbons	27/27 (100%)	19/22 (86%)	11/13 (85%)	4/4 (100%)	NA
Polychlorinated Biphenyls	22/22 (100%)	4/4 (100%)	4/4 (100%)	NA	NA
Pesticides	8/8 (100%)	NA	NA	NA	NA
Coliform (Fecal)	NA	0/2 (0%) [5]	NA	4/4 (100%)	0/4 (0%) [6]
Cation Exchange Capacity	1/1 (100%)	NA	NA	NA	NA
Total Organic Carbon	1/1 (100%)	NA	NA	NA	NA
Part II. Tallies With Uncollectable Samples Not Counted in Total Number of Samples.					
Explosives	18/18 (100%)	11/11 (100%)	11/13 (85%)	4/4 (100%)	NA
Perchlorate	18/18 (100%)	11/11 (100%)	11/13 (85%)	4/4 (100%)	NA
Herbicides	8/8 (100%)	NA	NA	NA	NA
Metals, Total	27/27 (100%)	19/19 (100%)	5/5 (100%)	15/15 (100%)	2/2 (100%)
Metals, Filtered [4]	NA	19/19 (100%)	NA	7/7 (100%)	1/1 (100%)
Semivolatiles except PAHs	27/27 (100%)	19/19 (100%)	11/13 (85%)	4/4 (100%)	NA
1,4-Dioxane only	28/28 (100%)	19/19 (100%)	12/12 (100%)	28/28 (100%)	1/1 (100%)
8260 Volatile Organic Compounds	89/89 (100%)	30/30 (100%)	16/18 (89%)	30/30 (100%)	2/2 (100%)
Polycyclic Aromatic Hydrocarbons	27/27 (100%)	19/19 (100%)	11/13 (85%)	4/4 (100%)	NA
Polychlorinated Biphenyls	22/22 (100%)	4/4 (100%)	4/4 (100%)	NA	NA
Pesticides	8/8 (100%)	NA	NA	NA	NA
Coliform (Fecal)	NA	0/2 (0%) [5]	NA	4/4 (100%)	0/1 (0%) [6]
Cation Exchange Capacity	1/1 (100%)	NA	NA	NA	NA
Total Organic Carbon	1/1 (100%)	NA	NA	NA	NA

1 Includes both surface and subsurface soil samples. Samples not collected because of refusal are not represented in the tallies. See Section H.3.1.1 text for explanation of highlighted values.

2 Samples that were to be collected under prescribed conditions (e.g., if surface soil PAH concentrations were significant or debris was observed in soil cores in the landfill area) are not represented in these tallies if they were not collected.

3 Includes samples that could not be collected due to insufficient water at or near the specified sampling location (2 locations were affected in this manner). SW category includes sump samples.

4 Some aqueous samples were filtered to allow for determining whether or not the observed metals concentrations were associated with turbidity.

5.Two samples were collected but they were analyzed for total coli forms instead of fecal coli forms.

6. One sample was collected but it was analyzed for total coli forms instead of fecal coli forms.

SE - Seep samples
SD - Sediment samples
GW - Ground water samples
SW - Surface water samples
NA - Not applicable

* All aqueous matrices percent completeness are 100% if instances where wells dried out or no surface water existed during the sampling event are excluded from the counts.

TABLE H-2

PERCENT COMPLETE FOR ANALYTICAL FRACTIONS (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND
NSWC CRANE,
CRANE, INDIANA

	GROUNDWATER				SURFACE WATER			
Fraction	Non-Rejects	Rejects	Total	Pct Complete	Non-Rejects	Rejects	Total	Pct Complete
FIELD	108	0	108	100.0	155.0	0.0	155.0	100.0
METALS, TOTAL	384	0	384	100.0	517.0	0.0	517.0	100.0
METALS, DISSOLVED	144	0	144	100.0	518.0	0.0	518.0	100.0
MISC	10	0	10	100.0	14.0	0.0	14.0	100.0
PEST/PCB	N/A	N/A	N/A	N/A	35.0	0.0	35.0	100.0
SVOC	452	4	456	99.1	1992.0	86.0	2078.0	95.9
VOC	1632	128	1760	92.7	1989.0	156.0	2145.0	92.7

	SEDIMENT				SOIL			
Fraction	Non-Rejects	Rejects	Total	Pct Complete	Non-Rejects	Rejects	Total	Pct Complete
EXP	168	0	168	100.0	280	0	280	100.0
HERB	N/A	N/A	N/A	N/A	54	0	54	100.0
METALS, TOTAL	168	0	168	100.0	720	0	720	100.0
MISC	18	0	18	100.0	23	0	23	100.0
PEST/PCB	35	0	35	100.0	357	0	357	100.0
SVOC	2499	45	2544	98.2	3164	46	3210	98.6
VOC	969	76	1045	92.7	4766	404	5170	92.2

EXP = Explosives
FIELD = Field Analyses
HERB = Herbicides
MISC = Miscellaneous parameters
N/A = not applicable
PEST/PCB = Pesticides/polychlorinated biphenyls
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
GW	08GWTW001	OS	4-NITROQUINOLINE-1-OXIDE	C
GW	08GWTW002	OS	4-NITROQUINOLINE-1-OXIDE	C
GW	08GWTW003	OS	4-NITROQUINOLINE-1-OXIDE	C
GW	08GWTW004	OS	4-NITROQUINOLINE-1-OXIDE	C
GW	08GWT00101	OV	ACETONITRILE	C
GW	08GWT00102	OV	ACETONITRILE	C
GW	08GWT00201	OV	ACETONITRILE	C
GW	08GWT00201-D	OV	ACETONITRILE	C
GW	08GWT00202	OV	ACETONITRILE	C
GW	08GWT00301	OV	ACETONITRILE	C
GW	08GWT00302	OV	ACETONITRILE	C
GW	08GWT00302-D	OV	ACETONITRILE	C
GW	08GWT00401	OV	ACETONITRILE	C
GW	08GWT00402	OV	ACETONITRILE	C
GW	08GWT00501	OV	ACETONITRILE	C
GW	08GWT00502	OV	ACETONITRILE	C
GW	08GWT00601-0603	OV	ACETONITRILE	C
GW	08GWT00602	OV	ACETONITRILE	C
GW	08GWT00701	OV	ACETONITRILE	C
GW	08GWT00702	OV	ACETONITRILE	C
GW	08GWT00801	OV	ACETONITRILE	C
GW	08GWT00802	OV	ACETONITRILE	C
GW	08GWT00901	OV	ACETONITRILE	C
GW	08GWT00902	OV	ACETONITRILE	C
GW	08GWT01001	OV	ACETONITRILE	C
GW	08GWT01002	OV	ACETONITRILE	C
GW	08GWT01101	OV	ACETONITRILE	C
GW	08GWT01102	OV	ACETONITRILE	C
GW	08GWT01201	OV	ACETONITRILE	C
GW	08GWT01301	OV	ACETONITRILE	C
GW	08GWT01401	OV	ACETONITRILE	C
GW	08GWTW001	OV	ACETONITRILE	C
GW	08GWTW002	OV	ACETONITRILE	C
GW	08GWTW003	OV	ACETONITRILE	C
GW	08GWTW004	OV	ACETONITRILE	C
GW	08GWTW006	OV	ACETONITRILE	C
GW	08GWT00101	OV	ACROLEIN	C
GW	08GWT00102	OV	ACROLEIN	C
GW	08GWT00201	OV	ACROLEIN	C
GW	08GWT00201-D	OV	ACROLEIN	C
GW	08GWT00202	OV	ACROLEIN	C
GW	08GWT00301	OV	ACROLEIN	C
GW	08GWT00302	OV	ACROLEIN	C
GW	08GWT00302-D	OV	ACROLEIN	C
GW	08GWT00401	OV	ACROLEIN	C
GW	08GWT00402	OV	ACROLEIN	C
GW	08GWT00501	OV	ACROLEIN	C
GW	08GWT00502	OV	ACROLEIN	C
GW	08GWT00601-0603	OV	ACROLEIN	C
GW	08GWT00602	OV	ACROLEIN	C
GW	08GWT00701	OV	ACROLEIN	C
GW	08GWT00702	OV	ACROLEIN	C
GW	08GWT00801	OV	ACROLEIN	C
GW	08GWT00802	OV	ACROLEIN	C
GW	08GWT00901	OV	ACROLEIN	C
GW	08GWT00902	OV	ACROLEIN	C
GW	08GWT01001	OV	ACROLEIN	C
GW	08GWT01002	OV	ACROLEIN	C
GW	08GWT01101	OV	ACROLEIN	C
GW	08GWT01102	OV	ACROLEIN	C
GW	08GWT01201	OV	ACROLEIN	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
GW	08GWT01301	OV	ACROLEIN	C
GW	08GWT01401	OV	ACROLEIN	C
GW	08GWTW001	OV	ACROLEIN	C
GW	08GWTW002	OV	ACROLEIN	C
GW	08GWTW003	OV	ACROLEIN	C
GW	08GWTW004	OV	ACROLEIN	C
GW	08GWTW006	OV	ACROLEIN	C
GW	08GWT00101	OV	ISOBUTANOL	C
GW	08GWT00102	OV	ISOBUTANOL	C
GW	08GWT00201	OV	ISOBUTANOL	C
GW	08GWT00201-D	OV	ISOBUTANOL	C
GW	08GWT00202	OV	ISOBUTANOL	C
GW	08GWT00301	OV	ISOBUTANOL	C
GW	08GWT00302	OV	ISOBUTANOL	C
GW	08GWT00302-D	OV	ISOBUTANOL	C
GW	08GWT00401	OV	ISOBUTANOL	C
GW	08GWT00402	OV	ISOBUTANOL	C
GW	08GWT00501	OV	ISOBUTANOL	C
GW	08GWT00502	OV	ISOBUTANOL	C
GW	08GWT00601-0603	OV	ISOBUTANOL	C
GW	08GWT00602	OV	ISOBUTANOL	C
GW	08GWT00701	OV	ISOBUTANOL	C
GW	08GWT00702	OV	ISOBUTANOL	C
GW	08GWT00801	OV	ISOBUTANOL	C
GW	08GWT00802	OV	ISOBUTANOL	C
GW	08GWT00901	OV	ISOBUTANOL	C
GW	08GWT00902	OV	ISOBUTANOL	C
GW	08GWT01001	OV	ISOBUTANOL	C
GW	08GWT01002	OV	ISOBUTANOL	C
GW	08GWT01101	OV	ISOBUTANOL	C
GW	08GWT01102	OV	ISOBUTANOL	C
GW	08GWT01201	OV	ISOBUTANOL	C
GW	08GWT01301	OV	ISOBUTANOL	C
GW	08GWT01401	OV	ISOBUTANOL	C
GW	08GWTW001	OV	ISOBUTANOL	C
GW	08GWTW002	OV	ISOBUTANOL	C
GW	08GWTW003	OV	ISOBUTANOL	C
GW	08GWTW004	OV	ISOBUTANOL	C
GW	08GWTW006	OV	ISOBUTANOL	C
GW	08GWT00101	OV	PROPIONITRILE	C
GW	08GWT00102	OV	PROPIONITRILE	C
GW	08GWT00201	OV	PROPIONITRILE	C
GW	08GWT00201-D	OV	PROPIONITRILE	C
GW	08GWT00202	OV	PROPIONITRILE	C
GW	08GWT00301	OV	PROPIONITRILE	C
GW	08GWT00302	OV	PROPIONITRILE	C
GW	08GWT00302-D	OV	PROPIONITRILE	C
GW	08GWT00401	OV	PROPIONITRILE	C
GW	08GWT00402	OV	PROPIONITRILE	C
GW	08GWT00501	OV	PROPIONITRILE	C
GW	08GWT00502	OV	PROPIONITRILE	C
GW	08GWT00601-0603	OV	PROPIONITRILE	C
GW	08GWT00602	OV	PROPIONITRILE	C
GW	08GWT00701	OV	PROPIONITRILE	C
GW	08GWT00702	OV	PROPIONITRILE	C
GW	08GWT00801	OV	PROPIONITRILE	C
GW	08GWT00802	OV	PROPIONITRILE	C
GW	08GWT00901	OV	PROPIONITRILE	C
GW	08GWT00902	OV	PROPIONITRILE	C
GW	08GWT01001	OV	PROPIONITRILE	C
GW	08GWT01002	OV	PROPIONITRILE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
GW	08GWT01101	OV	PROPIONITRILE	C
GW	08GWT01102	OV	PROPIONITRILE	C
GW	08GWT01201	OV	PROPIONITRILE	C
GW	08GWT01301	OV	PROPIONITRILE	C
GW	08GWT01401	OV	PROPIONITRILE	C
GW	08GWTW001	OV	PROPIONITRILE	C
GW	08GWTW002	OV	PROPIONITRILE	C
GW	08GWTW003	OV	PROPIONITRILE	C
GW	08GWTW004	OV	PROPIONITRILE	C
GW	08GWTW006	OV	PROPIONITRILE	C
QC	08RB01110501	EXP	3-NITROTOLUENE	U
QC	08RB01110501	EXP	HMX	U
QC	08RB01110501	EXP	RDX	U
QC	08RB06060501	OS	2,4-DINITROPHENOL	E
QC	08SB06030501	OS	2,4-DINITROPHENOL	E
QC	08RB06060501	OS	4-NITROQUINOLINE-1-OXIDE	C
QC	08SB06030501	OS	4-NITROQUINOLINE-1-OXIDE	C
QC	08RB06060501	OS	KEPONE	C
QC	08SB06030501	OS	KEPONE	C
QC	08RB01110501	OV	ACETONITRILE	C
QC	08RB06030501	OV	ACETONITRILE	C
QC	08RB06060501	OV	ACETONITRILE	C
QC	08RB09270501	OV	ACETONITRILE	C
QC	08RB09300501	OV	ACETONITRILE	C
QC	08RB09300502	OV	ACETONITRILE	C
QC	08RB10040501	OV	ACETONITRILE	C
QC	08RB10170501	OV	ACETONITRILE	C
QC	08SB06030501	OV	ACETONITRILE	C
QC	08SB09300501	OV	ACETONITRILE	C
QC	08TB06020501	OV	ACETONITRILE	C
QC	08TB06030501	OV	ACETONITRILE	C
QC	08TB06070501	OV	ACETONITRILE	C
QC	08TB09270501	OV	ACETONITRILE	C
QC	08TB09290501	OV	ACETONITRILE	C
QC	08TB10020501	OV	ACETONITRILE	C
QC	08TB10040501	OV	ACETONITRILE	C
QC	08TB10110501	OV	ACETONITRILE	C
QC	08TB10120501	OV	ACETONITRILE	C
QC	08TB10150501	OV	ACETONITRILE	C
QC	08TB10250501	OV	ACETONITRILE	C
QC	08RB01110501	OV	ACROLEIN	C
QC	08RB06030501	OV	ACROLEIN	C
QC	08RB06060501	OV	ACROLEIN	C
QC	08RB09270501	OV	ACROLEIN	C
QC	08RB09300501	OV	ACROLEIN	C
QC	08RB09300502	OV	ACROLEIN	C
QC	08RB10040501	OV	ACROLEIN	C
QC	08RB10170501	OV	ACROLEIN	C
QC	08SB06030501	OV	ACROLEIN	C
QC	08SB09300501	OV	ACROLEIN	C
QC	08TB06020501	OV	ACROLEIN	C
QC	08TB06030501	OV	ACROLEIN	C
QC	08TB06070501	OV	ACROLEIN	C
QC	08TB09270501	OV	ACROLEIN	C
QC	08TB09290501	OV	ACROLEIN	C
QC	08TB10020501	OV	ACROLEIN	C
QC	08TB10040501	OV	ACROLEIN	C
QC	08TB10110501	OV	ACROLEIN	C
QC	08TB10120501	OV	ACROLEIN	C
QC	08TB10150501	OV	ACROLEIN	C
QC	08TB10250501	OV	ACROLEIN	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
QC	08RB01110501	OV	ISOBUTANOL	C
QC	08RB06030501	OV	ISOBUTANOL	C
QC	08RB06060501	OV	ISOBUTANOL	C
QC	08RB09270501	OV	ISOBUTANOL	C
QC	08RB09300501	OV	ISOBUTANOL	C
QC	08RB09300502	OV	ISOBUTANOL	C
QC	08RB10040501	OV	ISOBUTANOL	C
QC	08RB10170501	OV	ISOBUTANOL	C
QC	08SB06030501	OV	ISOBUTANOL	C
QC	08SB09300501	OV	ISOBUTANOL	C
QC	08TB06020501	OV	ISOBUTANOL	C
QC	08TB06030501	OV	ISOBUTANOL	C
QC	08TB06070501	OV	ISOBUTANOL	C
QC	08TB09270501	OV	ISOBUTANOL	C
QC	08TB09290501	OV	ISOBUTANOL	C
QC	08TB10020501	OV	ISOBUTANOL	C
QC	08TB10040501	OV	ISOBUTANOL	C
QC	08TB10110501	OV	ISOBUTANOL	C
QC	08TB10120501	OV	ISOBUTANOL	C
QC	08TB10150501	OV	ISOBUTANOL	C
QC	08TB10250501	OV	ISOBUTANOL	C
QC	08RB01110501	OV	PROPIONITRILE	C
QC	08RB06030501	OV	PROPIONITRILE	C
QC	08RB06060501	OV	PROPIONITRILE	C
QC	08RB09270501	OV	PROPIONITRILE	C
QC	08RB09300501	OV	PROPIONITRILE	C
QC	08RB09300502	OV	PROPIONITRILE	C
QC	08RB10040501	OV	PROPIONITRILE	C
QC	08RB10170501	OV	PROPIONITRILE	C
QC	08SB06030501	OV	PROPIONITRILE	C
QC	08SB09300501	OV	PROPIONITRILE	C
QC	08TB06020501	OV	PROPIONITRILE	C
QC	08TB06030501	OV	PROPIONITRILE	C
QC	08TB06070501	OV	PROPIONITRILE	C
QC	08TB09270501	OV	PROPIONITRILE	C
QC	08TB09290501	OV	PROPIONITRILE	C
QC	08TB10020501	OV	PROPIONITRILE	C
QC	08TB10040501	OV	PROPIONITRILE	C
QC	08TB10110501	OV	PROPIONITRILE	C
QC	08TB10120501	OV	PROPIONITRILE	C
QC	08TB10150501	OV	PROPIONITRILE	C
QC	08TB10250501	OV	PROPIONITRILE	C
SD	08SD015010006	OS	2,4-DIMETHYLPHENOL	D
SD	08SD007010006	OS	3,3'-DICHLOROBENZIDINE	D
SD	08SD015010006	OS	3,3'-DICHLOROBENZIDINE	D
SD	08SD007010006	OS	4-CHLOROANILINE	D
SD	08SD015010006	OS	4-CHLOROANILINE	D
SD	08SD001010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD001020006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD002010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD002020006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD003010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD003020006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD004010012	OS	4-NITROQUINOLINE-1-OXIDE	CY
SD	08SD004011224	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD005010012	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD005011224	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD006010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD006020006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD007010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD007010006-D	OS	4-NITROQUINOLINE-1-OXIDE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SD	08SD007020006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD008010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD008020006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD009010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD009020006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD010010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD011010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD012010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD012010006-D	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD013010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD014010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD015010006	OS	4-NITROQUINOLINE-1-OXIDE	C
SD	08SD001020006	OS	KEPONE	C
SD	08SD002020006	OS	KEPONE	C
SD	08SD003020006	OS	KEPONE	C
SD	08SD006020006	OS	KEPONE	C
SD	08SD007020006	OS	KEPONE	C
SD	08SD008020006	OS	KEPONE	C
SD	08SD009020006	OS	KEPONE	C
SD	08SD010010006	OS	KEPONE	C
SD	08SD011010006	OS	KEPONE	C
SD	08SD012010006	OS	KEPONE	C
SD	08SD012010006-D	OS	KEPONE	C
SD	08SD013010006	OS	KEPONE	C
SD	08SD014010006	OS	KEPONE	C
SD	08SD015010006	OS	KEPONE	C
SD	08SD001010006	OV	ACETONITRILE	C
SD	08SD002010006	OV	ACETONITRILE	C
SD	08SD003010006	OV	ACETONITRILE	C
SD	08SD004010012	OV	ACETONITRILE	C
SD	08SD004011224	OV	ACETONITRILE	C
SD	08SD005010012	OV	ACETONITRILE	C
SD	08SD005011224	OV	ACETONITRILE	C
SD	08SD006010006	OV	ACETONITRILE	C
SD	08SD007010006	OV	ACETONITRILE	C
SD	08SD007010006-D	OV	ACETONITRILE	C
SD	08SD008010006	OV	ACETONITRILE	C
SD	08SD009010006	OV	ACETONITRILE	C
SD	08SD010010006	OV	ACETONITRILE	C
SD	08SD011010006	OV	ACETONITRILE	C
SD	08SD012010006	OV	ACETONITRILE	C
SD	08SD012010006-D	OV	ACETONITRILE	C
SD	08SD013010006	OV	ACETONITRILE	C
SD	08SD014010006	OV	ACETONITRILE	C
SD	08SD015010006	OV	ACETONITRILE	C
SD	08SD001010006	OV	ACROLEIN	C
SD	08SD002010006	OV	ACROLEIN	C
SD	08SD003010006	OV	ACROLEIN	C
SD	08SD004010012	OV	ACROLEIN	C
SD	08SD004011224	OV	ACROLEIN	C
SD	08SD005010012	OV	ACROLEIN	C
SD	08SD005011224	OV	ACROLEIN	C
SD	08SD006010006	OV	ACROLEIN	C
SD	08SD007010006	OV	ACROLEIN	C
SD	08SD007010006-D	OV	ACROLEIN	C
SD	08SD008010006	OV	ACROLEIN	C
SD	08SD009010006	OV	ACROLEIN	C
SD	08SD010010006	OV	ACROLEIN	C
SD	08SD011010006	OV	ACROLEIN	C
SD	08SD012010006	OV	ACROLEIN	C
SD	08SD012010006-D	OV	ACROLEIN	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SD	08SD013010006	OV	ACROLEIN	C
SD	08SD014010006	OV	ACROLEIN	C
SD	08SD015010006	OV	ACROLEIN	C
SD	08SD001010006	OV	ISOBUTANOL	C
SD	08SD002010006	OV	ISOBUTANOL	C
SD	08SD003010006	OV	ISOBUTANOL	C
SD	08SD004010012	OV	ISOBUTANOL	C
SD	08SD004011224	OV	ISOBUTANOL	C
SD	08SD005010012	OV	ISOBUTANOL	C
SD	08SD005011224	OV	ISOBUTANOL	C
SD	08SD006010006	OV	ISOBUTANOL	C
SD	08SD007010006	OV	ISOBUTANOL	C
SD	08SD007010006-D	OV	ISOBUTANOL	C
SD	08SD008010006	OV	ISOBUTANOL	C
SD	08SD009010006	OV	ISOBUTANOL	C
SD	08SD010010006	OV	ISOBUTANOL	C
SD	08SD011010006	OV	ISOBUTANOL	C
SD	08SD012010006	OV	ISOBUTANOL	C
SD	08SD012010006-D	OV	ISOBUTANOL	C
SD	08SD013010006	OV	ISOBUTANOL	C
SD	08SD014010006	OV	ISOBUTANOL	C
SD	08SD015010006	OV	ISOBUTANOL	C
SD	08SD001010006	OV	PROPIONITRILE	C
SD	08SD002010006	OV	PROPIONITRILE	C
SD	08SD003010006	OV	PROPIONITRILE	C
SD	08SD0040110012	OV	PROPIONITRILE	C
SD	08SD004011224	OV	PROPIONITRILE	C
SD	08SD005010012	OV	PROPIONITRILE	C
SD	08SD005011224	OV	PROPIONITRILE	C
SD	08SD006010006	OV	PROPIONITRILE	C
SD	08SD007010006	OV	PROPIONITRILE	C
SD	08SD007010006-D	OV	PROPIONITRILE	C
SD	08SD008010006	OV	PROPIONITRILE	C
SD	08SD009010006	OV	PROPIONITRILE	C
SD	08SD010010006	OV	PROPIONITRILE	C
SD	08SD011010006	OV	PROPIONITRILE	C
SD	08SD012010006	OV	PROPIONITRILE	C
SD	08SD012010006-D	OV	PROPIONITRILE	C
SD	08SD013010006	OV	PROPIONITRILE	C
SD	08SD014010006	OV	PROPIONITRILE	C
SD	08SD015010006	OV	PROPIONITRILE	C
SO	08SB0040206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0050206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0060206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0060610	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0070206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0070610	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0071013	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0080206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0080610	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0090206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0090610	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0090610-D	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0100206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0110206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0120206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0120206-D	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0130206	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0010002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0020002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0030002	OS	4-NITROQUINOLINE-1-OXIDE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SS0040002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0050002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0060002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0070002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0080002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0090002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0100002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0110002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0120002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SS0130002	OS	4-NITROQUINOLINE-1-OXIDE	C
SO	08SB0040206	OS	KEPONE	C
SO	08SB0050206	OS	KEPONE	C
SO	08SB0060206	OS	KEPONE	C
SO	08SB0060610	OS	KEPONE	C
SO	08SB0070206	OS	KEPONE	C
SO	08SB0070610	OS	KEPONE	C
SO	08SB0071013	OS	KEPONE	C
SO	08SB0080206	OS	KEPONE	C
SO	08SB0080610	OS	KEPONE	C
SO	08SB0090206	OS	KEPONE	C
SO	08SB0090610	OS	KEPONE	C
SO	08SS0040002	OS	KEPONE	C
SO	08SS0060002	OS	KEPONE	C
SO	08SS0070002	OS	KEPONE	C
SO	08SS0080002	OS	KEPONE	C
SO	08SS0090002	OS	KEPONE	C
SO	08SB0160203	OV	ACETONE	C
SO	08SB0180204	OV	ACETONE	C
SO	08SB0240203	OV	ACETONE	C
SO	08SB0320607	OV	ACETONE	C
SO	08SB0400204	OV	ACETONE	C
SO	08SS0160002	OV	ACETONE	C
SO	08SS0170002	OV	ACETONE	C
SO	08SS0180002	OV	ACETONE	C
SO	08SS0200002	OV	ACETONE	C
SO	08SS0210002	OV	ACETONE	C
SO	08SS0240002	OV	ACETONE	C
SO	08SS0400002	OV	ACETONE	C
SO	08SB0040206	OV	ACETONITRILE	C
SO	08SB0050206	OV	ACETONITRILE	C
SO	08SB0060206	OV	ACETONITRILE	C
SO	08SB0060610	OV	ACETONITRILE	C
SO	08SB0070206	OV	ACETONITRILE	C
SO	08SB0070610	OV	ACETONITRILE	C
SO	08SB0071013	OV	ACETONITRILE	C
SO	08SB0080206	OV	ACETONITRILE	C
SO	08SB0080610	OV	ACETONITRILE	C
SO	08SB0090206	OV	ACETONITRILE	C
SO	08SB0090610	OV	ACETONITRILE	C
SO	08SB0090610-D	OV	ACETONITRILE	C
SO	08SB0100206	OV	ACETONITRILE	C
SO	08SB0100610	OV	ACETONITRILE	C
SO	08SB0101013	OV	ACETONITRILE	C
SO	08SB0110206	OV	ACETONITRILE	C
SO	08SB0120206	OV	ACETONITRILE	C
SO	08SB0120206-D	OV	ACETONITRILE	C
SO	08SB0120610	OV	ACETONITRILE	C
SO	08SB0121018	OV	ACETONITRILE	C
SO	08SB0130206	OV	ACETONITRILE	C
SO	08SB0130610	OV	ACETONITRILE	C
SO	08SB0131013	OV	ACETONITRILE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SB0150406	OV	ACETONITRILE	C
SO	08SB0160203	OV	ACETONITRILE	C
SO	08SB0180204	OV	ACETONITRILE	C
SO	08SB0200204	OV	ACETONITRILE	C
SO	08SB0210204	OV	ACETONITRILE	C
SO	08SB0220608	OV	ACETONITRILE	C
SO	08SB0240203	OV	ACETONITRILE	C
SO	08SB0250206	OV	ACETONITRILE	C
SO	08SB0250608	OV	ACETONITRILE	C
SO	08SB0260406	OV	ACETONITRILE	C
SO	08SB0270406	OV	ACETONITRILE	C
SO	08SB0280406	OV	ACETONITRILE	C
SO	08SB0290406	OV	ACETONITRILE	C
SO	08SB0310406	OV	ACETONITRILE	C
SO	08SB0310406-D	OV	ACETONITRILE	C
SO	08SB0320607	OV	ACETONITRILE	C
SO	08SB0330406	OV	ACETONITRILE	C
SO	08SB0330406-D	OV	ACETONITRILE	C
SO	08SB0340406	OV	ACETONITRILE	C
SO	08SB0350305	OV	ACETONITRILE	C
SO	08SB0400204	OV	ACETONITRILE	C
SO	08SB0410406	OV	ACETONITRILE	C
SO	08SB0420406	OV	ACETONITRILE	C
SO	08SB0430305	OV	ACETONITRILE	C
SO	08SB0440204	OV	ACETONITRILE	C
SO	08SB0450204	OV	ACETONITRILE	C
SO	08SS0010002	OV	ACETONITRILE	C
SO	08SS0020002	OV	ACETONITRILE	C
SO	08SS0030002	OV	ACETONITRILE	C
SO	08SS0040002	OV	ACETONITRILE	C
SO	08SS0050002	OV	ACETONITRILE	C
SO	08SS0060002	OV	ACETONITRILE	C
SO	08SS0070002	OV	ACETONITRILE	C
SO	08SS0080002	OV	ACETONITRILE	C
SO	08SS0090002	OV	ACETONITRILE	C
SO	08SS0100002	OV	ACETONITRILE	C
SO	08SS0110002	OV	ACETONITRILE	C
SO	08SS0120002	OV	ACETONITRILE	C
SO	08SS0130002	OV	ACETONITRILE	C
SO	08SS0150002	OV	ACETONITRILE	C
SO	08SS0160002	OV	ACETONITRILE	C
SO	08SS0170002	OV	ACETONITRILE	C
SO	08SS0180002	OV	ACETONITRILE	C
SO	08SS0190002	OV	ACETONITRILE	C
SO	08SS0200002	OV	ACETONITRILE	C
SO	08SS0210002	OV	ACETONITRILE	C
SO	08SS0220002	OV	ACETONITRILE	C
SO	08SS0230002	OV	ACETONITRILE	C
SO	08SS0240002	OV	ACETONITRILE	C
SO	08SS0250002	OV	ACETONITRILE	C
SO	08SS0260002	OV	ACETONITRILE	C
SO	08SS0270002	OV	ACETONITRILE	C
SO	08SS0280002	OV	ACETONITRILE	C
SO	08SS0290002	OV	ACETONITRILE	C
SO	08SS0300002	OV	ACETONITRILE	C
SO	08SS0310002	OV	ACETONITRILE	C
SO	08SS0320002	OV	ACETONITRILE	C
SO	08SS0330002	OV	ACETONITRILE	C
SO	08SS0340002	OV	ACETONITRILE	C
SO	08SS0350002	OV	ACETONITRILE	C
SO	08SS0360002	OV	ACETONITRILE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SS0370002	OV	ACETONITRILE	C
SO	08SS0380002	OV	ACETONITRILE	C
SO	08SS0390002	OV	ACETONITRILE	C
SO	08SS0400002	OV	ACETONITRILE	C
SO	08SS0410002	OV	ACETONITRILE	C
SO	08SS0420002	OV	ACETONITRILE	C
SO	08SS0430002	OV	ACETONITRILE	C
SO	08SS0440002	OV	ACETONITRILE	C
SO	08SS0450002	OV	ACETONITRILE	C
SO	08SS0450002-D	OV	ACETONITRILE	C
SO	08SB0040206	OV	ACROLEIN	C
SO	08SB0050206	OV	ACROLEIN	C
SO	08SB0060206	OV	ACROLEIN	C
SO	08SB0060610	OV	ACROLEIN	C
SO	08SB0070206	OV	ACROLEIN	C
SO	08SB0070610	OV	ACROLEIN	C
SO	08SB0071013	OV	ACROLEIN	C
SO	08SB0080206	OV	ACROLEIN	C
SO	08SB0080610	OV	ACROLEIN	C
SO	08SB0090206	OV	ACROLEIN	C
SO	08SB0090610	OV	ACROLEIN	C
SO	08SB0090610-D	OV	ACROLEIN	C
SO	08SB0100206	OV	ACROLEIN	C
SO	08SB0100610	OV	ACROLEIN	C
SO	08SB0101013	OV	ACROLEIN	C
SO	08SB0110206	OV	ACROLEIN	C
SO	08SB0120206	OV	ACROLEIN	C
SO	08SB0120206-D	OV	ACROLEIN	C
SO	08SB0120610	OV	ACROLEIN	C
SO	08SB0121018	OV	ACROLEIN	C
SO	08SB0130206	OV	ACROLEIN	C
SO	08SB0130610	OV	ACROLEIN	C
SO	08SB0131013	OV	ACROLEIN	C
SO	08SB0150406	OV	ACROLEIN	C
SO	08SB0160203	OV	ACROLEIN	C
SO	08SB0180204	OV	ACROLEIN	C
SO	08SB0200204	OV	ACROLEIN	C
SO	08SB0210204	OV	ACROLEIN	C
SO	08SB0220608	OV	ACROLEIN	C
SO	08SB0240203	OV	ACROLEIN	C
SO	08SB0250206	OV	ACROLEIN	C
SO	08SB0250608	OV	ACROLEIN	C
SO	08SB0260406	OV	ACROLEIN	C
SO	08SB0270406	OV	ACROLEIN	C
SO	08SB0280406	OV	ACROLEIN	C
SO	08SB0290406	OV	ACROLEIN	C
SO	08SB0310406	OV	ACROLEIN	C
SO	08SB0310406-D	OV	ACROLEIN	C
SO	08SB0320607	OV	ACROLEIN	C
SO	08SB0330406	OV	ACROLEIN	C
SO	08SB0330406-D	OV	ACROLEIN	C
SO	08SB0340406	OV	ACROLEIN	C
SO	08SB0350305	OV	ACROLEIN	C
SO	08SB0400204	OV	ACROLEIN	C
SO	08SB0410406	OV	ACROLEIN	C
SO	08SB0420406	OV	ACROLEIN	C
SO	08SB0430305	OV	ACROLEIN	C
SO	08SB0440204	OV	ACROLEIN	C
SO	08SB0450204	OV	ACROLEIN	C
SO	08SS0010002	OV	ACROLEIN	C
SO	08SS0020002	OV	ACROLEIN	C

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REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SS0030002	OV	ACROLEIN	C
SO	08SS0040002	OV	ACROLEIN	C
SO	08SS0050002	OV	ACROLEIN	C
SO	08SS0060002	OV	ACROLEIN	C
SO	08SS0070002	OV	ACROLEIN	C
SO	08SS0080002	OV	ACROLEIN	C
SO	08SS0090002	OV	ACROLEIN	C
SO	08SS0100002	OV	ACROLEIN	C
SO	08SS0110002	OV	ACROLEIN	C
SO	08SS0120002	OV	ACROLEIN	C
SO	08SS0130002	OV	ACROLEIN	C
SO	08SS0150002	OV	ACROLEIN	C
SO	08SS0160002	OV	ACROLEIN	C
SO	08SS0170002	OV	ACROLEIN	C
SO	08SS0180002	OV	ACROLEIN	C
SO	08SS0190002	OV	ACROLEIN	C
SO	08SS0200002	OV	ACROLEIN	C
SO	08SS0210002	OV	ACROLEIN	C
SO	08SS0220002	OV	ACROLEIN	C
SO	08SS0230002	OV	ACROLEIN	C
SO	08SS0240002	OV	ACROLEIN	C
SO	08SS0250002	OV	ACROLEIN	C
SO	08SS0260002	OV	ACROLEIN	C
SO	08SS0270002	OV	ACROLEIN	C
SO	08SS0280002	OV	ACROLEIN	C
SO	08SS0290002	OV	ACROLEIN	C
SO	08SS0300002	OV	ACROLEIN	C
SO	08SS0310002	OV	ACROLEIN	C
SO	08SS0320002	OV	ACROLEIN	C
SO	08SS0330002	OV	ACROLEIN	C
SO	08SS0340002	OV	ACROLEIN	C
SO	08SS0350002	OV	ACROLEIN	C
SO	08SS0360002	OV	ACROLEIN	C
SO	08SS0370002	OV	ACROLEIN	C
SO	08SS0380002	OV	ACROLEIN	C
SO	08SS0390002	OV	ACROLEIN	C
SO	08SS0400002	OV	ACROLEIN	C
SO	08SS0410002	OV	ACROLEIN	C
SO	08SS0420002	OV	ACROLEIN	C
SO	08SS0430002	OV	ACROLEIN	C
SO	08SS0440002	OV	ACROLEIN	C
SO	08SS0450002	OV	ACROLEIN	C
SO	08SS0450002-D	OV	ACROLEIN	C
SO	08SB0040206	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0060206	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0060610	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0070206	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0070610	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0071013	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0080206	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0090206	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0090610	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0090610-D	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0100610	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0101013	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0120610	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0121018	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0130610	OV	DICHLORODIFLUOROMETHANE	C
SO	08SS0080002	OV	DICHLORODIFLUOROMETHANE	C
SO	08SB0040206	OV	ISOBUTANOL	C
SO	08SB0050206	OV	ISOBUTANOL	C

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REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SB0060206	OV	ISOBUTANOL	C
SO	08SB0060610	OV	ISOBUTANOL	C
SO	08SB0070206	OV	ISOBUTANOL	C
SO	08SB0070610	OV	ISOBUTANOL	C
SO	08SB0071013	OV	ISOBUTANOL	C
SO	08SB0080206	OV	ISOBUTANOL	C
SO	08SB0080610	OV	ISOBUTANOL	C
SO	08SB0090206	OV	ISOBUTANOL	C
SO	08SB0090610	OV	ISOBUTANOL	C
SO	08SB0090610-D	OV	ISOBUTANOL	C
SO	08SB0100206	OV	ISOBUTANOL	C
SO	08SB0100610	OV	ISOBUTANOL	C
SO	08SB0101013	OV	ISOBUTANOL	C
SO	08SB0110206	OV	ISOBUTANOL	C
SO	08SB0120206	OV	ISOBUTANOL	C
SO	08SB0120206-D	OV	ISOBUTANOL	C
SO	08SB0120610	OV	ISOBUTANOL	C
SO	08SB0121018	OV	ISOBUTANOL	C
SO	08SB0130206	OV	ISOBUTANOL	C
SO	08SB0130610	OV	ISOBUTANOL	C
SO	08SB0131013	OV	ISOBUTANOL	C
SO	08SB0150406	OV	ISOBUTANOL	C
SO	08SB0160203	OV	ISOBUTANOL	C
SO	08SB0180204	OV	ISOBUTANOL	C
SO	08SB0200204	OV	ISOBUTANOL	C
SO	08SB0210204	OV	ISOBUTANOL	C
SO	08SB0220608	OV	ISOBUTANOL	C
SO	08SB0240203	OV	ISOBUTANOL	C
SO	08SB0250206	OV	ISOBUTANOL	C
SO	08SB0250608	OV	ISOBUTANOL	C
SO	08SB0260406	OV	ISOBUTANOL	C
SO	08SB0270406	OV	ISOBUTANOL	C
SO	08SB0280406	OV	ISOBUTANOL	C
SO	08SB0290406	OV	ISOBUTANOL	C
SO	08SB0310406	OV	ISOBUTANOL	C
SO	08SB0310406-D	OV	ISOBUTANOL	C
SO	08SB0320607	OV	ISOBUTANOL	C
SO	08SB0330406	OV	ISOBUTANOL	C
SO	08SB0330406-D	OV	ISOBUTANOL	C
SO	08SB0340406	OV	ISOBUTANOL	C
SO	08SB0350305	OV	ISOBUTANOL	C
SO	08SB0400204	OV	ISOBUTANOL	C
SO	08SB0410406	OV	ISOBUTANOL	C
SO	08SB0420406	OV	ISOBUTANOL	C
SO	08SB0430305	OV	ISOBUTANOL	C
SO	08SB0440204	OV	ISOBUTANOL	C
SO	08SB0450204	OV	ISOBUTANOL	C
SO	08SS0010002	OV	ISOBUTANOL	C
SO	08SS0020002	OV	ISOBUTANOL	C
SO	08SS0030002	OV	ISOBUTANOL	C
SO	08SS0040002	OV	ISOBUTANOL	C
SO	08SS0050002	OV	ISOBUTANOL	C
SO	08SS0060002	OV	ISOBUTANOL	C
SO	08SS0070002	OV	ISOBUTANOL	C
SO	08SS0080002	OV	ISOBUTANOL	C
SO	08SS0090002	OV	ISOBUTANOL	C
SO	08SS0100002	OV	ISOBUTANOL	C
SO	08SS0110002	OV	ISOBUTANOL	C
SO	08SS0120002	OV	ISOBUTANOL	C
SO	08SS0130002	OV	ISOBUTANOL	C
SO	08SS0150002	OV	ISOBUTANOL	C

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REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SS0160002	OV	ISOBUTANOL	C
SO	08SS0170002	OV	ISOBUTANOL	C
SO	08SS0180002	OV	ISOBUTANOL	C
SO	08SS0190002	OV	ISOBUTANOL	C
SO	08SS0200002	OV	ISOBUTANOL	C
SO	08SS0210002	OV	ISOBUTANOL	C
SO	08SS0220002	OV	ISOBUTANOL	C
SO	08SS0230002	OV	ISOBUTANOL	C
SO	08SS0240002	OV	ISOBUTANOL	C
SO	08SS0250002	OV	ISOBUTANOL	C
SO	08SS0260002	OV	ISOBUTANOL	C
SO	08SS0270002	OV	ISOBUTANOL	C
SO	08SS0280002	OV	ISOBUTANOL	C
SO	08SS0290002	OV	ISOBUTANOL	C
SO	08SS0300002	OV	ISOBUTANOL	C
SO	08SS0310002	OV	ISOBUTANOL	C
SO	08SS0320002	OV	ISOBUTANOL	C
SO	08SS0330002	OV	ISOBUTANOL	C
SO	08SS0340002	OV	ISOBUTANOL	C
SO	08SS0350002	OV	ISOBUTANOL	C
SO	08SS0360002	OV	ISOBUTANOL	C
SO	08SS0370002	OV	ISOBUTANOL	C
SO	08SS0380002	OV	ISOBUTANOL	C
SO	08SS0390002	OV	ISOBUTANOL	C
SO	08SS0400002	OV	ISOBUTANOL	C
SO	08SS0410002	OV	ISOBUTANOL	C
SO	08SS0420002	OV	ISOBUTANOL	C
SO	08SS0430002	OV	ISOBUTANOL	C
SO	08SS0440002	OV	ISOBUTANOL	C
SO	08SS0450002	OV	ISOBUTANOL	C
SO	08SS0450002-D	OV	ISOBUTANOL	C
SO	08SB0040206	OV	PROPIONITRILE	C
SO	08SB0050206	OV	PROPIONITRILE	C
SO	08SB0060206	OV	PROPIONITRILE	C
SO	08SB0060610	OV	PROPIONITRILE	C
SO	08SB0070206	OV	PROPIONITRILE	C
SO	08SB0070610	OV	PROPIONITRILE	C
SO	08SB0071013	OV	PROPIONITRILE	C
SO	08SB0080206	OV	PROPIONITRILE	C
SO	08SB0080610	OV	PROPIONITRILE	C
SO	08SB0090206	OV	PROPIONITRILE	C
SO	08SB0090610	OV	PROPIONITRILE	C
SO	08SB0090610-D	OV	PROPIONITRILE	C
SO	08SB0100206	OV	PROPIONITRILE	C
SO	08SB0100610	OV	PROPIONITRILE	C
SO	08SB0101013	OV	PROPIONITRILE	C
SO	08SB0110206	OV	PROPIONITRILE	C
SO	08SB0120206	OV	PROPIONITRILE	C
SO	08SB0120206-D	OV	PROPIONITRILE	C
SO	08SB0120610	OV	PROPIONITRILE	C
SO	08SB0121018	OV	PROPIONITRILE	C
SO	08SB0130206	OV	PROPIONITRILE	C
SO	08SB0130610	OV	PROPIONITRILE	C
SO	08SB0131013	OV	PROPIONITRILE	C
SO	08SB0150406	OV	PROPIONITRILE	C
SO	08SB0160203	OV	PROPIONITRILE	C
SO	08SB0180204	OV	PROPIONITRILE	C
SO	08SB0200204	OV	PROPIONITRILE	C
SO	08SB0210204	OV	PROPIONITRILE	C
SO	08SB0220608	OV	PROPIONITRILE	C
SO	08SB0240203	OV	PROPIONITRILE	C

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REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SB0250206	OV	PROPIONITRILE	C
SO	08SB0250608	OV	PROPIONITRILE	C
SO	08SB0260406	OV	PROPIONITRILE	C
SO	08SB0270406	OV	PROPIONITRILE	C
SO	08SB0280406	OV	PROPIONITRILE	C
SO	08SB0290406	OV	PROPIONITRILE	C
SO	08SB0310406	OV	PROPIONITRILE	C
SO	08SB0310406-D	OV	PROPIONITRILE	C
SO	08SB0320607	OV	PROPIONITRILE	C
SO	08SB0330406	OV	PROPIONITRILE	C
SO	08SB0330406-D	OV	PROPIONITRILE	C
SO	08SB0340406	OV	PROPIONITRILE	C
SO	08SB0350305	OV	PROPIONITRILE	C
SO	08SB0400204	OV	PROPIONITRILE	C
SO	08SB0410406	OV	PROPIONITRILE	C
SO	08SB0420406	OV	PROPIONITRILE	C
SO	08SB0430305	OV	PROPIONITRILE	C
SO	08SB0440204	OV	PROPIONITRILE	C
SO	08SB0450204	OV	PROPIONITRILE	C
SO	08SS0010002	OV	PROPIONITRILE	C
SO	08SS0020002	OV	PROPIONITRILE	C
SO	08SS0030002	OV	PROPIONITRILE	C
SO	08SS0040002	OV	PROPIONITRILE	C
SO	08SS0050002	OV	PROPIONITRILE	C
SO	08SS0060002	OV	PROPIONITRILE	C
SO	08SS0070002	OV	PROPIONITRILE	C
SO	08SS0080002	OV	PROPIONITRILE	C
SO	08SS0090002	OV	PROPIONITRILE	C
SO	08SS0100002	OV	PROPIONITRILE	C
SO	08SS0110002	OV	PROPIONITRILE	C
SO	08SS0120002	OV	PROPIONITRILE	C
SO	08SS0130002	OV	PROPIONITRILE	C
SO	08SS0150002	OV	PROPIONITRILE	C
SO	08SS0160002	OV	PROPIONITRILE	C
SO	08SS0170002	OV	PROPIONITRILE	C
SO	08SS0180002	OV	PROPIONITRILE	C
SO	08SS0190002	OV	PROPIONITRILE	C
SO	08SS0200002	OV	PROPIONITRILE	C
SO	08SS0210002	OV	PROPIONITRILE	C
SO	08SS0220002	OV	PROPIONITRILE	C
SO	08SS0230002	OV	PROPIONITRILE	C
SO	08SS0240002	OV	PROPIONITRILE	C
SO	08SS0250002	OV	PROPIONITRILE	C
SO	08SS0260002	OV	PROPIONITRILE	C
SO	08SS0270002	OV	PROPIONITRILE	C
SO	08SS0280002	OV	PROPIONITRILE	C
SO	08SS0290002	OV	PROPIONITRILE	C
SO	08SS0300002	OV	PROPIONITRILE	C
SO	08SS0310002	OV	PROPIONITRILE	C
SO	08SS0320002	OV	PROPIONITRILE	C
SO	08SS0330002	OV	PROPIONITRILE	C
SO	08SS0340002	OV	PROPIONITRILE	C
SO	08SS0350002	OV	PROPIONITRILE	C
SO	08SS0360002	OV	PROPIONITRILE	C
SO	08SS0370002	OV	PROPIONITRILE	C
SO	08SS0380002	OV	PROPIONITRILE	C
SO	08SS0390002	OV	PROPIONITRILE	C
SO	08SS0400002	OV	PROPIONITRILE	C
SO	08SS0410002	OV	PROPIONITRILE	C
SO	08SS0420002	OV	PROPIONITRILE	C
SO	08SS0430002	OV	PROPIONITRILE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SO	08SS0440002	OV	PROPIONITRILE	C
SO	08SS0450002	OV	PROPIONITRILE	C
SO	08SS0450002-D	OV	PROPIONITRILE	C
SP	08SP00201	OV	ACETONITRILE	C
SP	08SP00202	OV	ACETONITRILE	C
SP	08SP00201	OV	ACROLEIN	C
SP	08SP00202	OV	ACROLEIN	C
SP	08SP00201	OV	ISOBUTANOL	C
SP	08SP00202	OV	ISOBUTANOL	C
SP	08SP00201	OV	PROPIONITRILE	C
SP	08SP00202	OV	PROPIONITRILE	C
SU	08SU00101	OS	4-NITROQUINOLINE-1-OXIDE	C
SU	08SU00101	OS	KEPONE	C
SU	08SU00101	OV	ACETONITRILE	C
SU	08SU00101	OV	ACROLEIN	C
SU	08SU00101	OV	ISOBUTANOL	C
SU	08SU00101	OV	PROPIONITRILE	C
SW	08SW00402	OS	2,3,4,6-TETRACHLOROPHENOL	R
SW	08SW00501	OS	2,3,4,6-TETRACHLOROPHENOL	R
SW	08SW00502	OS	2,3,4,6-TETRACHLOROPHENOL	R
SW	08SW00402	OS	2,4,5-TRICHLOROPHENOL	R
SW	08SW00501	OS	2,4,5-TRICHLOROPHENOL	R
SW	08SW00502	OS	2,4,5-TRICHLOROPHENOL	R
SW	08SW00402	OS	2,4,6-TRICHLOROPHENOL	R
SW	08SW00501	OS	2,4,6-TRICHLOROPHENOL	R
SW	08SW00502	OS	2,4,6-TRICHLOROPHENOL	R
SW	08SW00402	OS	2,4-DICHLOROPHENOL	R
SW	08SW00501	OS	2,4-DICHLOROPHENOL	R
SW	08SW00502	OS	2,4-DICHLOROPHENOL	R
SW	08SW00402	OS	2,4-DIMETHYLPHENOL	R
SW	08SW00501	OS	2,4-DIMETHYLPHENOL	R
SW	08SW00502	OS	2,4-DIMETHYLPHENOL	R
SW	08SW00302	OS	2,4-DINITROPHENOL	E
SW	08SW00402	OS	2,4-DINITROPHENOL	R
SW	08SW00501	OS	2,4-DINITROPHENOL	R
SW	08SW00502	OS	2,4-DINITROPHENOL	R
SW	08SW00702	OS	2,4-DINITROPHENOL	E
SW	08SW00802	OS	2,4-DINITROPHENOL	E
SW	08SW00902	OS	2,4-DINITROPHENOL	E
SW	08SW01001	OS	2,4-DINITROPHENOL	E
SW	08SW01201	OS	2,4-DINITROPHENOL	E
SW	08SW01201-D	OS	2,4-DINITROPHENOL	E
SW	08SW01401	OS	2,4-DINITROPHENOL	E
SW	08SW01501	OS	2,4-DINITROPHENOL	E
SW	08SW00402	OS	2,6-DICHLOROPHENOL	R
SW	08SW00501	OS	2,6-DICHLOROPHENOL	R
SW	08SW00502	OS	2,6-DICHLOROPHENOL	R
SW	08SW00402	OS	2-CHLOROPHENOL	R
SW	08SW00501	OS	2-CHLOROPHENOL	R
SW	08SW00502	OS	2-CHLOROPHENOL	R
SW	08SW00402	OS	2-METHYLPHENOL	R
SW	08SW00501	OS	2-METHYLPHENOL	R
SW	08SW00502	OS	2-METHYLPHENOL	R
SW	08SW00402	OS	2-NITROPHENOL	R
SW	08SW00501	OS	2-NITROPHENOL	R
SW	08SW00502	OS	2-NITROPHENOL	R
SW	08SW00402	OS	3&4-METHYLPHENOL	R
SW	08SW00501	OS	3&4-METHYLPHENOL	R
SW	08SW00502	OS	3&4-METHYLPHENOL	R
SW	08SW00402	OS	4,6-DINITRO-2-METHYLPHENOL	R
SW	08SW00501	OS	4,6-DINITRO-2-METHYLPHENOL	R

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SW	08SW00502	OS	4,6-DINITRO-2-METHYLPHENOL	R
SW	08SW00402	OS	4-CHLORO-3-METHYLPHENOL	R
SW	08SW00501	OS	4-CHLORO-3-METHYLPHENOL	R
SW	08SW00502	OS	4-CHLORO-3-METHYLPHENOL	R
SW	08SW00402	OS	4-NITROPHENOL	R
SW	08SW00501	OS	4-NITROPHENOL	R
SW	08SW00502	OS	4-NITROPHENOL	R
SW	08SW00701	OS	4-NITROPHENOL	D
SW	08SW00101	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00301	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00302	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00401	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00402	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00501	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00502	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00601	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00701	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00701-D	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00702	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00801	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00802	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00901	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00902	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW01001	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW01201	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW01201-D	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW01401	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW01501	OS	4-NITROQUINOLINE-1-OXIDE	C
SW	08SW00302	OS	KEPONE	C
SW	08SW00702	OS	KEPONE	C
SW	08SW00802	OS	KEPONE	C
SW	08SW00902	OS	KEPONE	C
SW	08SW01001	OS	KEPONE	C
SW	08SW01201	OS	KEPONE	C
SW	08SW01201-D	OS	KEPONE	C
SW	08SW01401	OS	KEPONE	C
SW	08SW01501	OS	KEPONE	C
SW	08SW00402	OS	PHENOL	R
SW	08SW00501	OS	PHENOL	R
SW	08SW00502	OS	PHENOL	R
SW	08SW00101	OV	ACETONITRILE	C
SW	08SW00102	OV	ACETONITRILE	C
SW	08SW00201	OV	ACETONITRILE	C
SW	08SW00301	OV	ACETONITRILE	C
SW	08SW00302	OV	ACETONITRILE	C
SW	08SW00303	OV	ACETONITRILE	C
SW	08SW00401	OV	ACETONITRILE	C
SW	08SW00402	OV	ACETONITRILE	C
SW	08SW00403	OV	ACETONITRILE	C
SW	08SW00403-D	OV	ACETONITRILE	C
SW	08SW00501	OV	ACETONITRILE	C
SW	08SW00502	OV	ACETONITRILE	C
SW	08SW00601	OV	ACETONITRILE	C
SW	08SW00701	OV	ACETONITRILE	C
SW	08SW00701-D	OV	ACETONITRILE	C
SW	08SW00702	OV	ACETONITRILE	C
SW	08SW00801	OV	ACETONITRILE	C
SW	08SW00802	OV	ACETONITRILE	C
SW	08SW00803	OV	ACETONITRILE	C
SW	08SW00901	OV	ACETONITRILE	C
SW	08SW00902	OV	ACETONITRILE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SW	08SW00903	OV	ACETONITRILE	C
SW	08SW01001	OV	ACETONITRILE	C
SW	08SW01002	OV	ACETONITRILE	C
SW	08SW01101	OV	ACETONITRILE	C
SW	08SW01201	OV	ACETONITRILE	C
SW	08SW01201-D	OV	ACETONITRILE	C
SW	08SW01301	OV	ACETONITRILE	C
SW	08SW01401	OV	ACETONITRILE	C
SW	08SW01402	OV	ACETONITRILE	C
SW	08SW01501	OV	ACETONITRILE	C
SW	08SW01502	OV	ACETONITRILE	C
SW	08SW01701	OV	ACETONITRILE	C
SW	08SW01801	OV	ACETONITRILE	C
SW	08SW02001	OV	ACETONITRILE	C
SW	08SW02101	OV	ACETONITRILE	C
SW	08SW00101	OV	ACROLEIN	C
SW	08SW00102	OV	ACROLEIN	C
SW	08SW00201	OV	ACROLEIN	C
SW	08SW00301	OV	ACROLEIN	C
SW	08SW00302	OV	ACROLEIN	C
SW	08SW00303	OV	ACROLEIN	C
SW	08SW00401	OV	ACROLEIN	C
SW	08SW00402	OV	ACROLEIN	C
SW	08SW00403	OV	ACROLEIN	C
SW	08SW00403-D	OV	ACROLEIN	C
SW	08SW00501	OV	ACROLEIN	C
SW	08SW00502	OV	ACROLEIN	C
SW	08SW00601	OV	ACROLEIN	C
SW	08SW00701	OV	ACROLEIN	C
SW	08SW00701-D	OV	ACROLEIN	C
SW	08SW00702	OV	ACROLEIN	C
SW	08SW00801	OV	ACROLEIN	C
SW	08SW00802	OV	ACROLEIN	C
SW	08SW00803	OV	ACROLEIN	C
SW	08SW00901	OV	ACROLEIN	C
SW	08SW00902	OV	ACROLEIN	C
SW	08SW00903	OV	ACROLEIN	C
SW	08SW01001	OV	ACROLEIN	C
SW	08SW01002	OV	ACROLEIN	C
SW	08SW01101	OV	ACROLEIN	C
SW	08SW01201	OV	ACROLEIN	C
SW	08SW01201-D	OV	ACROLEIN	C
SW	08SW01301	OV	ACROLEIN	C
SW	08SW01401	OV	ACROLEIN	C
SW	08SW01402	OV	ACROLEIN	C
SW	08SW01501	OV	ACROLEIN	C
SW	08SW01502	OV	ACROLEIN	C
SW	08SW01701	OV	ACROLEIN	C
SW	08SW01801	OV	ACROLEIN	C
SW	08SW02001	OV	ACROLEIN	C
SW	08SW02101	OV	ACROLEIN	C
SW	08SW00101	OV	ISOBUTANOL	C
SW	08SW00102	OV	ISOBUTANOL	C
SW	08SW00201	OV	ISOBUTANOL	C
SW	08SW00301	OV	ISOBUTANOL	C
SW	08SW00302	OV	ISOBUTANOL	C
SW	08SW00303	OV	ISOBUTANOL	C
SW	08SW00401	OV	ISOBUTANOL	C
SW	08SW00402	OV	ISOBUTANOL	C
SW	08SW00403	OV	ISOBUTANOL	C
SW	08SW00403-D	OV	ISOBUTANOL	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SW	08SW00501	OV	ISOBUTANOL	C
SW	08SW00502	OV	ISOBUTANOL	C
SW	08SW00601	OV	ISOBUTANOL	C
SW	08SW00701	OV	ISOBUTANOL	C
SW	08SW00701-D	OV	ISOBUTANOL	C
SW	08SW00702	OV	ISOBUTANOL	C
SW	08SW00801	OV	ISOBUTANOL	C
SW	08SW00802	OV	ISOBUTANOL	C
SW	08SW00803	OV	ISOBUTANOL	C
SW	08SW00901	OV	ISOBUTANOL	C
SW	08SW00902	OV	ISOBUTANOL	C
SW	08SW00903	OV	ISOBUTANOL	C
SW	08SW01001	OV	ISOBUTANOL	C
SW	08SW01002	OV	ISOBUTANOL	C
SW	08SW01101	OV	ISOBUTANOL	C
SW	08SW01201	OV	ISOBUTANOL	C
SW	08SW01201-D	OV	ISOBUTANOL	C
SW	08SW01301	OV	ISOBUTANOL	C
SW	08SW01401	OV	ISOBUTANOL	C
SW	08SW01402	OV	ISOBUTANOL	C
SW	08SW01501	OV	ISOBUTANOL	C
SW	08SW01502	OV	ISOBUTANOL	C
SW	08SW01701	OV	ISOBUTANOL	C
SW	08SW01801	OV	ISOBUTANOL	C
SW	08SW02001	OV	ISOBUTANOL	C
SW	08SW02101	OV	ISOBUTANOL	C
SW	08SW00101	OV	PROPIONITRILE	C
SW	08SW00102	OV	PROPIONITRILE	C
SW	08SW00201	OV	PROPIONITRILE	C
SW	08SW00301	OV	PROPIONITRILE	C
SW	08SW00302	OV	PROPIONITRILE	C
SW	08SW00303	OV	PROPIONITRILE	C
SW	08SW00401	OV	PROPIONITRILE	C
SW	08SW00402	OV	PROPIONITRILE	C
SW	08SW00403	OV	PROPIONITRILE	C
SW	08SW00403-D	OV	PROPIONITRILE	C
SW	08SW00501	OV	PROPIONITRILE	C
SW	08SW00502	OV	PROPIONITRILE	C
SW	08SW00601	OV	PROPIONITRILE	C
SW	08SW00701	OV	PROPIONITRILE	C
SW	08SW00701-D	OV	PROPIONITRILE	C
SW	08SW00702	OV	PROPIONITRILE	C
SW	08SW00801	OV	PROPIONITRILE	C
SW	08SW00802	OV	PROPIONITRILE	C
SW	08SW00803	OV	PROPIONITRILE	C
SW	08SW00901	OV	PROPIONITRILE	C
SW	08SW00902	OV	PROPIONITRILE	C
SW	08SW00903	OV	PROPIONITRILE	C
SW	08SW01001	OV	PROPIONITRILE	C
SW	08SW01002	OV	PROPIONITRILE	C
SW	08SW01101	OV	PROPIONITRILE	C
SW	08SW01201	OV	PROPIONITRILE	C
SW	08SW01201-D	OV	PROPIONITRILE	C
SW	08SW01301	OV	PROPIONITRILE	C
SW	08SW01401	OV	PROPIONITRILE	C
SW	08SW01402	OV	PROPIONITRILE	C
SW	08SW01501	OV	PROPIONITRILE	C
SW	08SW01502	OV	PROPIONITRILE	C
SW	08SW01701	OV	PROPIONITRILE	C
SW	08SW01801	OV	PROPIONITRILE	C
SW	08SW02001	OV	PROPIONITRILE	C

TABLE H-3

REJECTED RESULTS FOR ALL SAMPLE MATRICES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Matrix	Sample	Fraction	Parameter	Reason for Rejection
SW	08SW02101	OV	PROPIONITRILE	C

Table includes TRG, and (blank) sample types.
Only rejected data are shown; data with the following validation qualifiers are excluded: >, J, U, UJ, (blank)

GW = Groundwater
QC = Field quality control sample
SD = Sediment
SO = Soil
SP = Seep
SU = Sump water
SW = Surface water

EXP = Explosives
OS = Semivolatile organic compounds
OV = Volatile organic compounds

C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
R = Surrogates Recovery Noncompliance
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
Y = Percent solids <30%

TABLE H-4

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SOIL (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
EXP	1,3,5-TRINITROBENZENE	MG/KG	0.25	0.25	0.25	0.5	0.376
	1,3-DINITROBENZENE	MG/KG	0.25	0.25	0.25	0.5	0.655
	2,4,6-TRINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	16
	2,4-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	1.28
	2,6-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	0.0328
	2-AMINO-4,6-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	16
	2-NITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	370
	3-NITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	370
	4-AMINO-2,6-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	16
	4-NITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	370
	HMX	MG/KG	0.25	0.25	0.25	0.5	3100
	NITROBENZENE	MG/KG	0.25	0.25	0.25	0.5	1.31
	RDX	MG/KG	0.25	0.25	0.25	0.5	4.4
	TETRYL	MG/KG	0.25	0.25	0.25	0.5	610
HERB	2,4,5-T	UG/KG	1.55	1.66	1.34	2.67	596
	2,4,5-TP (SILVEX)	UG/KG	1.55	1.66	1.34	2.67	109
	2,4-D	UG/KG	1.55	1.66	1.34	2.67	27.2
	DINOSEB	UG/KG	1.55	1.66	1.34	2.67	21.8
	HEXACHLOROPHENE	UG/KG	0.974	1.04	0.45	0.9	199
	PENTACHLOROPHENOL	UG/KG	0.515	0.553	0.85	1.7	119
M	ANTIMONY	MG/KG	0.07	0.64	0.05	0.5	0.142
	BERYLLIUM	MG/KG	0.32	0.52	0.05	0.5	1.06
	CADMIUM	MG/KG	0.1	0.41	0.35	0.5	0.00222
	MERCURY	MG/KG	0.006	0.007	0.02	0.1	0.1
	SELENIUM	MG/KG	0.08	0.52	0.2	0.5	0.0276
	SILVER	MG/KG	0.041	0.2	0.05	0.5	4.04
	SODIUM	MG/KG	32.6	97.6	0.8	50	--(4)
	THALLIUM	MG/KG	0.07	0.36	0.05	0.5	0.0569
	TIN	MG/KG	0.22	3	0.05	5	7.62
MISC	PERCHLORATE	MG/KG	0.043	0.05	#N/A	#N/A	#N/A
OS	1,2,4,5-TETRACHLOROBENZENE	UG/KG	73.3	82.3	67	330	2020
	1,2,4-TRICHLOROBENZENE	UG/KG	73.3	82.3	67	330	11100
	1,2-DICHLOROBENZENE	UG/KG	73.3	82.3	67	330	2960
	1,3-DICHLOROBENZENE	UG/KG	73.3	82.3	67	330	200
	1,4-DICHLOROBENZENE	UG/KG	73.3	82.3	67	330	546
	1,4-DIOXANE	UG/KG	109	123	100	200	2050
	1,4-NAPHTHOQUINONE	UG/KG	73.3	82.3	67	330	1670
	1,4-PHENYLENEDIAMINE	UG/KG	73.3	82.3	67	670	6160
	1-NAPHTHYLAMINE	UG/KG	73.3	82.3	67	330	9340
	2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	73.3	82.3	67	330	27
	2,3,4,6-TETRACHLOROPHENOL	UG/KG	73.3	82.3	67	330	199
	2,4,5-TRICHLOROPHENOL	UG/KG	73.3	82.3	67	330	14100
	2,4,6-TRICHLOROPHENOL	UG/KG	73.3	82.3	67	330	70
	2,4-DICHLOROPHENOL	UG/KG	73.3	82.3	67	330	111000
	2,4-DIMETHYLPHENOL	UG/KG	73.3	82.3	67	330	10
	2,4-DINITROPHENOL	UG/KG	73.3	82.3	67	670	60.9
	2,6-DICHLOROPHENOL	UG/KG	73.3	82.3	67	330	1170
	2-ACETYLAMINOFLUORENE	UG/KG	73.3	82.3	67	330	596
	2-CHLORONAPHTHALENE	UG/KG	73.3	82.3	67	330	12.2
	2-CHLOROPHENOL	UG/KG	73.3	82.3	67	330	243
	2-METHYLNAPHTHALENE	UG/KG	3.61	4.05	0.25	6.7	3240
	2-METHYLPHENOL	UG/KG	73.3	82.3	67	330	40400
	2-NAPHTHYLAMINE	UG/KG	73.3	82.3	67	330	3030
	2-NITROANILINE	UG/KG	73.3	82.3	67	330	1700
	2-NITROPHENOL	UG/KG	73.3	82.3	67	330	1600
	2-PICOLINE	UG/KG	73.3	82.3	67	330	--(4)

TABLE H-4

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SOIL (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	3&4-METHYLPHENOL	UG/KG	73.3	82.3	67	330	3490
	3,3'-DICHLOROBENZIDINE	UG/KG	73.3	82.3	67	330	646
	3,3'-DIMETHYLBENZIDINE	UG/KG	73.3	82.3	67	330	53
	3-METHYLCHOLANTHRENE	UG/KG	73.3	82.3	67	330	77.9
	3-NITROANILINE	UG/KG	73.3	82.3	67	330	--(4)
	4,6-DINITRO-2-METHYLPHENOL	UG/KG	73.3	82.3	67	330	144
	4-AMINOBIPHENYL	UG/KG	73.3	82.3	67	330	3.05
	4-BROMOPHENYL PHENYL ETHER	UG/KG	73.3	82.3	67	330	--(4)
	4-CHLORO-3-METHYLPHENOL	UG/KG	73.3	82.3	67	330	7950
	4-CHLOROANILINE	UG/KG	73.3	82.3	67	330	1100
	4-CHLOROPHENYL PHENYL ETHER	UG/KG	73.3	82.3	67	330	--(4)
	4-NITROANILINE	UG/KG	73.3	82.3	67	330	--(4)
	4-NITROPHENOL	UG/KG	73.3	82.3	67	330	--(4)
	4-NITROQUINOLINE-1-OXIDE	UG/KG	73.3	82.3	67	330	122
	5-NITRO-O-TOLUIDINE	UG/KG	73.3	82.3	67	330	8730
	7,12-DIMETHYLBENZ(A)ANTHRACENE	UG/KG	73.3	82.3	67	330	16300
	A,A-DIMETHYLPHENETHYLAMINE	UG/KG	73.3	82.3	67	330	61000
	ACENAPHTHENE	UG/KG	3.61	4.05	0.25	6.7	130000
	ACENAPHTHYLENE	UG/KG	3.61	4.05	0.25	6.7	130000
	ACETOPHENONE	UG/KG	73.3	82.3	67	330	300000
	ANILINE	UG/KG	73.3	82.3	67	330	56.8
	ANTHRACENE	UG/KG	3.61	4.05	0.25	6.7	51000
	ARAMITE	UG/KG	73.3	82.3	67	330	19000
	BENZO(A)ANTHRACENE	UG/KG	3.61	4.05	0.25	6.7	620
	BENZO(A)PYRENE	UG/KG	3.61	4.05	0.25	6.7	62
	BENZO(B)FLUORANTHENE	UG/KG	3.61	4.05	0.25	6.7	620
	BENZO(G,H,I)PERYLENE	UG/KG	3.61	4.05	0.25	6.7	119000
	BENZO(K)FLUORANTHENE	UG/KG	3.61	4.05	0.25	6.7	380
	BENZYL ALCOHOL	UG/KG	73.3	82.3	67	330	48000
	BIS(2-CHLOROETHOXY)METHANE	UG/KG	73.3	82.3	67	330	302
	BIS(2-CHLOROETHYL)ETHER	UG/KG	73.3	82.3	67	670	0.7
	BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	73.3	82.3	67	330	925
	BUTYL BENZYL PHTHALATE	UG/KG	73.3	82.3	67	330	239
	CHLOROBENZILATE	UG/KG	73.3	82.3	67	330	1800
	CHRYSENE	UG/KG	3.61	4.05	0.25	6.7	4730
	DIALLATE	UG/KG	73.3	82.3	67	330	452
	DIBENZO(A,H)ANTHRACENE	UG/KG	3.61	4.05	0.25	6.7	62
	DIBENZOFURAN	UG/KG	73.3	82.3	67	330	4900
	DIETHYL PHTHALATE	UG/KG	73.3	82.3	67	330	24800
	DIMETHYL PHTHALATE	UG/KG	73.3	82.3	67	330	734000
	DI-N-BUTYL PHTHALATE	UG/KG	73.3	82.3	67	330	150
	DI-N-OCTYL PHTHALATE	UG/KG	73.3	82.3	67	330	709000
	DIPHENYLAMINE	UG/KG	73.3	82.3	67	330	1010
	ETHYL METHANE SULFONATE	UG/KG	73.3	82.3	67	330	--(4)
	FLUORANTHENE	UG/KG	3.61	4.05	0.25	6.7	122000
	FLUORENE	UG/KG	3.61	4.05	0.25	6.7	122000
	HEXACHLOROBENZENE	UG/KG	73.3	82.3	67	330	199
	HEXACHLOROBUTADIENE	UG/KG	73.3	82.3	67	330	39.8
	HEXACHLOROCYCLOPENTADIENE	UG/KG	73.3	82.3	67	330	755
	HEXACHLOROETHANE	UG/KG	73.3	82.3	67	330	596
	HEXACHLOROPROPENE	UG/KG	73.3	82.3	67	330	--(4)
	INDENO(1,2,3-CD)PYRENE	UG/KG	3.61	4.05	0.25	6.7	620
	ISODRIN	UG/KG	73.3	82.3	67	330	3.32
	ISOPHORONE	UG/KG	73.3	82.3	67	330	5300
	ISOSAFROLE	UG/KG	73.3	82.3	67	330	9940
	KEPONE	UG/KG	73.3	82.3	67	330	32.7

TABLE H-4

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SOIL (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	METHAPYRILENE	UG/KG	73.3	82.3	67	330	2780
	METHYL METHANE SULFONATE	UG/KG	73.3	82.3	67	330	315
	NAPHTHALENE	UG/KG	3.61	4.03	0.25	6.7	99.4
	N-NITROSODIETHYLAMINE	UG/KG	73.3	82.3	67	330	3.2
	N-NITROSODIMETHYLAMINE	UG/KG	73.3	82.3	67	330	0.0321
	N-NITROSO-DI-N-BUTYLAMINE	UG/KG	73.3	82.3	67	330	24
	N-NITROSO-DI-N-PROPYLAMINE	UG/KG	73.3	82.3	67	330	69
	N-NITROSODIPHENYLAMINE	UG/KG	73.3	82.3	#N/A	#N/A	#N/A
	N-NITROSOMETHYLETHYLAMINE	UG/KG	73.3	82.3	67	330	0.0321
	N-NITROSOMORPHOLINE	UG/KG	73.3	82.3	67	330	--(4)
	N-NITROSOPIPERIDINE	UG/KG	73.3	82.3	67	330	6.65
	N-NITROSOPYRROLIDINE	UG/KG	73.3	82.3	67	330	12.6
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	UG/KG	73.3	82.3	67	330	152
	O-TOLUIDINE	UG/KG	73.3	82.3	67	330	2000
	P-(DIMETHYLAMINO)AZOBENZENE	UG/KG	73.3	82.3	67	330	40
	PENTACHLOROBENZENE	UG/KG	73.3	82.3	67	330	497
	PENTACHLOROETHANE	UG/KG	73.3	82.3	67	330	--(4)
	PENTACHLORONITROBENZENE	UG/KG	73.3	82.3	67	330	1900
	PHENACETIN	UG/KG	73.3	82.3	67	330	11700
	PHENANTHRENE	UG/KG	3.61	4.05	0.25	6.7	13000
	PHENOL	UG/KG	73.3	82.3	67	330	56000
	PRONAMIDE	UG/KG	73.3	82.3	67	330	13.6
	PYRENE	UG/KG	3.61	4.05	0.25	6.7	78500
	PYRIDINE	UG/KG	73.3	82.3	67	330	1030
	SAFROLE	UG/KG	73.3	82.3	67	330	404
OV	1,1,1,2-TETRACHLOROETHANE	UG/KG	0.867	1.32	1	3	53
	1,1,1-TRICHLOROETHANE	UG/KG	0.867	1.32	1	3	1900
	1,1,2,2-TETRACHLOROETHANE	UG/KG	0.867	1.32	1	3	7
	1,1,2-TRICHLOROETHANE	UG/KG	0.867	1.32	1	3	30
	1,1-DICHLOROETHANE	UG/KG	0.867	1.32	1	3	5600
	1,1-DICHLOROETHENE	UG/KG	0.867	1.32	1	3	58
	1,2,3-TRICHLOROPROPANE	UG/KG	0.867	1.32	1	3	5
	1,2-DIBROMO-3-CHLOROPROPANE	UG/KG	0.867	1.32	1	3	19
	1,2-DIBROMOETHANE	UG/KG	0.867	1.32	1	3	6.9
	1,2-DICHLOROETHANE	UG/KG	0.867	1.32	1	3	24
	1,2-DICHLOROPROPANE	UG/KG	0.867	1.32	1	3	30
	2-BUTANONE	UG/KG	0.867	1.32	1	10	35000
	2-HEXANONE	UG/KG	0.867	1.32	1	10	12600
	3-CHLOROPROPENE	UG/KG	0.867	1.32	1	10	13.4
	4-METHYL-2-PENTANONE	UG/KG	0.867	1.32	1	10	20000
	ACETONE	UG/KG	0.899	27	1	10	2500
	ACETONITRILE	UG/KG	9.1	48	40	80	1370
	ACROLEIN	UG/KG	0.867	1.32	1	10	0.27
	ACRYLONITRILE	UG/KG	0.867	1.32	1	10	23.9
	BENZENE	UG/KG	0.867	1.32	1	3	34
	BROMODICHLOROMETHANE	UG/KG	0.867	1.32	1	3	510
	BROMOFORM	UG/KG	0.867	1.32	1	3	15900
	BROMOMETHANE	UG/KG	0.867	1.32	1	3	235
	CARBON DISULFIDE	UG/KG	0.867	1.32	1	3	94.1
	CARBON TETRACHLORIDE	UG/KG	0.867	1.32	1	3	66
	CHLOROBENZENE	UG/KG	0.867	1.32	1	3	1300
	CHLORODIBROMOMETHANE	UG/KG	0.867	1.32	1	3	1100
	CHLOROETHANE	UG/KG	0.867	1.32	1	3	650
	CHLOROFORM	UG/KG	0.867	1.32	1	3	470
	CHLOROMETHANE	UG/KG	0.867	1.32	1	3	1200
	CHLOROPRENE	UG/KG	0.867	1.32	1	10	2.9

TABLE H-4

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SOIL (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	CIS-1,2-DICHLOROETHENE	UG/KG	0.867	1.32	1	3	400
	CIS-1,3-DICHLOROPROPENE	UG/KG	0.867	1.32	1	3	780
	DIBROMOMETHANE	UG/KG	0.867	1.32	1	3	65000
	DICHLORODIFLUOROMETHANE	UG/KG	0.867	1.32	1	3	39500
	ETHYL METHACRYLATE	UG/KG	0.867	1.32	1	10	30000
	ETHYLBENZENE	UG/KG	0.867	1.32	1	3	5160
	ISOBUTANOL	UG/KG	34.7	52.8	40	80	20800
	METHACRYLONITRILE	UG/KG	0.867	1.32	1	10	57
	METHYL IODIDE	UG/KG	0.867	1.32	1	10	1230
	METHYL METHACRYLATE	UG/KG	0.867	1.32	1	10	984000
	METHYL TERT-BUTYL ETHER	UG/KG	0.867	1.32	1	3	180
	METHYLENE CHLORIDE	UG/KG	0.867	1.32	1	3	23
	PROPIONITRILE	UG/KG	9.1	48	40	80	49.8
	STYRENE	UG/KG	0.867	1.32	1	3	3500
	TETRACHLOROETHENE	UG/KG	0.867	1.32	1	3	58
	TOLUENE	UG/KG	0.867	1.32	1	3	5450
	TOTAL XYLENES	UG/KG	0.867	1.32	1	3	10000
	TRANS-1,2-DICHLOROETHENE	UG/KG	0.867	1.32	1	3	680
	TRANS-1,3-DICHLOROPROPENE	UG/KG	0.867	1.32	1	3	780
	TRANS-1,4-DICHLORO-2-BUTENE	UG/KG	0.867	1.32	#N/A	#N/A	7.9
	TRICHLOROETHENE	UG/KG	0.867	1.32	#N/A	#N/A	1600
	TRICHLOROFLUOROMETHANE	UG/KG	0.867	1.32	1	3	16400
	VINYL ACETATE	UG/KG	0.867	1.32	1	10	2300
	VINYL CHLORIDE	UG/KG	0.867	1.32	1	3	13
PEST/PCB	4,4'-DDD	UG/KG	1.55	1.66	1.65	3.3	758
	4,4'-DDE	UG/KG	1.55	1.66	1.65	3.3	596
	4,4'-DDT	UG/KG	1.55	1.66	1.65	3.3	3.5
	ALDRIN	UG/KG	0.745	0.799	0.85	1.7	3.32
	ALPHA-BHC	UG/KG	0.745	0.799	0.85	1.7	7.2
	ALPHA-CHLORDANE	UG/KG	0.745	0.799	0.85	1.7	224
	AROCLOR-1016	UG/KG	9.85	11.1	250	16.6	0.332
	AROCLOR-1221	UG/KG	9.85	11.1	250	16.6	0.332
	AROCLOR-1232	UG/KG	9.85	11.1	250	16.6	0.332
	AROCLOR-1242	UG/KG	9.85	11.1	250	16.6	0.332
	AROCLOR-1248	UG/KG	9.85	11.1	250	16.6	0.332
	AROCLOR-1254	UG/KG	9.85	11.1	250	16.6	0.332
	AROCLOR-1260	UG/KG	9.85	11.1	250	16.6	0.332
	BETA-BHC	UG/KG	0.745	0.799	0.85	1.7	3.98
	DELTA-BHC	UG/KG	0.745	0.799	0.85	1.7	90
	DIELDRIN	UG/KG	1.55	1.66	1.65	3.3	2.38
	ENDOSULFAN I	UG/KG	0.745	0.799	0.85	1.7	119
	ENDOSULFAN II	UG/KG	1.55	1.66	1.65	3.3	119
	ENDOSULFAN SULFATE	UG/KG	1.55	1.66	1.7	3.3	119
	ENDRIN	UG/KG	1.55	1.66	1.7	3.3	10.1
	ENDRIN ALDEHYDE	UG/KG	1.55	1.66	1.65	3.3	10.5
	ENDRIN KETONE	UG/KG	1.55	1.66	1.7	3.3	10.1
	GAMMA-BHC (LINDANE)	UG/KG	0.745	0.799	0.85	1.7	5
	GAMMA-CHLORDANE	UG/KG	0.745	0.799	0.85	1.7	224
	HEPTACHLOR	UG/KG	0.745	0.799	0.85	1.7	5.98
	HEPTACHLOR EPOXIDE	UG/KG	0.745	0.799	0.85	1.7	53
	METHOXYCHLOR	UG/KG	7.45	7.99	8.5	17	19.9
	TOXAPHENE	UG/KG	19.5	20.9	85	170	119

1 Only results with validation qualifiers that contain a "U" are tallied.

2 Highlighted values (yellow when reproduced in color and gray when reproduced in black and white) exceed laboratory RBTLs.

3 Risk-based target levels are taken from Table 1-5 of the SWMUs 8, 15, 18, 19, 20,and OGTSL QAPP (TtNUS, 2004) and are subject to change.

TABLE H-4

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SOIL (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]

4 Risk-based target level is not provided because human health or ecological risk-based criteria were not available for this compound.

EXP = Explosives
HERB = Herbicides
M = Metals, total
MISC = Miscellaneous parameters
OS = Semivolatile organic compounds
OV = Volatile organic compounds
PEST/PCB = Pesticides/polychlorinated biphenyls

MG/KG = milligrams per kilogram
UG/KG = micrograms per kilogram

TABLE H-5

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
EXP	1,3,5-TRINITROBENZENE	MG/KG	0.25	0.25	0.25	0.5	1800
	1,3-DINITROBENZENE	MG/KG	0.25	0.25	0.25	0.5	0.00861
	2,4,6-TRINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	#N/A
	2,4-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	0.0144
	2,6-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	0.0398
	2-AMINO-4,6-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	16
	2-NITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	370
	3-NITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	370
	4-AMINO-2,6-DINITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	16
	4-NITROTOLUENE	MG/KG	0.25	0.25	0.25	0.5	370
	HMX	MG/KG	0.25	0.25	0.25	0.5	#N/A
	NITROBENZENE	MG/KG	0.25	0.25	0.25	0.5	0.145
	RDX	MG/KG	0.25	0.25	0.25	0.5	#N/A
	TETRYL	MG/KG	0.25	0.25	0.25	0.5	#N/A
M	ANTIMONY	MG/KG	0.29	0.77	0.05	0.5	#N/A
	SELENIUM	MG/KG	0.19	0.19	0.2	0.5	390
	SILVER	MG/KG	0.051	0.12	0.05	0.5	0.5
	SODIUM	MG/KG	46.6	104	0.8	50	#N/A
	THALLIUM	MG/KG	0.1	0.35	0.05	0.5	#N/A
	TIN	MG/KG	0.6	2.5	0.05	5	--
MISC	PERCHLORATE	MG/KG	0.096	0.118	#N/A	#N/A	#N/A
	PERCHLORATE-8321	UG/KG	0.28	5.6	#N/A	#N/A	#N/A
OS	1,2,4,5-TETRACHLOROBENZENE	UG/KG	69.7	401	67	330	1252
	1,2,4-TRICHLOROBENZENE	UG/KG	69.7	401	67	330	5062
	1,2-DICHLOROBENZENE	UG/KG	69.7	401	67	330	294
	1,3-DICHLOROBENZENE	UG/KG	69.7	401	67	330	1315
	1,4-DICHLOROBENZENE	UG/KG	69.7	401	67	330	318
	1,4-DIOXANE	UG/KG	104	599	100	200	#N/A
	1,4-NAPHTHOQUINONE	UG/KG	69.7	401	67	330	--(4)
	1,4-PHENYLENEDIAMINE	UG/KG	69.7	401	67	670	12000000
	1-NAPHTHYLAMINE	UG/KG	69.7	401	67	330	--(4)
	2,2'-OXYBIS(1-CHLOROPROPANE)	UG/KG	69.7	401	67	330	#N/A
	2,3,4,6-TETRACHLOROPHENOL	UG/KG	69.7	401	67	330	129
	2,4,5-TRICHLOROPHENOL	UG/KG	69.7	401	67	330	6100000
	2,4,6-TRICHLOROPHENOL	UG/KG	69.7	401	67	330	208
	2,4-DICHLOROPHENOL	UG/KG	69.7	401	67	330	81.7
	2,4-DIMETHYLPHENOL	UG/KG	69.7	401	67	330	304
	2,4-DINITROPHENOL	UG/KG	69.7	401	67	670	6.21
	2,6-DICHLOROPHENOL	UG/KG	69.7	401	67	330	--(4)
	2-ACETYLAMINOFLUORENE	UG/KG	69.7	401	67	330	15.3
	2-CHLORONAPHTHALENE	UG/KG	69.7	401	67	330	417
	2-CHLOROPHENOL	UG/KG	69.7	401	67	330	31.9
	2-METHYLNAPHTHALENE	UG/KG	3.95	4.51	0.25	6.7	#N/A
	2-METHYLPHENOL	UG/KG	69.7	401	67	330	55.4
	2-NAPHTHYLAMINE	UG/KG	69.7	401	67	330	--(4)
	2-NITROANILINE	UG/KG	69.7	401	67	330	1700
	2-NITROPHENOL	UG/KG	69.7	401	67	330	--(4)
	2-PICOLINE	UG/KG	69.7	401	67	330	--(4)
	3&4-METHYLPHENOL	UG/KG	69.7	119	67	330	#N/A
	3,3'-DICHLOROBENZIDINE	UG/KG	69.7	401	67	330	127
	3,3'-DIMETHYLBENZIDINE	UG/KG	69.7	401	67	330	53
	3-METHYLCHOLANTHRENE	UG/KG	69.7	401	67	330	8190000
	3-NITROANILINE	UG/KG	69.7	401	67	330	--(4)
	4,6-DINITRO-2-METHYLPHENOL	UG/KG	69.7	401	67	330	104

TABLE H-5

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	4-AMINOBIPHENYL	UG/KG	69.7	401	67	330	--(4)
	4-BROMOPHENYL PHENYL ETHER	UG/KG	69.7	401	67	330	1550
	4-CHLORO-3-METHYLPHENOL	UG/KG	69.7	401	67	330	388
	4-CHLOROANILINE	UG/KG	69.7	401	67	330	146
	4-CHLOROPHENYL PHENYL ETHER	UG/KG	69.7	401	67	330	--(4)
	4-NITROANILINE	UG/KG	69.7	401	67	330	--(4)
	4-NITROPHENOL	UG/KG	69.7	401	67	330	--(4)
	4-NITROQUINOLINE-1-OXIDE	UG/KG	69.7	401	67	330	--(4)
	5-NITRO-O-TOLUIDINE	UG/KG	69.7	401	67	330	15000
	7,12-DIMETHYLBENZ(A)ANTHRACENE	UG/KG	69.7	401	67	330	66400
	A,A-DIMETHYLPHENETHYLAMINE	UG/KG	69.7	401	67	330	#N/A
	ACENAPHTHENE	UG/KG	3.95	39.5	0.25	6.7	#N/A
	ACENAPHTHYLENE	UG/KG	3.95	59.5	0.25	6.7	5.87
	ACETOPHENONE	UG/KG	69.7	401	67	330	--(4)
	ANILINE	UG/KG	69.7	401	67	330	0.31
	ANTHRACENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	ARAMITE	UG/KG	69.7	401	67	330	19000
	BENZO(A)ANTHRACENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	BENZO(A)PYRENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	BENZO(B)FLUORANTHENE	UG/KG	3.95	59.5	0.25	6.7	620
	BENZO(G,H,I)PERYLENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	BENZO(K)FLUORANTHENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	BENZYL ALCOHOL	UG/KG	69.7	401	67	330	1.04
	BIS(2-CHLOROETHOXY)METHANE	UG/KG	69.7	401	67	330	--(4)
	BIS(2-CHLOROETHYL)ETHER	UG/KG	69.7	401	67	670	210
	BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	80.1	95.7	67	330	#N/A
	BUTYL BENZYL PHTHALATE	UG/KG	69.7	401	67	330	1970
	CHLOROBENZILATE	UG/KG	69.7	401	67	330	860
	CHRYSENE	UG/KG	3.95	59.5	0.25	6.7	166
	DIALLATE	UG/KG	69.7	401	67	330	8000
	DIBENZO(A,H)ANTHRACENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	DIBENZOFURAN	UG/KG	69.7	401	67	330	449
	DIETHYL PHTHALATE	UG/KG	69.7	401	67	330	295
	DIMETHYL PHTHALATE	UG/KG	69.7	401	67	330	1E+08
	DI-N-BUTYL PHTHALATE	UG/KG	69.7	401	67	330	1114
	DI-N-OCTYL PHTHALATE	UG/KG	69.7	401	67	330	40600
	DIPHENYLAMINE	UG/KG	69.7	401	67	330	#N/A
	ETHYL METHANE SULFONATE	UG/KG	69.7	401	67	330	--(4)
	FLUORANTHENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	FLUORENE	UG/KG	3.95	39.5	0.25	6.7	#N/A
	HEXACHLOROBENZENE	UG/KG	69.7	401	67	330	20
	HEXACHLOROBUTADIENE	UG/KG	69.7	401	67	330	26.5
	HEXACHLOROCYCLOPENTADIENE	UG/KG	69.7	401	67	330	901
	HEXACHLOROETHANE	UG/KG	69.7	401	67	330	584
	HEXACHLOROPROPENE	UG/KG	69.7	401	67	330	--(4)
	INDENO(1,2,3-CD)PYRENE	UG/KG	3.95	59.5	0.25	6.7	#N/A
	ISODRIN	UG/KG	69.7	401	67	330	55.2
	ISOPHORONE	UG/KG	69.7	401	67	330	432
	ISOSAFROLE	UG/KG	69.7	401	67	330	--(4)
	KEPONE	UG/KG	69.7	401	67	330	3.31
	METHAPYRILENE	UG/KG	69.7	401	67	330	--(4)
	METHYL METHANE SULFONATE	UG/KG	69.7	401	67	330	--(4)
	NAPHTHALENE	UG/KG	3.95	4.25	0.25	6.7	#N/A
	N-NITROSODIETHYLAMINE	UG/KG	69.7	401	67	330	3.2

TABLE H-5

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	N-NITROSODIMETHYLAMINE	UG/KG	69.7	401	67	330	9.5
	N-NITROSO-DI-N-BUTYLAMINE	UG/KG	69.7	401	67	330	#N/A
	N-NITROSO-DI-N-PROPYLAMINE	UG/KG	69.7	401	67	330	#N/A
	N-NITROSODIPHENYLAMINE	UG/KG	69.7	401	#N/A	#N/A	#N/A
	N-NITROSOMETHYLETHYLAMINE	UG/KG	69.7	401	67	330	9.5
	N-NITROSOMORPHOLINE	UG/KG	69.7	401	67	330	--(4)
	N-NITROSOPIPERIDINE	UG/KG	69.7	401	67	330	--(4)
	N-NITROSOPYRROLIDINE	UG/KG	69.7	401	67	330	230
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	UG/KG	69.7	401	67	330	2.47
	O-TOLUIDINE	UG/KG	69.7	401	67	330	2000
	P-(DIMETHYLAMINO)AZOBENZENE	UG/KG	69.7	401	67	330	318
	PENTACHLOROBENZENE	UG/KG	69.7	401	67	330	24
	PENTACHLOROETHANE	UG/KG	69.7	401	67	330	--(4)
	PENTACHLORONITROBENZENE	UG/KG	69.7	401	67	330	1900
	PHENACETIN	UG/KG	69.7	401	67	330	--(4)
	PHENANTHRENE	UG/KG	3.95	4.27	0.25	6.7	204
	PHENOL	UG/KG	69.7	401	67	330	49.1
	PRONAMIDE	UG/KG	69.7	401	67	330	4600000
	PYRENE	UG/KG	4.12	59.5	0.25	6.7	#N/A
	PYRIDINE	UG/KG	69.7	401	67	330	106
	SAFROLE	UG/KG	69.7	401	67	330	--(4)
OV	1,1,1,2-TETRACHLOROETHANE	UG/KG	1.04	19960	1	3	3200
	1,1,1-TRICHLOROETHANE	UG/KG	1.04	13.7	1	3	213
	1,1,2,2-TETRACHLOROETHANE	UG/KG	1.04	19960	1	3	410
	1,1,2-TRICHLOROETHANE	UG/KG	1.04	19960	1	3	730
	1,1-DICHLOROETHANE	UG/KG	1.04	1.5	1	3	0.575
	1,1-DICHLOROETHENE	UG/KG	1.04	1.73	1	3	19.4
	1,2,3-TRICHLOROPROPANE	UG/KG	1.04	19960	1	3	5
	1,2-DIBROMO-3-CHLOROPROPANE	UG/KG	1.04	19960	1	3	19
	1,2-DIBROMOETHANE	UG/KG	1.04	19960	1	3	6.9
	1,2-DICHLOROETHANE	UG/KG	1.04	19960	1	3	280
	1,2-DICHLOROPROPANE	UG/KG	1.04	19960	1	3	333
	2-BUTANONE	UG/KG	1.04	19960	1	10	42.4
	2-HEXANONE	UG/KG	1.04	19960	1	10	58.2
	3-CHLOROPROPENE	UG/KG	1.04	19960	1	10	#N/A
	4-METHYL-2-PENTANONE	UG/KG	1.04	19960	1	10	25.1
	ACETONE	UG/KG	1.04	19960	1	10	9.9
	ACETONITRILE	UG/KG	41.6	420000	40	80	56
	ACROLEIN	UG/KG	1.04	19960	1	10	0.00152
	ACRYLONITRILE	UG/KG	1.04	19960	1	10	1.2
	BENZENE	UG/KG	1.04	19960	1	3	142
	BROMODICHLOROMETHANE	UG/KG	1.04	19960	1	3	820
	BROMOFORM	UG/KG	1.04	19960	1	3	492
	BROMOMETHANE	UG/KG	1.04	19960	1	3	1.37
	CARBON DISULFIDE	UG/KG	1.04	19960	1	3	23.9
	CARBON TETRACHLORIDE	UG/KG	1.04	19960	1	3	250
	CHLOROBENZENE	UG/KG	1.04	19960	1	3	291
	CHLORODIBROMOMETHANE	UG/KG	1.04	19960	1	3	#N/A
	CHLOROETHANE	UG/KG	1.04	59.3	1	3	3000
	CHLOROFORM	UG/KG	1.04	19960	1	3	121
	CHLOROMETHANE	UG/KG	1.04	19960	1	3	1200
	CHLOROPRENE	UG/KG	1.04	19960	1	10	#N/A
	CIS-1,2-DICHLOROETHENE	UG/KG	1.04	1.73	1	3	43000
	CIS-1,3-DICHLOROPROPENE	UG/KG	1.04	19960	1	3	780

TABLE H-5

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	DIBROMOMETHANE	UG/KG	1.04	19960	1	3	67000
	DICHLORODIFLUOROMETHANE	UG/KG	1.04	19960	1	3	94000
	ETHYL METHACRYLATE	UG/KG	1.04	19960	1	10	140000
	ETHYLBENZENE	UG/KG	1.04	19960	1	3	175
	ISOBUTANOL	UG/KG	41.6	798402	40	80	13000000
	METHACRYLONITRILE	UG/KG	1.04	19960	1	10	2100
	METHYL IODIDE	UG/KG	1.04	19960	1	10	--(4)
	METHYL METHACRYLATE	UG/KG	1.04	19960	1	10	168
	METHYL TERT-BUTYL ETHER	UG/KG	1.04	19960	1	3	62000
	METHYLENE CHLORIDE	UG/KG	1.04	19960	1	3	9100
	PROPIONITRILE	UG/KG	41.6	798402	40	80	--(4)
	STYRENE	UG/KG	1.04	19960	1	3	254
	TETRACHLOROETHENE	UG/KG	1.04	19960	1	3	990
	TOLUENE	UG/KG	1.04	1.5	1	3	1220
	TOTAL XYLENES	UG/KG	1.04	19960	1	3	433
	TRANS-1,2-DICHLOROETHENE	UG/KG	1.04	19960	1	3	654
	TRANS-1,3-DICHLOROPROPENE	UG/KG	1.04	19960	1	3	780
	TRANS-1,4-DICHLORO-2-BUTENE	UG/KG	1.04	19960	#N/A	#N/A	7.9
	TRICHLOROETHENE	UG/KG	1.04	1.73	#N/A	#N/A	1600
	TRICHLOROFLUOROMETHANE	UG/KG	1.04	19960	1	3	390000
	VINYL ACETATE	UG/KG	1.04	19960	1	10	430000
	VINYL CHLORIDE	UG/KG	1.04	19960	1	3	202
PEST/PCB	AROCLOR-1016	UG/KG	10.8	11.7	250	16.6	59.8
	AROCLOR-1221	UG/KG	10.8	11.7	250	16.6	59.8
	AROCLOR-1232	UG/KG	10.8	11.7	250	16.6	59.8
	AROCLOR-1242	UG/KG	10.8	11.7	250	16.6	59.8
	AROCLOR-1248	UG/KG	10.8	11.7	250	16.6	59.8
	AROCLOR-1254	UG/KG	10.8	11.7	250	16.6	59.8
	AROCLOR-1260	UG/KG	10.8	11.7	250	16.6	59.8

1 Only results with validation qualifiers that contain a "U" are tallied.
2 Highlighted values (yellow when reproduced in color and gray when reproduced in black and white) exceed laboratory RBTLs.
3 Risk-based target levels are taken from Table 1-5 of the SWMUs 8, 15, 18, 19, 20,and OGTSL QAPP (TtNUS, 2004) and are subject to change.
4 Risk-based target level is not provided because human health or ecological risk-based criteria were not available for this compound.

EXP = Explosives
M = Metals, total
MISC = Miscellaneous parameters
OS = Semivolatile organic compounds
OV = Volatile organic compounds
PEST/PCB = Pesticides/polychlorinated biphenyls

MG/KG = milligrams per kilogram
UG/KG = micrograms per kilogram

TABLE H-6

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
EXP	1,3,5-TRINITROBENZENE	UG/L	0.238	0.278	0.25	0.5	1100
	1,3-DINITROBENZENE	UG/L	0.238	0.278	0.25	0.5	3.6
	2,4,6-TRINITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	2.2
	2,4-DINITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	44
	2,6-DINITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	36
	2-AMINO-4,6-DINITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	7.3
	2-NITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	61
	3-NITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	61
	4-AMINO-2,6-DINITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	7.3
	4-NITROTOLUENE	UG/L	0.238	0.278	0.25	0.5	61
	HMX	UG/L	0.238	0.278	0.25	0.5	1800
	NITROBENZENE	UG/L	0.238	0.278	0.25	0.5	3.4
	RDX	UG/L	0.238	0.278	0.25	0.5	0.61
	TETRYL	UG/L	0.238	0.278	0.25	0.5	360
M	ALUMINUM	UG/L	21.9	41.8	2.6	50	36000
	ANTIMONY	UG/L	0.085	0.5	0.1	1	6
	ARSENIC	UG/L	0.17	0.68	0.2	1	0.045
	BERYLLIUM	UG/L	0.02	0.05	0.1	1	3.6
	CADMIUM	UG/L	0.05	0.37	0.7	1	0.15
	COBALT	UG/L	0.088	0.088	0.1	1	24
	COPPER	UG/L	1.6	4.8	0.1	2	1.58
	LEAD	UG/L	0.069	0.499	0.1	1	1.17
	MERCURY	UG/L	0.03	0.03	0.1	0.2	0.0013
	SELENIUM	UG/L	0.094	0.48	0.4	1	5
	SILVER	UG/L	0.028	0.36	0.1	1	0.12
	THALLIUM	UG/L	0.043	0.28	0.1	1	2
	TIN	UG/L	0.048	0.13	0.1	10	180
	VANADIUM	UG/L	1.14	1.14	0.1	2	12
	ZINC	UG/L	2.5	21	0.5	10	65.7
MF	ALUMINUM	UG/L	8.35	62.7	2.6	50	36000
	ANTIMONY	UG/L	0.085	0.62	0.1	1	6
	ARSENIC	UG/L	0.12	0.48	0.2	1	0.045
	BERYLLIUM	UG/L	0.02	0.03	0.1	1	3.6
	CADMIUM	UG/L	0.05	0.11	0.7	1	0.15
	CHROMIUM	UG/L	0.46	1.7	0.1	1	42
	COBALT	UG/L	0.088	0.088	0.1	1	24
	COPPER	UG/L	1.2	2	0.1	2	1.58
	IRON	UG/L	6.15	6.15	3.9	50	11000
	LEAD	UG/L	0.069	0.069	0.1	1	1.17
	MERCURY	UG/L	0.03	0.056	0.1	0.2	0.0013
	SELENIUM	UG/L	0.094	0.64	0.4	1	5
	SILVER	UG/L	0.028	0.36	0.1	1	0.12
	THALLIUM	UG/L	0.07	0.27	0.1	1	2
	TIN	UG/L	0.048	0.09	0.1	10	180
	VANADIUM	UG/L	1.14	1.14	0.1	2	12
	ZINC	UG/L	1.8	3.5	0.5	10	65.7
MISC	PERCHLORATE	UG/L	2	4	#N/A	#N/A	#N/A
SVOC	1,2,4,5-TETRACHLOROBENZENE	UG/L	0.962	1.08	1	5	3
	1,2,4-TRICHLOROBENZENE	UG/L	0.962	1.08	1	5	30
	1,2-DICHLOROBENZENE	UG/L	0.962	1.08	1	5	14
	1,3-DICHLOROBENZENE	UG/L	0.962	1.08	1	5	5.5
	1,4-DICHLOROBENZENE	UG/L	0.962	1.08	1	5	0.5
	1,4-DIOXANE	UG/L	0.962	1.06	50	100	6.1
	1,4-NAPHTHOQUINONE	UG/L	0.962	1.08	1	5	--(4)
	1,4-PHENYLENEDIAMINE	UG/L	0.962	1.08	1	10	6900
	1-NAPHTHYLAMINE	UG/L	0.962	1.08	1	5	--(4)
	2,2'-OXYBIS(1-CHLOROPROPANE)	UG/L	0.962	1.08	1	5	0.27
	2,3,4,6-TETRACHLOROPHENOL	UG/L	0.962	1.08	1	5	1.2

TABLE H-6

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	2,4,5-TRICHLOROPHENOL	UG/L	0.962	1.08	1	5	3600
	2,4,6-TRICHLOROPHENOL	UG/L	0.962	1.08	1	5	0.96
	2,4-DICHLOROPHENOL	UG/L	0.962	1.08	1	5	11
	2,4-DIMETHYLPHENOL	UG/L	0.962	1.08	1	5	100
	2,4-DINITROPHENOL	UG/L	0.962	1.08	1	10	19
	2,6-DICHLOROPHENOL	UG/L	0.962	1.08	1	5	--(4)
	2-ACETYLAMINOFLUORENE	UG/L	0.962	1.08	1	5	535
	2-CHLORONAPHTHALENE	UG/L	0.962	1.08	1	5	0.396
	2-CHLOROPHENOL	UG/L	0.962	1.08	1	5	24
	2-METHYLNAPHTHALENE	UG/L	0.048	0.053	0.05	0.1	5
	2-METHYLPHENOL	UG/L	0.962	1.08	1	5	67
	2-NAPHTHYLAMINE	UG/L	0.962	1.08	1	5	--(4)
	2-NITROANILINE	UG/L	0.962	1.08	1	5	1
	2-NITROPHENOL	UG/L	0.962	1.08	1	5	--(4)
	2-PICOLINE	UG/L	0.962	1.08	1	5	--(4)
	3&4-METHYLPHENOL	UG/L	0.962	1.08	2.5	5	25
	3,3'-DICHLOROBENZIDINE	UG/L	0.962	1.08	1	5	0.15
	3,3'-DIMETHYLBENZIDINE	UG/L	0.962	1.08	1	5	0.0073
	3-METHYLCHOLANTHRENE	UG/L	0.962	1.08	1	5	0.0891
	3-NITROANILINE	UG/L	0.962	1.08	1	5	--(4)
	4,6-DINITRO-2-METHYLPHENOL	UG/L	0.962	1.08	1	5	23
	4-AMINOBIPHENYL	UG/L	0.962	1.08	1	5	--(4)
	4-BROMOPHENYL PHENYL ETHER	UG/L	0.962	1.08	1	5	1.5
	4-CHLORO-3-METHYLPHENOL	UG/L	0.962	1.08	1	5	34.8
	4-CHLOROANILINE	UG/L	0.962	1.08	1	5	150
	4-CHLOROPHENYL PHENYL ETHER	UG/L	0.962	1.08	1	5	--(4)
	4-NITROANILINE	UG/L	0.962	1.08	1	5	--(4)
	4-NITROPHENOL	UG/L	0.962	1.08	1	5	--(4)
	4-NITROQUINOLINE-1-OXIDE	UG/L	0.962	1.08	1	5	--(4)
	5-NITRO-O-TOLUIDINE	UG/L	0.962	1.08	1	5	2
	7,12-DIMETHYLBENZ(A)ANTHRACENE	UG/L	0.962	1.08	1	5	0.548
	A,A-DIMETHYLPHENETHYLAMINE	UG/L	0.962	1.08	1	5	36
	ACENAPHTHENE	UG/L	0.048	0.053	0.05	0.1	38
	ACENAPHTHYLENE	UG/L	0.048	0.215	0.05	0.1	370
	ACETOPHENONE	UG/L	0.962	1.08	1	5	--(4)
	ANILINE	UG/L	0.962	1.08	1	5	4.1
	ANTHRACENE	UG/L	0.048	0.215	0.05	0.1	0.035
	ARAMITE	UG/L	0.962	1.08	1	10	2.7
	BENZO(A)ANTHRACENE	UG/L	0.048	0.215	0.05	0.1	0.025
	BENZO(A)PYRENE	UG/L	0.048	0.215	0.05	0.1	0.0092
	BENZO(B)FLUORANTHENE	UG/L	0.048	0.215	0.05	0.1	0.092
	BENZO(G,H,I)PERYLENE	UG/L	0.048	0.215	0.05	0.1	0.26
	BENZO(K)FLUORANTHENE	UG/L	0.048	0.215	0.05	0.1	0.8
	BENZYL ALCOHOL	UG/L	0.962	1.08	1	5	8.6
	BIS(2-CHLOROETHOXY)METHANE	UG/L	0.962	1.08	1	5	--(4)
	BIS(2-CHLOROETHYL)ETHER	UG/L	0.962	1.08	0.9	5	0.0098
	BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	0.962	1.08	1	5	0.3
	BUTYL BENZYL PHTHALATE	UG/L	0.962	1.08	1	5	23
	CHLOROBENZILATE	UG/L	0.962	1.08	1	5	0.25
	CHRYSENE	UG/L	0.048	0.215	0.05	0.1	1.6
	DIALLATE	UG/L	0.962	1.08	1	5	1.1
	DIBENZO(A,H)ANTHRACENE	UG/L	0.048	0.215	0.05	0.1	0.0092
	DIBENZOFURAN	UG/L	0.962	1.08	1	5	4
	DIETHYL PHTHALATE	UG/L	0.962	1.08	1	5	110
	DIMETHYL PHTHALATE	UG/L	0.962	1.08	1	5	360000
	DI-N-BUTYL PHTHALATE	UG/L	0.962	1.08	1	5	9.7
	DI-N-OCTYL PHTHALATE	UG/L	0.962	1.08	1	5	20
	DIPHENYLAMINE	UG/L	0.962	1.08	1	5	412

TABLE H-6

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	ETHYL METHANE SULFONATE	UG/L	0.962	1.08	1	5	--(4)
	FLUORANTHENE	UG/L	0.048	0.215	0.05	0.1	1.9
	FLUORENE	UG/L	0.048	0.215	0.05	0.1	19
	HEXACHLOROBENZENE	UG/L	0.962	1.08	1	5	0.0003
	HEXACHLOROBUTADIENE	UG/L	0.962	1.08	1	5	0.053
	HEXACHLOROCYCLOPENTADIENE	UG/L	0.962	1.08	1	5	50
	HEXACHLOROETHANE	UG/L	0.962	1.08	1	5	4.8
	HEXACHLOROPROPENE	UG/L	0.962	1.08	1	5	--(4)
	INDENO(1,2,3-CD)PYRENE	UG/L	0.048	0.215	0.05	0.1	0.022
	ISODRIN	UG/L	0.962	1.08	1	5	0.0309
	ISOPHORONE	UG/L	0.962	1.08	1	5	71
	ISOSAFROLE	UG/L	0.962	1.08	1	5	--(4)
	KEPONE	UG/L	0.962	1.08	1	5	0.0084
	METHAPYRILENE	UG/L	0.962	1.08	1	5	--(4)
	METHYL METHANE SULFONATE	UG/L	0.962	1.08	1	5	--(4)
	NAPHTHALENE	UG/L	0.048	0.053	0.05	0.1	6.2
	N-NITROSODIETHYLAMINE	UG/L	0.962	1.08	1	5	0.00045
	N-NITROSODIMETHYLAMINE	UG/L	0.962	1.08	1	5	0.0013
	N-NITROSO-DI-N-BUTYLAMINE	UG/L	0.962	1.08	1	5	0.002
	N-NITROSO-DI-N-PROPYLAMINE	UG/L	0.962	1.08	1	5	0.0096
	N-NITROSODIPHENYLAMINE	UG/L	0.962	1.08	#N/A	#N/A	#N/A
	N-NITROSOMETHYLETHYLAMINE	UG/L	0.962	1.08	1	5	0.0013
	N-NITROSOMORPHOLINE	UG/L	0.962	1.08	1	5	--(4)
	N-NITROSOPIPERIDINE	UG/L	0.962	1.08	1	5	--(4)
	N-NITROSOPYRROLIDINE	UG/L	0.962	1.08	1	5	0.032
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	UG/L	0.962	1.08	2.5	5	0.0038
	O-TOLUIDINE	UG/L	0.962	1.08	1	5	0.28
	P-(DIMETHYLAMINO)AZOBENZENE	UG/L	0.962	1.08	1	5	1.65
	PENTACHLOROBENZENE	UG/L	0.962	1.08	1	5	0.019
	PENTACHLOROETHANE	UG/L	0.962	1.08	1	5	--(4)
	PENTACHLORONITROBENZENE	UG/L	0.962	1.08	1	5	0.26
	PHENACETIN	UG/L	0.962	1.08	1	5	--(4)
	PHENANTHRENE	UG/L	0.048	0.053	0.05	0.1	3.6
	PHENOL	UG/L	0.962	1.08	1	5	180
	PRONAMIDE	UG/L	0.962	1.08	1	5	2700
	PYRENE	UG/L	0.048	0.215	0.05	0.1	0.3
	PYRIDINE	UG/L	0.962	1.08	1	5	36
	SAFROLE	UG/L	0.962	1.08	1	5	--(4)
VOC	1,1,1,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.43
	1,1,1-TRICHLOROETHANE	UG/L	0.3	0.3	0.3	1	76
	1,1,2,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.055
	1,1,2-TRICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.2
	1,1-DICHLOROETHANE	UG/L	0.3	0.3	0.3	1	47
	1,1-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	7
	1,2,3-TRICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0056
	1,2-DIBROMO-3-CHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0016
	1,2-DIBROMOETHANE	UG/L	0.3	0.3	0.3	1	0.00076
	1,2-DICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.12
	1,2-DICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.16
	2-BUTANONE	UG/L	0.5	0.5	0.5	5	1900
	2-HEXANONE	UG/L	0.5	0.5	0.5	5	99
	3-CHLOROPROPENE	UG/L	0.5	0.5	0.5	5	1800
	4-METHYL-2-PENTANONE	UG/L	0.5	0.5	0.5	5	160
	ACETONE	UG/L	0.5	0.5	0.5	5	610
	ACETONITRILE	UG/L	20	20	20	40	100
	ACROLEIN	UG/L	0.5	0.5	0.5	5	0.042
	ACRYLONITRILE	UG/L	0.5	0.5	0.5	5	0.039
	BENZENE	UG/L	0.3	0.3	0.3	1	0.34

TABLE H-6

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	BROMODICHLOROMETHANE	UG/L	0.3	0.3	0.3	1	0.18
	BROMOFORM	UG/L	0.3	0.3	0.3	1	8.5
	BROMOMETHANE	UG/L	0.3	0.3	0.3	1	8.7
	CARBON DISULFIDE	UG/L	0.3	0.3	0.3	1	15
	CARBON TETRACHLORIDE	UG/L	0.3	0.3	0.3	1	0.17
	CHLOROBENZENE	UG/L	0.3	0.3	0.3	1	47
	CHLORODIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	0.13
	CHLOROETHANE	UG/L	0.5	0.5	0.3	1	4.6
	CHLOROFORM	UG/L	0.3	0.3	0.3	1	6.2
	CHLOROMETHANE	UG/L	0.3	0.3	0.3	1	1.5
	CHLOROPRENE	UG/L	0.5	0.5	0.5	5	14
	CIS-1,2-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	61
	CIS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	DIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	61
	DICHLORODIFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	390
	ETHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	550
	ETHYLBENZENE	UG/L	0.3	0.3	0.3	1	2.9
	ISOBUTANOL	UG/L	20	20	20	40	1800
	METHACRYLONITRILE	UG/L	0.3	0.3	0.5	5	1
	METHYL IODIDE	UG/L	0.5	0.5	0.5	5	--(4)
	METHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	1400
	METHYL TERT-BUTYL ETHER	UG/L	0.5	0.5	0.5	1	13
	METHYLENE CHLORIDE	UG/L	0.3	0.3	0.3	1	4.3
	PROPIONITRILE	UG/L	20	20	20	40	--(4)
	STYRENE	UG/L	0.3	0.3	0.3	1	32
	TETRACHLOROETHENE	UG/L	0.3	0.3	0.3	1	0.66
	TOLUENE	UG/L	0.3	0.3	0.3	1	253
	TOTAL XYLENES	UG/L	0.3	0.3	0.3	1	27
	TRANS-1,2-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	100
	TRANS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	TRANS-1,4-DICHLORO-2-BUTENE	UG/L	0.5	0.5	#N/A	#N/A	0.0012
	TRICHLOROETHENE	UG/L	0.3	0.3	#N/A	#N/A	0.026
	TRICHLOROFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	1300
	VINYL ACETATE	UG/L	0.5	0.5	0.5	5	410
	VINYL CHLORIDE	UG/L	0.3	0.3	0.3	1	2
PEST/PCB	AROCLOR-1016	UG/L	0.236	0.265	0.25	0.5	0.00012
	AROCLOR-1221	UG/L	0.236	0.265	0.25	0.5	0.00012
	AROCLOR-1232	UG/L	0.236	0.265	0.25	0.5	0.00012
	AROCLOR-1242	UG/L	0.236	0.265	0.25	0.5	0.00012
	AROCLOR-1248	UG/L	0.236	0.265	0.25	0.5	0.00012
	AROCLOR-1254	UG/L	0.236	0.265	0.25	0.5	0.00012
	AROCLOR-1260	UG/L	0.236	0.265	0.25	0.5	0.00012

1 Only results with validation qualifiers that contain a "U" are tallied.

2 Highlighted values (yellow when reproduced in color and gray when reproduced in black and white) exceed laboratory RBTLs.

3 Risk-based target levels are taken from Table 1-5 of the SWMUs 8, 15, 18, 19, 20,and OGTSL QAPP (TtNUS, 2004) and are subject to change.

4 Risk-based target level is not provided because human health or ecological risk-based criteria were not available for this compound:

EXP = Explosives
M = Metals, total
MF = Metals, dissolved
MISC = Miscellaneous parameters
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds
PEST/PCB = Pesticides/polychlorinated biphenyls
UG/L = micrograms per Liter

Values taken from Table 1-5 of the SWMUs 8, 15, 18, 19, and 20 and the OGTSL Quality Assurance Project Plan, TtNUS, 2004.

TABLE H-7

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SUMP WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
M	ALUMINUM	UG/L	25.1	25.1	2.6	50	36000
	ANTIMONY	UG/L	0.26	0.26	0.1	1	6
	BERYLLIUM	UG/L	0.02	0.02	0.1	1	3.6
	COPPER	UG/L	3.3	3.3	0.1	2	1.58
	MERCURY	UG/L	0.03	0.03	0.1	0.2	0.0013
	SILVER	UG/L	0.04	0.04	0.1	1	0.12
	THALLIUM	UG/L	0.11	0.11	0.1	1	2
	TIN	UG/L	0.12	0.12	0.1	10	180
	VANADIUM	UG/L	1.14	1.14	0.1	2	12
MF	ALUMINUM	UG/L	8.35	8.35	2.6	50	36000
	ANTIMONY	UG/L	0.14	0.14	0.1	1	6
	BERYLLIUM	UG/L	0.02	0.02	0.1	1	3.6
	CADMIUM	UG/L	0.12	0.12	0.7	1	0.15
	COPPER	UG/L	2.1	2.1	0.1	2	1.58
	MERCURY	UG/L	0.03	0.03	0.1	0.2	0.0013
	SILVER	UG/L	0.028	0.028	0.1	1	0.12
	THALLIUM	UG/L	0.07	0.07	0.1	1	2
	TIN	UG/L	0.07	0.07	0.1	10	180
	VANADIUM	UG/L	1.14	1.14	0.1	2	12
SVOC	1,2,4,5-TETRACHLOROBENZENE	UG/L	1.03	1.03	1	5	3
	1,2,4-TRICHLOROBENZENE	UG/L	1.03	1.03	1	5	30
	1,2-DICHLOROBENZENE	UG/L	1.03	1.03	1	5	14
	1,3-DICHLOROBENZENE	UG/L	1.03	1.03	1	5	5.5
	1,4-DICHLOROBENZENE	UG/L	1.03	1.03	1	5	0.5
	1,4-NAPHTHOQUINONE	UG/L	1.03	1.03	1	5	--(4)
	1,4-PHENYLENEDIAMINE	UG/L	1.03	1.03	1	10	6900
	1-NAPHTHYLAMINE	UG/L	1.03	1.03	1	5	--(4)
	2,2'-OXYBIS(1-CHLOROPROPANE)	UG/L	1.03	1.03	1	5	0.27
	2,3,4,6-TETRACHLOROPHENOL	UG/L	1.03	1.03	1	5	1.2
	2,4,5-TRICHLOROPHENOL	UG/L	1.03	1.03	1	5	3600
	2,4,6-TRICHLOROPHENOL	UG/L	1.03	1.03	1	5	0.96
	2,4-DICHLOROPHENOL	UG/L	1.03	1.03	1	5	11
	2,4-DIMETHYLPHENOL	UG/L	1.03	1.03	1	5	100
	2,4-DINITROPHENOL	UG/L	1.03	1.03	1	10	19
	2,6-DICHLOROPHENOL	UG/L	1.03	1.03	1	5	--(4)
	2-ACETYLAMINOFLUORENE	UG/L	1.03	1.03	1	5	535
	2-CHLORONAPHTHALENE	UG/L	1.03	1.03	1	5	0.396
	2-CHLOROPHENOL	UG/L	1.03	1.03	1	5	24
	2-METHYLPHENOL	UG/L	1.03	1.03	1	5	67
	2-NAPHTHYLAMINE	UG/L	1.03	1.03	1	5	--(4)
	2-NITROANILINE	UG/L	1.03	1.03	1	5	1
	2-NITROPHENOL	UG/L	1.03	1.03	1	5	--(4)
	2-PICOLINE	UG/L	1.03	1.03	1	5	--(4)
	3&4-METHYLPHENOL	UG/L	1.03	1.03	2.5	5	25
	3,3'-DICHLOROBENZIDINE	UG/L	1.03	1.03	1	5	0.15
	3,3'-DIMETHYLBENZIDINE	UG/L	1.03	1.03	1	5	0.0073
	3-METHYLCHOLANTHRENE	UG/L	1.03	1.03	1	5	0.0891
	3-NITROANILINE	UG/L	1.03	1.03	1	5	--(4)
	4,6-DINITRO-2-METHYLPHENOL	UG/L	1.03	1.03	1	5	23
	4-AMINOBIPHENYL	UG/L	1.03	1.03	1	5	--(4)
	4-BROMOPHENYL PHENYL ETHER	UG/L	1.03	1.03	1	5	1.5
	4-CHLORO-3-METHYLPHENOL	UG/L	1.03	1.03	1	5	34.8
	4-CHLOROANILINE	UG/L	1.03	1.03	1	5	150
	4-CHLOROPHENYL PHENYL ETHER	UG/L	1.03	1.03	1	5	--(4)
	4-NITROANILINE	UG/L	1.03	1.03	1	5	--(4)
	4-NITROPHENOL	UG/L	1.03	1.03	1	5	--(4)

TABLE H-7

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SUMP WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	4-NITROQUINOLINE-1-OXIDE	UG/L	1.03	1.03	1	5	--(4)
	5-NITRO-O-TOLUIDINE	UG/L	1.03	1.03	1	5	2
	7,12-DIMETHYLBENZ(A)ANTHRACENE	UG/L	1.03	1.03	1	5	0.548
	A,A-DIMETHYLPHENETHYLAMINE	UG/L	1.03	1.03	1	5	36
	ACETOPHENONE	UG/L	1.03	1.03	1	5	--(4)
	ANILINE	UG/L	1.03	1.03	1	5	4.1
	ARAMITE	UG/L	1.03	1.03	1	10	2.7
	BENZYL ALCOHOL	UG/L	1.03	1.03	1	5	8.6
	BIS(2-CHLOROETHOXY)METHANE	UG/L	1.03	1.03	1	5	--(4)
	BIS(2-CHLOROETHYL)ETHER	UG/L	1.03	1.03	0.9	5	0.0098
	BUTYL BENZYL PHTHALATE	UG/L	1.03	1.03	1	5	23
	CHLOROBENZILATE	UG/L	1.03	1.03	1	5	0.25
	DIALLATE	UG/L	1.03	1.03	1	5	1.1
	DIBENZOFURAN	UG/L	1.03	1.03	1	5	4
	DIETHYL PHTHALATE	UG/L	1.03	1.03	1	5	110
	DIMETHYL PHTHALATE	UG/L	1.03	1.03	1	5	360000
	DI-N-BUTYL PHTHALATE	UG/L	1.03	1.03	1	5	9.7
	DI-N-OCTYL PHTHALATE	UG/L	1.03	1.03	1	5	20
	DIPHENYLAMINE	UG/L	1.03	1.03	1	5	412
	ETHYL METHANE SULFONATE	UG/L	1.03	1.03	1	5	--(4)
	HEXACHLOROBENZENE	UG/L	1.03	1.03	1	5	0.0003
	HEXACHLOROBUTADIENE	UG/L	1.03	1.03	1	5	0.053
	HEXACHLOROCYCLOPENTADIENE	UG/L	1.03	1.03	1	5	50
	HEXACHLOROETHANE	UG/L	1.03	1.03	1	5	4.8
	HEXACHLOROPROPENE	UG/L	1.03	1.03	1	5	--(4)
	ISODRIN	UG/L	1.03	1.03	1	5	0.0309
	ISOPHORONE	UG/L	1.03	1.03	1	5	71
	ISOSAFROLE	UG/L	1.03	1.03	1	5	--(4)
	KEPONE	UG/L	1.03	1.03	1	5	0.0084
	METHAPYRILENE	UG/L	1.03	1.03	1	5	--(4)
	METHYL METHANE SULFONATE	UG/L	1.03	1.03	1	5	--(4)
	N-NITROSODIETHYLAMINE	UG/L	1.03	1.03	1	5	0.00045
	N-NITROSODIMETHYLAMINE	UG/L	1.03	1.03	1	5	0.0013
	N-NITROSO-DI-N-BUTYLAMINE	UG/L	1.03	1.03	1	5	0.002
	N-NITROSO-DI-N-PROPYLAMINE	UG/L	1.03	1.03	1	5	0.0096
	N-NITROSODIPHENYLAMINE	UG/L	1.03	1.03	#N/A	#N/A	#N/A
	N-NITROSOMETHYLETHYLAMINE	UG/L	1.03	1.03	1	5	0.0013
	N-NITROSOMORPHOLINE	UG/L	1.03	1.03	1	5	--(4)
	N-NITROSOPIPERIDINE	UG/L	1.03	1.03	1	5	--(4)
	N-NITROSOPYRROLIDINE	UG/L	1.03	1.03	1	5	0.032
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	UG/L	1.03	1.03	2.5	5	0.0038
	O-TOLUIDINE	UG/L	1.03	1.03	1	5	0.28
	P-(DIMETHYLAMINO)AZOBENZENE	UG/L	1.03	1.03	1	5	1.65
	PENTACHLOROBENZENE	UG/L	1.03	1.03	1	5	0.019
	PENTACHLOROETHANE	UG/L	1.03	1.03	1	5	--(4)
	PENTACHLORONITROBENZENE	UG/L	1.03	1.03	1	5	0.26
	PHENACETIN	UG/L	1.03	1.03	1	5	--(4)
	PHENOL	UG/L	1.03	1.03	1	5	180
	PRONAMIDE	UG/L	1.03	1.03	1	5	2700
	PYRIDINE	UG/L	1.03	1.03	1	5	36
	SAFROLE	UG/L	1.03	1.03	1	5	--(4)
VOC	1,1,1,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.43
	1,1,2,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.055
	1,1,2-TRICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.2
	1,1-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	7
	1,2,3-TRICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0056

TABLE H-7

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SUMP WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	1,2-DIBROMO-3-CHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0016
	1,2-DIBROMOETHANE	UG/L	0.3	0.3	0.3	1	0.00076
	1,2-DICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.12
	1,2-DICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.16
	2-BUTANONE	UG/L	0.5	0.5	0.5	5	1900
	2-HEXANONE	UG/L	0.5	0.5	0.5	5	99
	3-CHLOROPROPENE	UG/L	0.5	0.5	0.5	5	1800
	4-METHYL-2-PENTANONE	UG/L	0.5	0.5	0.5	5	160
	ACETONITRILE	UG/L	20	20	20	40	100
	ACROLEIN	UG/L	0.5	0.5	0.5	5	0.042
	ACRYLONITRILE	UG/L	0.5	0.5	0.5	5	0.039
	BENZENE	UG/L	0.3	0.3	0.3	1	0.34
	BROMODICHLOROMETHANE	UG/L	0.3	0.3	0.3	1	0.18
	BROMOFORM	UG/L	0.3	0.3	0.3	1	8.5
	BROMOMETHANE	UG/L	0.3	0.3	0.3	1	8.7
	CARBON DISULFIDE	UG/L	0.3	0.3	0.3	1	15
	CARBON TETRACHLORIDE	UG/L	0.3	0.3	0.3	1	0.17
	CHLOROBENZENE	UG/L	0.3	0.3	0.3	1	47
	CHLORODIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	0.13
	CHLOROFORM	UG/L	0.3	0.3	0.3	1	6.2
	CHLOROMETHANE	UG/L	0.3	0.3	0.3	1	1.5
	CHLOROPRENE	UG/L	0.5	0.5	0.5	5	14
	CIS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	DIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	61
	DICHLORODIFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	390
	ETHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	550
	ETHYLBENZENE	UG/L	0.3	0.3	0.3	1	2.9
	ISOBUTANOL	UG/L	20	20	20	40	1800
	METHACRYLONITRILE	UG/L	0.3	0.3	0.5	5	1
	METHYL IODIDE	UG/L	0.5	0.5	0.5	5	--(4)
	METHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	1400
	METHYL TERT-BUTYL ETHER	UG/L	0.5	0.5	0.5	1	13
	METHYLENE CHLORIDE	UG/L	0.3	0.3	0.3	1	4.3
	PROPIONITRILE	UG/L	20	20	20	40	--(4)
	STYRENE	UG/L	0.3	0.3	0.3	1	32
	TETRACHLOROETHENE	UG/L	0.3	0.3	0.3	1	0.66
	TOLUENE	UG/L	0.3	0.3	0.3	1	253
	TOTAL XYLENES	UG/L	0.3	0.3	0.3	1	27
	TRANS-1,2-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	100
	TRANS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	TRANS-1,4-DICHLORO-2-BUTENE	UG/L	0.5	0.5	#N/A	#N/A	0.0012
	TRICHLOROFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	1300
	VINYL ACETATE	UG/L	0.5	0.5	0.5	5	410
	VINYL CHLORIDE	UG/L	0.3	0.3	0.3	1	2

1 Only results with validation qualifiers that contain a "U" are tallied.
2 Highlighted values (yellow when reproduced in color and gray when reproduced in black and white) exceed laboratory RBTLs.
3 Risk-based target levels are taken from Table 1-5 of the SWMUs 8, 15, 18, 19, 20,and OGTSL QAPP (TtNUS, 2004) and are subject to change.
4 Risk-based target level is not provided because human health or ecological risk-based criteria were not available for this compound.

M = Metals, total
MF = Metals, dissolved
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds
UG/L = micrograms per Liter

TABLE H-8

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
EXP	1,3,5-TRINITROBENZENE	UG/L	0.25	0.25	0.25	0.5	1100
	1,3-DINITROBENZENE	UG/L	0.25	0.266	0.25	0.5	3.6
	2,4,6-TRINITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	2.2
	2,4-DINITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	44
	2,6-DINITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	36
	2-AMINO-4,6-DINITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	7.3
	2-NITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	61
	3-NITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	61
	4-AMINO-2,6-DINITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	7.3
	4-NITROTOLUENE	UG/L	0.25	0.266	0.25	0.5	61
	HMX	UG/L	0.25	0.266	0.25	0.5	1800
	NITROBENZENE	UG/L	0.25	0.266	0.25	0.5	3.4
	RDX	UG/L	0.25	0.266	0.25	0.5	0.61
	TETRYL	UG/L	0.25	0.266	0.25	0.5	360
M	ALUMINUM	UG/L	14.4	33.8	2.6	50	36000
	ANTIMONY	UG/L	0.085	0.8	0.1	1	6
	ARSENIC	UG/L	0.29	0.72	0.2	1	0.045
	BERYLLIUM	UG/L	0.02	0.23	0.1	1	3.6
	CADMIUM	UG/L	0.16	0.16	0.7	1	0.15
	CHROMIUM	UG/L	0.94	0.94	0.1	1	42
	COPPER	UG/L	1.5	2.7	0.1	2	1.58
	LEAD	UG/L	0.069	0.12	0.1	1	1.17
	MERCURY	UG/L	0.03	0.03	0.1	0.2	0.0013
	NICKEL	UG/L	0.1	0.1	0.1	1	730
	SELENIUM	UG/L	0.094	0.2	0.4	1	5
	SILVER	UG/L	0.028	0.18	0.1	1	0.12
	THALLIUM	UG/L	0.043	0.26	0.1	1	2
	TIN	UG/L	0.048	0.53	0.1	10	180
	VANADIUM	UG/L	1.14	1.14	0.1	2	12
	ZINC	UG/L	1.7	4	0.5	10	65.7
MF	ALUMINUM	UG/L	8.35	21.2	2.6	50	36000
	ANTIMONY	UG/L	0.085	0.5	0.1	1	6
	ARSENIC	UG/L	0.047	0.62	0.2	1	0.045
	BERYLLIUM	UG/L	0.02	0.02	0.1	1	3.6
	CADMIUM	UG/L	0.07	0.28	0.7	1	0.15
	CHROMIUM	UG/L	0.95	0.96	0.1	1	42
	COPPER	UG/L	1.1	1.9	0.1	2	1.58
	IRON	UG/L	6.15	6.15	3.9	50	11000
	LEAD	UG/L	0.069	0.12	0.1	1	1.17
	MERCURY	UG/L	0.03	0.03	0.1	0.2	0.0013
	SILVER	UG/L	0.028	0.09	0.1	1	0.12
	SODIUM	UG/L	2490	2490	1.6	500	--(4)
	THALLIUM	UG/L	0.043	0.14	0.1	1	2
	TIN	UG/L	0.048	0.12	0.1	10	180
	VANADIUM	UG/L	1.14	1.14	0.1	2	12
	ZINC	UG/L	4	4.4	0.5	10	65.7
MISC	FECAL COLIFORM	CFU/L	0.1	1	#N/A	#N/A	#N/A
	PERCHLORATE	UG/L	2	10	#N/A	#N/A	#N/A
SVOC	1,2,4,5-TETRACHLOROBENZENE	UG/L	0.95	1.03	1	5	3
	1,2,4-TRICHLOROBENZENE	UG/L	0.95	1.03	1	5	30
	1,2-DICHLOROBENZENE	UG/L	0.95	1.03	1	5	14
	1,3-DICHLOROBENZENE	UG/L	0.95	1.03	1	5	5.5
	1,4-DICHLOROBENZENE	UG/L	0.95	1.03	1	5	0.5

TABLE H-8

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	1,4-DIOXANE	UG/L	0.95	4.04	50	100	6.1
	1,4-NAPHTHOQUINONE	UG/L	0.95	1.03	1	5	--(4)
	1,4-PHENYLENEDIAMINE	UG/L	0.95	1.03	1	10	6900
	1-NAPHTHYLAMINE	UG/L	0.95	1.03	1	5	--(4)
	2,2'-OXYBIS(1-CHLOROPROPANE)	UG/L	0.95	1.03	1	5	0.27
	2,3,4,6-TETRACHLOROPHENOL	UG/L	0.95	1.03	1	5	1.2
	2,4,5-TRICHLOROPHENOL	UG/L	0.95	1.03	1	5	3600
	2,4,6-TRICHLOROPHENOL	UG/L	0.95	1.03	1	5	0.96
	2,4-DICHLOROPHENOL	UG/L	0.95	1.03	1	5	11
	2,4-DIMETHYLPHENOL	UG/L	0.95	0.97	1	5	100
	2,4-DINITROPHENOL	UG/L	0.95	1.03	1	10	19
	2,6-DICHLOROPHENOL	UG/L	0.95	1.03	1	5	--(4)
	2-ACETYLAMINOFLUORENE	UG/L	0.95	1.03	1	5	535
	2-CHLORONAPHTHALENE	UG/L	0.95	1.03	1	5	0.396
	2-CHLOROPHENOL	UG/L	0.95	1.03	1	5	24
	2-METHYLNAPHTHALENE	UG/L	0.052	0.06	0.05	0.1	5
	2-METHYLPHENOL	UG/L	0.95	1.03	1	5	67
	2-NAPHTHYLAMINE	UG/L	0.95	1.03	1	5	--(4)
	2-NITROANILINE	UG/L	0.95	1.03	1	5	1
	2-NITROPHENOL	UG/L	0.95	1.03	1	5	--(4)
	2-PICOLINE	UG/L	0.95	1.03	1	5	--(4)
	3&4-METHYLPHENOL	UG/L	0.95	0.97	2.5	5	25
	3,3'-DICHLOROBENZIDINE	UG/L	0.95	1.03	1	5	0.15
	3,3'-DIMETHYLBENZIDINE	UG/L	0.95	1.03	1	5	0.0073
	3-METHYLCHOLANTHRENE	UG/L	0.95	1.03	1	5	0.0891
	3-NITROANILINE	UG/L	0.95	1.03	1	5	--(4)
	4,6-DINITRO-2-METHYLPHENOL	UG/L	0.95	1.03	1	5	23
	4-AMINOBIPHENYL	UG/L	0.95	1.03	1	5	--(4)
	4-BROMOPHENYL PHENYL ETHER	UG/L	0.95	1.03	1	5	1.5
	4-CHLORO-3-METHYLPHENOL	UG/L	0.95	1.03	1	5	34.8
	4-CHLOROANILINE	UG/L	0.95	1.03	1	5	150
	4-CHLOROPHENYL PHENYL ETHER	UG/L	0.95	1.03	1	5	--(4)
	4-NITROANILINE	UG/L	0.95	1.03	1	5	--(4)
	4-NITROPHENOL	UG/L	0.95	1.03	1	5	--(4)
	4-NITROQUINOLINE-1-OXIDE	UG/L	0.95	1.03	1	5	--(4)
	5-NITRO-O-TOLUIDINE	UG/L	0.95	1.03	1	5	2
	7,12-DIMETHYLBENZ(A)ANTHRACENE	UG/L	0.95	1.03	1	5	0.548
	A,A-DIMETHYLPHENETHYLAMINE	UG/L	0.95	1.03	1	5	36
	ACENAPHTHENE	UG/L	0.052	0.06	0.05	0.1	38
	ACENAPHTHYLENE	UG/L	0.052	0.06	0.05	0.1	370
	ACETOPHENONE	UG/L	0.95	1.03	1	5	--(4)
	ANILINE	UG/L	0.95	1.03	1	5	4.1
	ANTHRACENE	UG/L	0.052	0.06	0.05	0.1	0.035
	ARAMITE	UG/L	0.95	1.03	1	10	2.7
	BENZO(A)ANTHRACENE	UG/L	0.052	0.06	0.05	0.1	0.025
	BENZO(A)PYRENE	UG/L	0.052	0.06	0.05	0.1	0.0092
	BENZO(B)FLUORANTHENE	UG/L	0.052	0.06	0.05	0.1	0.092
	BENZO(G,H,I)PERYLENE	UG/L	0.052	0.06	0.05	0.1	0.26
	BENZO(K)FLUORANTHENE	UG/L	0.052	0.06	0.05	0.1	0.8
	BENZYL ALCOHOL	UG/L	0.95	1.03	1	5	8.6
	BIS(2-CHLOROETHOXY)METHANE	UG/L	0.95	1.03	1	5	--(4)
	BIS(2-CHLOROETHYL)ETHER	UG/L	0.95	1.03	0.9	5	0.0098
	BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	0.95	1.03	1	5	0.3

TABLE H-8

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	BUTYL BENZYL PHTHALATE	UG/L	0.95	1.03	1	5	23
	CHLOROBENZILATE	UG/L	0.95	1.03	1	5	0.25
	CHRYSENE	UG/L	0.052	0.06	0.05	0.1	1.6
	DIALLATE	UG/L	0.95	1.03	1	5	1.1
	DIBENZO(A,H)ANTHRACENE	UG/L	0.052	0.06	0.05	0.1	0.0092
	DIBENZOFURAN	UG/L	0.95	1.03	1	5	4
	DIETHYL PHTHALATE	UG/L	0.95	1.03	1	5	110
	DIMETHYL PHTHALATE	UG/L	0.95	1.03	1	5	360000
	DI-N-BUTYL PHTHALATE	UG/L	0.95	1.03	1	5	9.7
	DI-N-OCTYL PHTHALATE	UG/L	0.95	1.03	1	5	20
	DIPHENYLAMINE	UG/L	0.95	1.03	1	5	412
	ETHYL METHANE SULFONATE	UG/L	0.95	1.03	1	5	--(4)
	FLUORANTHENE	UG/L	0.052	0.06	0.05	0.1	1.9
	FLUORENE	UG/L	0.052	0.06	0.05	0.1	19
	HEXACHLOROBENZENE	UG/L	0.95	1.03	1	5	0.0003
	HEXACHLOROBUTADIENE	UG/L	0.95	1.03	1	5	0.053
	HEXACHLOROCYCLOPENTADIENE	UG/L	0.95	1.03	1	5	50
	HEXACHLOROETHANE	UG/L	0.95	1.03	1	5	4.8
	HEXACHLOROPROPENE	UG/L	0.95	1.03	1	5	--(4)
	INDENO(1,2,3-CD)PYRENE	UG/L	0.052	0.06	0.05	0.1	0.022
	ISODRIN	UG/L	0.95	1.03	1	5	0.0309
	ISOPHORONE	UG/L	0.95	1.03	1	5	71
	ISOSAFROLE	UG/L	0.95	1.03	1	5	--(4)
	KEPONE	UG/L	0.95	1.03	1	5	0.0084
	METHAPYRILENE	UG/L	0.95	1.03	1	5	--(4)
	METHYL METHANE SULFONATE	UG/L	0.95	1.03	1	5	--(4)
	NAPHTHALENE	UG/L	0.052	0.06	0.05	0.1	6.2
	N-NITROSODIETHYLAMINE	UG/L	0.95	1.03	1	5	0.00045
	N-NITROSODIMETHYLAMINE	UG/L	0.95	1.03	1	5	0.0013
	N-NITROSO-DI-N-BUTYLAMINE	UG/L	0.95	1.03	1	5	0.002
	N-NITROSO-DI-N-PROPYLAMINE	UG/L	0.95	1.03	1	5	0.0096
	N-NITROSODIPHENYLAMINE	UG/L	0.95	1.03	#N/A	#N/A	#N/A
	N-NITROSOMETHYLETHYLAMINE	UG/L	0.95	1.03	1	5	0.0013
	N-NITROSOMORPHOLINE	UG/L	0.95	1.03	1	5	--(4)
	N-NITROSOPIPERIDINE	UG/L	0.95	1.03	1	5	--(4)
	N-NITROSOPYRROLIDINE	UG/L	0.95	1.03	1	5	0.032
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	UG/L	0.95	1.03	2.5	5	0.0038
	O-TOLUIDINE	UG/L	0.95	1.03	1	5	0.28
	P-(DIMETHYLAMINO)AZOBENZENE	UG/L	0.95	1.03	1	5	1.65
	PENTACHLOROBENZENE	UG/L	0.95	1.03	1	5	0.019
	PENTACHLOROETHANE	UG/L	0.95	1.03	1	5	--(4)
	PENTACHLORONITROBENZENE	UG/L	0.95	1.03	1	5	0.26
	PHENACETIN	UG/L	0.95	1.03	1	5	--(4)
	PHENANTHRENE	UG/L	0.052	0.06	0.05	0.1	3.6
	PHENOL	UG/L	0.95	0.97	1	5	180
	PRONAMIDE	UG/L	0.95	1.03	1	5	2700
	PYRENE	UG/L	0.052	0.06	0.05	0.1	0.3
	PYRIDINE	UG/L	0.95	1.03	1	5	36
	SAFROLE	UG/L	0.95	1.03	1	5	--(4)
VOC	1,1,1,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.43
	1,1,1-TRICHLOROETHANE	UG/L	0.3	0.3	0.3	1	76
	1,1,2,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.055
	1,1,2-TRICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.2

TABLE H-8

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
	1,1-DICHLOROETHANE	UG/L	0.3	0.3	0.3	1	47
	1,1-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	7
	1,2,3-TRICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0056
	1,2-DIBROMO-3-CHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0016
	1,2-DIBROMOETHANE	UG/L	0.3	0.3	0.3	1	0.00076
	1,2-DICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.12
	1,2-DICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.16
	2-BUTANONE	UG/L	0.5	0.5	0.5	5	1900
	2-HEXANONE	UG/L	0.5	0.5	0.5	5	99
	3-CHLOROPROPENE	UG/L	0.5	0.5	0.5	5	1800
	4-METHYL-2-PENTANONE	UG/L	0.5	0.5	0.5	5	160
	ACETONE	UG/L	0.5	4.2	0.5	5	610
	ACETONITRILE	UG/L	20	20	20	40	100
	ACROLEIN	UG/L	0.5	0.5	0.5	5	0.042
	ACRYLONITRILE	UG/L	0.5	0.5	0.5	5	0.039
	BENZENE	UG/L	0.3	0.3	0.3	1	0.34
	BROMODICHLOROMETHANE	UG/L	0.3	0.3	0.3	1	0.18
	BROMOFORM	UG/L	0.3	0.3	0.3	1	8.5
	BROMOMETHANE	UG/L	0.3	0.3	0.3	1	8.7
	CARBON DISULFIDE	UG/L	0.3	0.3	0.3	1	15
	CARBON TETRACHLORIDE	UG/L	0.3	0.3	0.3	1	0.17
	CHLOROBENZENE	UG/L	0.3	0.3	0.3	1	47
	CHLORODIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	0.13
	CHLOROETHANE	UG/L	0.5	0.5	0.3	1	4.6
	CHLOROFORM	UG/L	0.3	0.3	0.3	1	6.2
	CHLOROMETHANE	UG/L	0.3	0.3	0.3	1	1.5
	CHLOROPRENE	UG/L	0.5	0.5	0.5	5	14
	CIS-1,2-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	61
	CIS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	DIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	61
	DICHLORODIFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	390
	ETHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	550
	ETHYLBENZENE	UG/L	0.3	0.3	0.3	1	2.9
	ISOBUTANOL	UG/L	20	20	20	40	1800
	METHACRYLONITRILE	UG/L	0.3	0.3	0.5	5	1
	METHYL IODIDE	UG/L	0.5	0.5	0.5	5	--(4)
	METHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	1400
	METHYL TERT-BUTYL ETHER	UG/L	0.5	0.5	0.5	1	13
	METHYLENE CHLORIDE	UG/L	0.3	0.3	0.3	1	4.3
	PROPIONITRILE	UG/L	20	20	20	40	--(4)
	STYRENE	UG/L	0.3	0.3	0.3	1	32
	TETRACHLOROETHENE	UG/L	0.3	0.3	0.3	1	0.66
	TOLUENE	UG/L	0.3	0.3	0.3	1	253
	TOTAL XYLENES	UG/L	0.3	0.3	0.3	1	27
	TRANS-1,2-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	100
	TRANS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	TRANS-1,4-DICHLORO-2-BUTENE	UG/L	0.5	0.5	#N/A	#N/A	0.0012
	TRICHLOROETHENE	UG/L	0.3	0.3	#N/A	#N/A	0.026
	TRICHLOROFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	1300
	VINYL ACETATE	UG/L	0.5	0.5	0.5	5	410
	VINYL CHLORIDE	UG/L	0.3	0.3	0.3	1	2

1 Only results with validation qualifiers that contain a "U" are tallied.

TABLE H-8

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]

2 Highlighted values (yellow when reproduced in color and gray when reproduced in black and white) exceed laboratory RBTLs.
3 Risk-based target levels are taken from Table 1-5 of the SWMUs 8, 15, 18, 19, 20,and OGTSL QAPP (TtNUS, 2004) and are subject to change.
4 Risk-based target level is not provided because human health or ecological risk-based criteria were not available for this compound.

CFU/L = Coliform units per liter
EXP = Explosives
M = Metals, total
MF = Metals, dissolved
MISC = Miscellaneous parameters
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds
UG/L = micrograms per Liter

TABLE H-9

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SEEP WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration[2]	Maximum Non-detect Concentration[2]	Laboratory TV	Laboratory RL	Risk-Based Target Level[3]
M	ANTIMONY	UG/L	0.25	0.25	0.1	1	6
	SILVER	UG/L	0.028	0.028	0.1	1	0.12
MF	ANTIMONY	UG/L	0.1	0.1	0.1	1	6
	ARSENIC	UG/L	0.42	0.42	0.2	1	0.045
	BERYLLIUM	UG/L	0.02	0.02	0.1	1	3.6
	CADMIUM	UG/L	0.1	0.1	0.7	1	0.15
	COPPER	UG/L	1.6	1.6	0.1	2	1.58
	MERCURY	UG/L	0.03	0.03	0.1	0.2	0.0013
	SILVER	UG/L	0.028	0.028	0.1	1	0.12
	THALLIUM	UG/L	0.09	0.09	0.1	1	2
	TIN	UG/L	0.06	0.06	0.1	10	180
	VANADIUM	UG/L	1.14	1.14	0.1	2	12
VOC	1,1,1,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.43
	1,1,2,2-TETRACHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.055
	1,1,2-TRICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.2
	1,2,3-TRICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0056
	1,2-DIBROMO-3-CHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.0016
	1,2-DIBROMOETHANE	UG/L	0.3	0.3	0.3	1	0.00076
	1,2-DICHLOROETHANE	UG/L	0.3	0.3	0.3	1	0.12
	1,2-DICHLOROPROPANE	UG/L	0.3	0.3	0.3	1	0.16
	2-BUTANONE	UG/L	0.5	0.5	0.5	5	1900
	2-HEXANONE	UG/L	0.5	0.5	0.5	5	99
	3-CHLOROPROPENE	UG/L	0.5	0.5	0.5	5	1800
	4-METHYL-2-PENTANONE	UG/L	0.5	0.5	0.5	5	160
	ACETONE	UG/L	0.5	0.5	0.5	5	610
	ACETONITRILE	UG/L	20	20	20	40	100
	ACROLEIN	UG/L	0.5	0.5	0.5	5	0.042
	ACRYLONITRILE	UG/L	0.5	0.5	0.5	5	0.039
	BENZENE	UG/L	0.3	0.3	0.3	1	0.34
	BROMODICHLOROMETHANE	UG/L	0.3	0.3	0.3	1	0.18
	BROMOFORM	UG/L	0.3	0.3	0.3	1	8.5
	BROMOMETHANE	UG/L	0.3	0.3	0.3	1	8.7
	CARBON DISULFIDE	UG/L	0.3	0.3	0.3	1	15
	CARBON TETRACHLORIDE	UG/L	0.3	0.3	0.3	1	0.17
	CHLOROBENZENE	UG/L	0.3	0.3	0.3	1	47
	CHLORODIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	0.13
	CHLOROETHANE	UG/L	0.5	0.5	0.3	1	4.6
	CHLOROFORM	UG/L	0.3	0.3	0.3	1	6.2
	CHLOROMETHANE	UG/L	0.3	0.3	0.3	1	1.5
	CHLOROPRENE	UG/L	0.5	0.5	0.5	5	14
	CIS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	DIBROMOMETHANE	UG/L	0.3	0.3	0.3	1	61
	DICHLORODIFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	390
	ETHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	550
	ETHYLBENZENE	UG/L	0.3	0.3	0.3	1	2.9
	ISOBUTANOL	UG/L	20	20	20	40	1800
	METHACRYLONITRILE	UG/L	0.3	0.3	0.5	5	1
	METHYL IODIDE	UG/L	0.5	0.5	0.5	5	--(4)
	METHYL METHACRYLATE	UG/L	0.5	0.5	0.5	5	1400
	METHYL TERT-BUTYL ETHER	UG/L	0.5	0.5	0.5	1	13
	METHYLENE CHLORIDE	UG/L	0.3	0.3	0.3	1	4.3

TABLE H-9

MINIMUM AND MAXIMUM NON-DETECT VALUES FOR SEEP WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

Fraction	Parameter	Units	Minimum Non-detect Concentration(2)	Maximum Non-detect Concentration(2)	Laboratory TV	Laboratory RL	Risk-Based Target Level(3)
	PROPIONITRILE	UG/L	20	20	20	40	--(4)
	STYRENE	UG/L	0.3	0.3	0.3	1	32
	TETRACHLOROETHENE	UG/L	0.3	0.3	0.3	1	0.66
	TOLUENE	UG/L	0.3	0.3	0.3	1	253
	TOTAL XYLENES	UG/L	0.3	0.3	0.3	1	27
	TRANS-1,2-DICHLOROETHENE	UG/L	0.3	0.3	0.3	1	100
	TRANS-1,3-DICHLOROPROPENE	UG/L	0.3	0.3	0.3	1	0.4
	TRANS-1,4-DICHLORO-2-BUTENE	UG/L	0.5	0.5	#N/A	#N/A	0.0012
	TRICHLOROFLUOROMETHANE	UG/L	0.3	0.3	0.3	1	1300
	VINYL ACETATE	UG/L	0.5	0.5	0.5	5	410
	VINYL CHLORIDE	UG/L	0.3	0.3	0.3	1	2

1 Only results with validation qualifiers that contain a "U" are tallied.
2 Highlighted values (yellow when reproduced in color and gray when reproduced in black and white) exceed laboratory RBTLs.
3 Risk-based target levels are taken from Table 1-5 of the SWMUs 8, 15, 18, 19, 20,and OGTSL QAPP (TtNUS, 2004) and are subject to change.
4 Risk-based target level is not provided because human health or ecological risk-based criteria were not available for this compound.

M = Metals, total
MF = Metals, dissolved
OV = Volatile organic compounds
UG/L = micrograms per Liter

TABLE H-10

PERCENT RECOVERIES FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Ave	Max	Count	Min	Ave	Max	Count	Min	Ave	Max	Count
EXP	1,3,5-TRINITROBENZENE	102	103.5	106	4	100	102.0	110	5	100	104.8	111	5
	1,3-DINITROBENZENE	102	104.3	107	4	100	103.0	111	5	102	106.2	112	5
	2,4,6-TRINITROTOLUENE	101	102.4	104	5	98	99.8	105	5	99	103.0	106	5
	2,4-DINITROTOLUENE	97	99.0	102	4	68	86.0	96	5	64	88.2	102	5
	2,6-DINITROTOLUENE	101	103.3	106	4	64	83.8	101	5	61	86.0	107	5
	2-AMINO-4,6-DINITROTOLUENE	89	95.3	98	4	83	97.6	108	5	88	100.2	114	5
	2-NITROTOLUENE	102	102.8	105	4	100	103.6	112	5	104	107.6	114	5
	3,4-DINITROTOLUENE (SURR)	99	108.0	114	4	105	109.8	120	5	101	109.8	122	5
	3-NITROTOLUENE	103	105.6	112	5	100	104.0	112	5	103	107.0	114	5
	4-AMINO-2,6-DINITROTOLUENE	93	96.8	106	4	89	94.4	107	5	91	97.2	108	5
	4-NITROTOLUENE	106	106.8	109	4	103	107.6	118	5	105	110.4	120	5
	HMX	97	98.8	102	4	93	96.4	101	5	95	98.4	103	5
	NITROBENZENE	106	106.8	109	4	61	83.6	105	5	67	86.4	108	5
	RDX	99	100.6	102	5	80	91.0	97	5	81	91.2	98	5
	TETRYL	81	95.6	113	5	42	73.4	103	5	38	74.4	103	5
HERB	2,4,5-T	86	97.6	108	8	64	76.7	86	6	55	75.3	91	6
	2,4,5-TP (SILVEX)	93	104.0	114	8	65	80.3	95	6	57	78.7	97	6
	2,4-D	107	119.4	132	8	76	92.3	112	6	69	95.2	117	6
	2,4-DICHLOROPHENYLACETIC ACID (SURR)	112	125.8	140	13	71	154.1	288	10	85	153.8	293	10
	DINOSEB	70	75.3	81	8	36	45.8	58	6	33	42.5	57	6
	HEXACHLOROPHENE	48	60.4	82	13	20	35.1	51	10	19	37.1	58	10
	PENTACHLOROPHENOL	91	116.5	133	13	35	62.3	84	10	20	62.0	88	10
M	ALUMINUM	88.3	101.9	107.8	10	---	---	---	---	---	---	---	---
	ANTIMONY	79.6	107.0	138.8	10	94.8	107.6	138.2	12	---	---	---	---
	ARSENIC	95.6	100.1	113.2	10	76.8	97.2	114.9	12	---	---	---	---
	BARIUM	85.2	99.4	108	11	36.8	87.6	196.4	7	---	---	---	---
	BERYLLIUM	98	104.5	117.2	10	85.8	101.6	118.1	12	---	---	---	---
	CADMIUM	95.6	101.3	116	10	92.9	99.0	113.3	12	---	---	---	---
	CALCIUM	88.8	101.3	108.1	10	52.2	82.8	104.4	9	---	---	---	---
	CHROMIUM	86.8	101.2	107.2	11	66.3	92.6	125.4	12	---	---	---	---

TABLE H-10

PERCENT RECOVERIES FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Ave	Max	Count	Min	Ave	Max	Count	Min	Ave	Max	Count
	COBALT	87.2	102.4	109.6	10	83.2	93.3	125.4	12	---	---	---	---
	COPPER	92.4	103.0	113.2	10	64.4	102.2	244.6*	12	---	---	---	---
	IRON	89.2	102.1	110.1	11	---	---	---	---	---	---	---	---
	LEAD	91.2	106.2	164.4	11	41.2	107.4	233.4	12	---	---	---	---
	LITHIUM	102.8	102.8	102.8	1	103.6	103.6	103.6	1	---	---	---	---
	MAGNESIUM	88.1	101.8	108.8	11	72.4	104.2	186.2	10	---	---	---	---
	MANGANESE	88.8	100.6	106.4	10	100	100.0	100	1	---	---	---	---
	MERCURY	68.3	99.4	124.9	11	57.4	96.9	119.1	12	---	---	---	---
	NICKEL	90.4	116.7	218	11	68.4	99.5	152.5	12	---	---	---	---
	POTASSIUM	93.9	102.6	109.1	11	63.5	96.6	167.5	12	---	---	---	---
	SELENIUM	93.6	102.9	116.4	10	79.7	98.5	111.4	12	---	---	---	---
	SILVER	89.6	99.9	113.2	10	86.8	94.7	108.9	12	---	---	---	---
	SODIUM	89.4	100.7	107.1	10	75.3	89.4	98.2	12	---	---	---	---
	STRONTIUM	96.8	96.8	96.8	1	89.5	89.5	89.5	1	---	---	---	---
	THALLIUM	94.8	106.4	120.8	11	91.2	104.4	114.7	12	---	---	---	---
	TIN	72.8	97.7	107.6	10	91.3	95.6	107.8	12	---	---	---	---
	VANADIUM	83.6	98.1	103.6	11	34.2	94.1	181.3*	12	---	---	---	---
	ZINC	88.8	104.6	130	10	-78.1	83.7	186.9	9	---	---	---	---
MISC	CYANIDE	90	94.0	98	2	82	82.0	82	1	80	80.0	80	1
	PERCHLORATE	98	102.4	104	5	90	105.8	138	5	95	105.8	123	5
	TOTAL ORGANIC CARBON	100	100.0	100	1	99	99.0	99	1	93	93.0	93	1
PEST/PCB	4,4'-DDD	85	101.3	118	6	84	94.8	117	4	80	86.0	91	4
	4,4'-DDE	83	99.0	113	6	72	90.3	113	4	72	82.3	89	4
	4,4'-DDT	84	100.0	116	6	73	89.8	109	4	70	82.3	88	4
	ALDRIN	74	87.8	105	6	70	75.8	81	4	68	70.8	73	4
	ALPHA-BHC	73	86.5	100	6	69	79.8	98	4	67	71.5	74	4
	ALPHA-CHLORDANE	78	90.2	106	6	81	84.8	90	4	75	76.5	77	4
	AROCLOR-1016	86	96.0	119	8	86	102.4	117	8	73	100.1	121	8
	AROCLOR-1260	91	101.6	118	8	92	107.5	124	8	76	105.0	129	8
	BETA-BHC	73	85.2	98	6	72	80.3	93	4	74	75.0	77	4

TABLE H-10

PERCENT RECOVERIES FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Ave	Max	Count	Min	Ave	Max	Count	Min	Ave	Max	Count
	DECACHLOROBIPHENYL (SURR)	75	91.4	111	14	63	91.6	124	12	63	89.3	119	12
	DELTA-BHC	78	84.8	93	6	67	77.5	88	4	65	73.8	79	4
	DIELDRIN	78	90.7	106	6	70	81.5	96	4	72	74.5	78	4
	ENDOSULFAN I	75	89.2	106	6	71	79.8	96	4	70	71.8	74	4
	ENDOSULFAN II	79	90.3	105	6	71	79.8	92	4	69	73.0	76	4
	ENDOSULFAN SULFATE	80	89.8	103	6	72	79.5	91	4	70	72.8	74	4
	ENDRIN	83	95.7	111	6	74	84.5	102	4	72	78.5	83	4
	ENDRIN ALDEHYDE	63	72.3	86	6	36	53.8	63	4	37	50.0	58	4
	ENDRIN KETONE	80	91.8	108	6	71	79.3	92	4	70	73.8	76	4
	GAMMA-BHC (LINDANE)	78	88.0	101	6	72	81.8	97	4	68	73.5	77	4
	GAMMA-CHLORDANE	73	86.0	101	6	68	79.0	90	4	70	73.5	78	4
	HEPTACHLOR	76	88.8	104	6	73	80.3	93	4	70	73.8	78	4
	HEPTACHLOR EPOXIDE	76	88.7	103	6	71	79.3	89	4	72	73.8	76	4
	METHOXYCHLOR	88	103.0	119	6	84	95.3	111	4	84	87.5	91	4
	TETRACHLORO-M-XYLENE (SURR)	70	84.3	103	14	61	85.1	112	12	58	78.9	109	12
SVOC	1,2,4-TRICHLOROBENZENE	58	77.3	92	15	56	72.8	84	13	63	74.8	90	13
	1,2-DICHLOROBENZENE	58	77.3	92	15	57	70.5	87	13	52	69.7	86	13
	1,3-DICHLOROBENZENE	53	72.9	92	14	48	65.4	87	13	42	64.2	84	13
	1,4-DICHLOROBENZENE	55	73.4	85	14	50	65.2	83	13	45	64.9	82	13
	1,4-DIOXANE	52	56.0	60	2	54	62.5	71	2	40	48.5	57	2
	1-FLUORONAPHTHALENE (SURR)	0	66.4	86	13	37	61.5	90	13	41	61.7	78	13
	2,2'-OXYBIS(1-CHLOROPROPANE)	61	83.8	108	14	67	80.2	104	13	64	82.4	106	13
	2,4,5-TRICHLOROPHENOL	66	84.3	100	15	67	81.2	91	13	70	84.5	98	13
	2,4,6-TRIBROMOPHENOL (SURR)	70	87.8	107	15	42	82.1	101	13	38	85.2	106	13
	2,4,6-TRICHLOROPHENOL	64	83.1	100	14	48	77.1	95	13	54	81.0	100	13
	2,4-DICHLOROPHENOL	63	78.1	92	14	57	72.2	87	13	51	75.0	90	13
	2,4-DIMETHYLPHENOL	26	57.3	85	15	0	40.0	82	13	0	40.8	83	13
	2,4-DINITROPHENOL	17	54.0	75	15	22	58.5	82	13	22	60.8	86	13
	2-CHLORONAPHTHALENE	49	63.9	77	14	52	63.4	76	13	56	64.9	78	13
	2-CHLOROPHENOL	63	82.5	100	15	58	76.3	93	13	53	78.9	100	13

TABLE H-10

PERCENT RECOVERIES FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Ave	Max	Count	Min	Ave	Max	Count	Min	Ave	Max	Count
	2-FLUOROBIPHENYL (SURR)	53	68.5	87	15	51	69.1	91	13	55	71.1	85	13
	2-FLUOROPHENOL (SURR)	64	76.7	95	14	46	70.7	85	13	49	71.8	94	13
	2-METHYLNAPHTHALENE	0	54.7	66	13	35	54.6	72	13	41	58.4	71	13
	2-METHYLPHENOL	63	79.6	115	15	19	64.8	85	13	21	67.2	104	13
	2-NITROANILINE	65	82.6	100	14	68	80.6	94	13	63	84.3	101	13
	2-NITROPHENOL	54	76.9	85	14	60	73.9	85	13	66	77.6	89	13
	3&4-METHYLPHENOL	60	77.7	115	14	17	63.4	86	13	21	64.5	100	13
	3,3'-DICHLOROBENZIDINE	28	44.7	61	15	0	12.3	38	13	0	16.0	52	13
	3-NITROANILINE	43	62.8	77	14	24	41.6	60	13	31	46.1	67	13
	4,6-DINITRO-2-METHYLPHENOL	29	71.1	85	15	41	68.2	86	13	40	70.6	90	13
	4-BROMOPHENYL PHENYL ETHER	66	86.3	100	15	78	88.8	105	13	78	92.1	117	13
	4-CHLORO-3-METHYLPHENOL	65	86.7	115	15	60	80.2	95	13	53	83.3	104	13
	4-CHLOROANILINE	25	39.7	63	15	0	14.1	28	13	0	15.1	27	13
	4-CHLOROPHENYL PHENYL ETHER	75	89.9	100	15	74	86.5	96	13	71	88.5	101	13
	4-NITROANILINE	55	80.7	100	14	39	54.6	77	13	43	59.5	80	13
	4-NITROPHENOL	38	71.4	92	15	39	71.8	93	13	51	73.5	95	13
	ACENAPHTHENE	25	62.6	76	14	40	66.4	80	13	54	71.2	88	13
	ACENAPHTHYLENE	20	62.0	77	13	42	64.8	85	13	50	70.6	93	13
	ANTHRACENE	63	69.3	82	14	48	69.0	81	13	62	75.5	88	13
	BENZO(A)ANTHRACENE	59	70.8	84	13	46	69.9	84	13	38	77.0	122	13
	BENZO(A)PYRENE	57	66.9	78	14	46	65.2	78	13	46	76.4	163	13
	BENZO(B)FLUORANTHENE	54	64.6	74	14	44	62.9	86	13	37	72.3	151	13
	BENZO(G,H,I)PERYLENE	51	78.6	95	14	60	88.4	121	13	60	102.0	228	13
	BENZO(K)FLUORANTHENE	49	57.1	72	14	48	63.2	75	13	43	67.2	95	13
	BENZYL ALCOHOL	68	87.3	115	15	73	85.6	99	13	75	88.7	111	13
	BIS(2-CHLOROETHOXY)METHANE	48	61.7	72	15	51	59.8	68	13	54	62.1	72	13
	BIS(2-CHLOROETHYL)ETHER	65	82.0	100	14	64	79.5	95	13	68	81.4	97	13
	BIS(2-ETHYLHEXYL)PHTHALATE	55	86.7	123	14	73	101.1	132	13	74	105.8	145	13
	BUTYL BENZYL PHTHALATE	61	82.3	115	15	78	92.8	122	13	76	96.1	119	13
	CHRYSENE	63	73.6	84	14	50	71.7	86	13	46	80.5	133	13

TABLE H-10

PERCENT RECOVERIES FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Ave	Max	Count	Min	Ave	Max	Count	Min	Ave	Max	Count
	DIBENZO(A,H)ANTHRACENE	53	76.9	94	14	58	89.0	122	13	69	98.6	142	13
	DIBENZOFURAN	69	83.2	92	15	71	80.5	89	13	71	82.6	95	13
	DIETHYL PHTHALATE	65	88.8	115	14	72	84.2	95	13	68	86.2	101	13
	DIMETHYL PHTHALATE	67	80.3	92	15	70	79.7	87	13	67	82.4	96	13
	DI-N-BUTYL PHTHALATE	69	89.1	115	15	73	90.5	111	13	72	92.8	120	13
	DI-N-OCTYL PHTHALATE	65	95.5	162	14	77	103.8	149	13	79	107.8	161	13
	DIPHENYLAMINE	54	69.9	85	14	22	58.8	98	13	10	61.1	106	13
	FLUORANTHENE	55	71.1	82	13	36	69.6	148	13	26	74.9	142	13
	FLUORENE	43	62.8	73	14	43	65.5	80	13	61	71.7	84	13
	FLUORENE-D10 (SURR)	54	74.8	88	14	49	75.0	103	13	70	77.2	90	13
	HEXACHLOROBENZENE	76	95.9	115	15	84	98.5	111	13	88	102.0	119	13
	HEXACHLOROBUTADIENE	54	77.6	100	14	52	72.1	90	13	56	73.5	92	13
	HEXACHLOROCYCLOPENTADIENE	40	56.0	77	14	0	25.6	45	13	0	25.5	42	13
	HEXACHLOROETHANE	55	76.9	92	15	44	64.3	87	13	41	64.3	83	13
	INDENO(1,2,3-CD)PYRENE	52	78.5	93	13	60	85.6	111	13	64	99.3	198	13
	ISOPHORONE	41	59.3	92	15	45	58.9	92	13	45	60.5	95	13
	NAPHTHALENE	0	55.7	67	13	29	52.7	70	13	38	56.8	71	13
	NITROBENZENE-D5 (SURR)	54	72.5	86	15	50	69.1	81	13	57	73.0	85	13
	N-NITROSODIMETHYLAMINE	57	73.5	85	15	64	76.8	110	13	63	78.5	103	13
	N-NITROSO-DI-N-PROPYLAMINE	67	86.4	108	15	70	85.0	101	13	67	87.6	99	13
	PHENANTHRENE	61	70.9	84	14	50	73.2	87	13	64	78.2	92	13
	PHENOL	58	78.1	100	15	55	74.2	89	13	56	76.4	95	13
	PHENOL-D5 (SURR)	65	75.6	92	15	57	72.5	89	13	58	74.5	86	13
	PYRENE	55	73.8	120	14	52	79.2	112	13	48	91.1	186	13
	PYRENE-D10 (SURR)	66	84.8	132	14	67	88.5	133	13	68	95.5	144	13
	TERPHENYL-D14 (SURR)	62	81.5	98	15	61	88.2	112	13	73	94.1	118	13
VOC	1,1,1,2-TETRACHLOROETHANE	86	104.0	120	34	55	77.3	112	12	51	77.0	153	12
	1,1,1-TRICHLOROETHANE	84	99.7	132	33	73	91.3	170	12	43	81.3	128	12
	1,1,2,2-TETRACHLOROETHANE	76	103.1	116	35	41	78.9	115	12	43	78.2	136	12
	1,1,2-TRICHLOROETHANE	84	98.0	106	33	66	77.2	108	12	58	76.4	127	12

TABLE H-10

PERCENT RECOVERIES FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Ave	Max	Count	Min	Ave	Max	Count	Min	Ave	Max	Count
	1,1-DICHLOROETHANE	86	99.1	122	34	75	86.8	127	12	45	79.1	117	12
	1,1-DICHLOROETHENE	78	96.7	118	35	67	81.8	161	12	41	72.2	107	12
	1,2,3-TRICHLOROPROPANE	90	101.1	114	32	63	80.9	124	12	61	78.9	123	12
	1,2-DIBROMO-3-CHLOROPROPANE	74	93.4	114	35	43	68.7	110	12	41	70.0	116	12
	1,2-DIBROMOETHANE	84	101.7	110	35	57	76.3	113	12	58	76.2	131	12
	1,2-DICHLOROETHANE	86	100.0	128	35	67	87.2	129	12	56	81.5	123	12
	1,2-DICHLOROETHANE-D4 (SURR)	88	103.7	130	33	91	117.1	191*	12	90	110.8	141	12
	1,2-DICHLOROPROPANE	86	98.2	116	35	70	81.9	107	12	48	75.9	115	12
	2-BUTANONE	72	97.1	122	32	47	78.2	139	12	52	78.1	120	12
	2-HEXANONE	86	104.4	128	35	30	70.1	120	12	36	73.1	113	12
	4-BROMOFLUOROBENZENE (SURR)	97	101.5	106	35	89	100.8	111	12	88	101.1	115	12
	4-METHYL-2-PENTANONE	86	104.6	138	34	55	84.9	126	12	64	82.3	116	12
	ACETONE	66	100.6	166	35	47	96.8	206	12	52	85.7	161	12
	BENZENE	82	94.6	112	32	63	77.3	104	12	41	72.3	111	12
	BROMODICHLOROMETHANE	76	90.3	114	35	57	73.9	109	12	43	70.1	116	12
	BROMOFORM	84	102.6	114	34	39	70.4	93	12	39	69.7	126	12
	BROMOMETHANE	78	97.2	118	33	41	91.3	274*	12	38	67.3	115	12
	CARBON DISULFIDE	60	98.8	154	34	57	81.5	152	12	37	70.8	110	12
	CARBON TETRACHLORIDE	84	101.8	130	35	65	85.8	176	12	38	77.8	134	12
	CHLOROBENZENE	86	99.2	112	35	50	69.3	109	12	43	68.5	126	12
	CHLORODIBROMOMETHANE	80	97.9	106	35	49	70.4	90	12	50	70.8	127	12
	CHLOROETHANE	80	102.8	124	33	68	101.1	270*	12	40	76.6	115	12
	CHLOROFORM	84	98.1	120	36	67	85.0	135	12	47	77.7	121	12
	CHLOROMETHANE	64	95.2	116	34	58	90.1	222*	12	30	69.8	91	12
	CIS-1,2-DICHLOROETHENE	76	95.8	112	35	66	79.3	110	12	44	75.0	117	12
	CIS-1,3-DICHLOROPROPENE	86	104.0	118	36	37	68.3	104	12	38	67.3	121	12
	DIBROMOFLUOROMETHANE (SURR)	95	103.4	113	34	93	108.3	158	12	92	105.6	119	12
	DIBROMOMETHANE	84	100.5	116	35	71	86.0	130	12	62	81.1	122	12
	DICHLORODIFLUOROMETHANE	42	94.8	144	33	46	90.8	327*	12	38	66.3	119	12
	ETHYLBENZENE	90	100.1	112	34	51	70.6	112	12	39	70.3	127	12

TABLE H-10

PERCENT RECOVERIES FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Ave	Max	Count	Min	Ave	Max	Count	Min	Ave	Max	Count
	METHYL TERT-BUTYL ETHER	71.1	91.1	108	35	45	75.3	114	12	45	71.3	101	12
	METHYLENE CHLORIDE	72	98.1	122	35	18	82.5	164	12	30	71.0	121	12
	STYRENE	92	103.1	112	35	45	66.9	113	12	39	66.8	131	12
	TETRACHLOROETHENE	74	90.2	102	34	46	64.3	106	12	35	63.2	121	12
	TOLUENE	84	97.3	110	35	55	71.9	110	12	41	71.6	124	12
	TOLUENE-D8 (SURR)	92	102.6	109	36	86	99.6	108	12	93	103.0	113	12
	TOTAL XYLENES	93	103.7	113	34	49	71.8	118	12	40	70.7	131	12
	TRANS-1,2-DICHLOROETHENE	78	94.5	112	35	65	76.6	105	12	38	71.4	111	12
	TRANS-1,3-DICHLOROPROPENE	86	104.5	114	34	38	68.0	107	12	38	70.4	140	12
	TRICHLOROETHENE	76	96.6	128	34	61	78.1	121	11	41	72.4	113	11
	TRICHLOROFLUOROMETHANE	78	92.2	128	34	53	84.1	216*	12	28	66.9	112	12
	VINYL CHLORIDE	64	95.1	124	35	60	94.7	303*	12	28	70.4	91	12

Only results with units = % are tallied.

EXP = Explosives
HERB = Herbicides
LCS = Laboratory control sample
M = Metals, total
MISC = Miscellaneous parameters
MS = Matrix spike (laboratory)
MSD = Matrix spike duplicate (laboratory)
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds
PEST/PCB = Pesticides/polychlorinated biphenyls

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
EXP	1,3,5-TRINITROBENZENE	85	95.3	105	4	97	99.0	101	2	96	97.5	99	2
	1,3-DINITROBENZENE	87	96.5	107	4	98	100.5	103	2	97	98.5	100	2
	2,4,6-TRINITROTOLUENE	84	93.8	103	4	96	98.0	100	2	95	96.5	98	2
	2,4-DINITROTOLUENE	78	88.5	102	4	62	78.5	95	2	74	81.0	88	2
	2,6-DINITROTOLUENE	82	93.5	108	4	78	89.0	100	2	80	86.0	92	2
	2-AMINO-4,6-DINITROTOLUENE	84	94.5	108	4	95	97.5	100	2	93	94.5	96	2
	2-NITROTOLUENE	76	87.0	100	4	88	91.5	95	2	87	88.5	90	2
	3,4-DINITROTOLUENE (SURR)	96	104.5	120	4	110	111.5	113	2	104	104.5	105	2
	3-NITROTOLUENE	74	85.3	97	4	87	91.0	95	2	87	88.0	89	2
	4-AMINO-2,6-DINITROTOLUENE	81	92.3	108	4	93	95.0	97	2	91	92.5	94	2
	4-NITROTOLUENE	79	89.8	103	4	92	95.0	98	2	89	91.0	93	2
	HMX	90	94.8	98	4	96	96.5	97	2	99	100.5	102	2
	NITROBENZENE	88	96.3	105	4	86	94.5	103	2	78	87.5	97	2
	RDX	96	100.3	104	4	102	102.5	103	2	105	106.0	107	2
	TETRYL	81	91.5	105	4	90	92.5	95	2	89	90.0	91	2
HERB	2,4,5-T	74	79.3	84	4	69	76.5	85	4	70	78.3	86	4
	2,4,5-TP (SILVEX)	71	82.0	99	4	70	76.3	83	4	75	80.5	89	4
	2,4-D	92	99.0	107	4	84	95.5	110	4	83	100.0	109	4
	2,4-DICHLOROPHENYLACETIC ACID (SURR)	84	98.4	116	5	90	101.8	121	5	91	97.8	108	5
	DINOSEB	59	63.0	72	4	0	47.8	70	4	0	49.5	67	4
	HEXACHLOROPHENE	33	40.4	47	5	24	38.4	52	5	28	37.6	44	5
	PENTACHLOROPHENOL	78	89.0	105	5	19	75.8	110	5	70	81.8	96	5
M	ALUMINUM	95.6	104.5	109.7	7	96.1	100.6	109.1	8	---	---	---	---
	ANTIMONY	93.2	98.7	101.9	7	88.8	97.8	104.3	8	---	---	---	---
	ARSENIC	85.3	90.9	109.4	7	90.7	98.8	115.8	8	---	---	---	---
	BARIUM	102.5	107.9	112.1	7	87.5	103.5	131.3	8	---	---	---	---
	BERYLLIUM	89.3	99.1	106.2	7	72.8	98.6	112.7	8	---	---	---	---
	CADMIUM	94.1	99.7	107.1	7	90.9	98.3	111.9	8	---	---	---	---
	CALCIUM	100.2	108.4	131.6	7	65.5	94.9	121.6	8	---	---	---	---

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
	CHROMIUM	100.4	102.9	106.3	7	93.9	101.3	109.7	8	---	---	---	---
	COBALT	102.1	104.6	108.5	7	97.8	102.7	111.6	8	---	---	---	---
	COPPER	103	106.9	111.3	7	97.9	103.9	109.8	8	---	---	---	---
	IRON	103.4	105.0	110.3	7	75.2	97.0	108	8	---	---	---	---
	LEAD	94.4	102.7	108.6	7	91.1	102.2	113.5	8	---	---	---	---
	MAGNESIUM	96.4	104.0	107.9	7	96.4	101.8	110.7	8	---	---	---	---
	MANGANESE	101.7	104.9	113.9	7	94	99.9	106.9	6	---	---	---	---
	MERCURY	98	102.9	109.2	8	48.3	88.0	105.4	8	---	---	---	---
	NICKEL	102	105.7	109.3	7	96.3	105.5	111.2	8	---	---	---	---
	POTASSIUM	95.1	102.5	105.9	7	94.8	99.9	109.4	8	---	---	---	---
	SELENIUM	81.5	91.0	114.3	7	77.3	89.8	119.9	8	---	---	---	---
	SILVER	99.1	108.3	124.8	7	56.1	89.6	113.9	8	---	---	---	---
	SODIUM	95.5	105.5	113.1	7	94.1	105.9	117.2	8	---	---	---	---
	THALLIUM	93.8	100.9	109.7	7	90.3	102.7	125	8	---	---	---	---
	TIN	97.7	102.7	109.3	7	76.8	96.5	106.1	8	---	---	---	---
	VANADIUM	98.9	102.8	109.1	7	97.8	102.8	109	8	---	---	---	---
	ZINC	86.3	92.2	98.4	7	84.4	90.1	103	8	---	---	---	---
MF	ALUMINUM	102.9	103.8	104.7	2	96.1	101.7	109.9	3	---	---	---	---
	ANTIMONY	98.2	101.4	104.6	2	95.9	103.1	108.4	3	---	---	---	---
	ARSENIC	95.1	97.1	99	2	97.3	99.3	103.2	3	---	---	---	---
	BARIUM	106.6	109.0	111.4	2	103.7	110.2	116.9	3	---	---	---	---
	BERYLLIUM	101.1	101.8	102.4	2	70.4	87.3	97.8	3	---	---	---	---
	CADMIUM	101	103.3	105.5	2	97.6	100.1	102.5	3	---	---	---	---
	CALCIUM	106.3	107.4	108.4	2	82.3	118.4	154.4	2	---	---	---	---
	CHROMIUM	107.6	107.9	108.2	2	90.4	105.3	119.1	3	---	---	---	---
	COBALT	107.1	107.5	107.8	2	103	111.2	116.2	3	---	---	---	---
	COPPER	105.8	106.6	107.4	2	102.2	104.0	106.8	3	---	---	---	---
	IRON	107.8	109.7	111.5	2	107.7	118.7	126.8	3	---	---	---	---
	LEAD	111.5	113.1	114.6	2	107.4	111.4	118.2	3	---	---	---	---

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
	MAGNESIUM	102.8	105.1	107.4	2	109.4	115.8	119.5	3	---	---	---	---
	MANGANESE	107.9	109.7	111.4	2	107.7	112.0	116.3	2	---	---	---	---
	MERCURY	101.9	102.7	103.4	2	98.2	98.5	98.7	2	---	---	---	---
	NICKEL	103.4	104.6	105.7	2	100.7	107.1	110.5	3	---	---	---	---
	POTASSIUM	100.8	101.5	102.2	2	98.6	107.3	124.3	3	---	---	---	---
	SELENIUM	94.6	95.0	95.3	2	94.3	95.3	96.8	3	---	---	---	---
	SILVER	103.2	103.2	103.2	2	60	88.0	102.5	3	---	---	---	---
	SODIUM	104.1	105.3	106.5	2	97.6	111.6	133.5	3	---	---	---	---
	THALLIUM	113.3	114.4	115.5	2	109.1	113.3	118.9	3	---	---	---	---
	TIN	103.9	106.4	108.9	2	104.3	106.6	107.9	3	---	---	---	---
	VANADIUM	107.2	108.8	110.4	2	109.8	117.5	122.6	3	---	---	---	---
	ZINC	97.2	97.5	97.7	2	92.2	95.8	98.2	3	---	---	---	---
MISC	PERCHLORATE	102	102.8	105	4	110	110.0	110	1	113	113.0	113	1
	TOTAL ORGANIC CARBON	106	106.0	106	1	---	---	---	---	---	---	---	---
PEST/PCB	4,4'-DDD	105	112.8	127	4	111	114.5	118	2	105	115.5	126	2
	4,4'-DDE	108	114.3	122	4	111	112.0	113	2	106	111.0	116	2
	4,4'-DDT	105	114.5	120	4	104	111.5	119	2	112	112.0	112	2
	ALDRIN	90	93.8	103	4	88	93.0	98	2	84	88.5	93	2
	ALPHA-BHC	96	100.5	103	4	95	96.5	98	2	90	95.5	101	2
	ALPHA-CHLORDANE	101	105.8	110	4	96	97.0	98	2	95	97.5	100	2
	AROCLOR-1016	89	94.0	99	4	91	93.3	97	3	90	94.7	100	3
	AROCLOR-1260	97	105.0	119	4	95	101.3	112	3	96	103.7	118	3
	BETA-BHC	94	99.5	102	4	82	87.0	92	2	85	91.5	98	2
	DECACHLOROBIPHENYL (SURR)	85	94.4	114	8	78	83.0	91	5	80	82.2	86	5
	DELTA-BHC	90	96.5	102	4	87	90.5	94	2	87	90.5	94	2
	DIELDRIN	108	111.3	114	4	102	103.0	104	2	101	104.5	108	2
	ENDOSULFAN I	105	108.8	112	4	101	102.5	104	2	100	102.0	104	2
	ENDOSULFAN II	105	111.8	116	4	103	103.0	103	2	101	105.0	109	2
	ENDOSULFAN SULFATE	102	107.5	110	4	98	99.0	100	2	96	101.0	106	2

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
	ENDRIN	112	116.8	122	4	107	109.0	111	2	106	109.5	113	2
	ENDRIN ALDEHYDE	86	89.0	95	4	63	66.5	70	2	61	71.0	81	2
	ENDRIN KETONE	106	111.0	113	4	105	105.5	106	2	99	105.0	111	2
	GAMMA-BHC (LINDANE)	99	104.3	107	4	100	100.5	101	2	96	98.5	101	2
	GAMMA-CHLORDANE	101	105.3	109	4	96	98.5	101	2	97	98.5	100	2
	HEPTACHLOR	93	96.5	103	4	89	94.5	100	2	88	90.5	93	2
	HEPTACHLOR EPOXIDE	104	108.3	111	4	100	101.0	102	2	100	103.5	107	2
	METHOXYCHLOR	109	113.0	121	4	111	115.0	119	2	111	115.0	119	2
	TETRACHLORO-M-XYLENE (SURR)	60	71.6	81	8	55	65.6	76	5	55	61.4	66	5
SVOC	1,2,4-TRICHLOROBENZENE	50	65.0	75	8	45	53.3	61	4	48	54.0	61	4
	1,2-DICHLOROBENZENE	46	63.3	70	8	49	55.8	64	4	46	54.3	60	4
	1,3-DICHLOROBENZENE	38	56.5	65	8	48	52.3	57	4	43	51.5	61	4
	1,4-DICHLOROBENZENE	42	58.4	70	8	47	52.3	58	4	43	51.0	56	4
	1,4-DIOXANE	50	66.7	75	9	65	72.0	82	3	73	76.3	81	3
	1-FLUORONAPHTHALENE (SURR)	52	55.0	59	4	49	54.0	59	3	52	58.3	66	3
	2,2'-OXYBIS(1-CHLOROPROPANE)	80	184.3	740*	7	74	86.3	96	4	81	89.0	98	4
	2,4,5-TRICHLOROPHENOL	65	74.4	90	8	24	49.0	77	4	42	70.3	84	4
	2,4,6-TRIBROMOPHENOL (SURR)	67	83.9	107	14	37	71.2	92	6	66	85.7	95	6
	2,4,6-TRICHLOROPHENOL	55	70.0	90	8	20	46.3	74	4	45	71.0	83	4
	2,4-DICHLOROPHENOL	60	71.3	80	8	23	45.0	72	4	48	66.5	74	4
	2,4-DIMETHYLPHENOL	50	68.1	90	8	63	71.5	87	4	59	75.5	89	4
	2,4-DINITROPHENOL	0	40.3	65	8	0	37.5	75	4	16	44.5	91	4
	2-CHLORONAPHTHALENE	55	63.8	70	8	54	58.0	62	4	59	61.3	63	4
	2-CHLOROPHENOL	50	69.4	90	8	25	46.8	71	4	57	65.3	79	4
	2-FLUOROBIPHENYL (SURR)	65	74.1	91	14	55	67.3	77	6	61	69.8	78	6
	2-FLUOROPHENOL (SURR)	22	57.0	82	14	6	41.3	80	6	24	50.3	78	6
	2-METHYLNAPHTHALENE	44	51.3	58	4	42	44.7	50	3	42	44.7	50	3
	2-METHYLPHENOL	65	78.8	95	8	57	69.8	80	4	70	76.0	79	4
	2-NITROANILINE	75	85.0	95	8	70	77.3	85	4	73	81.8	88	4

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
	2-NITROPHENOL	50	67.5	90	8	0	35.5	80	4	21	54.0	74	4
	3&4-METHYLPHENOL	75	83.1	100	8	56	67.0	80	4	72	76.8	80	4
	3,3'-DICHLOROBENZIDINE	9	61.1	80	8	7	32.5	81	4	0	37.3	77	4
	3-NITROANILINE	50	86.9	115	8	27	60.0	87	4	67	74.5	82	4
	4,6-DINITRO-2-METHYLPHENOL	19	56.6	95	8	0	38.8	77	4	12	47.8	88	4
	4-BROMOPHENYL PHENYL ETHER	80	93.1	105	8	86	95.8	105	4	88	96.8	104	4
	4-CHLORO-3-METHYLPHENOL	75	86.9	95	8	60	67.3	72	4	70	80.0	90	4
	4-CHLOROANILINE	35	59.9	75	8	11	44.3	62	4	43	55.3	74	4
	4-CHLOROPHENYL PHENYL ETHER	75	92.5	100	8	76	88.0	97	4	79	92.8	100	4
	4-NITROANILINE	60	89.4	115	8	46	67.8	81	4	54	72.8	84	4
	4-NITROPHENOL	34	54.1	75	8	0	35.5	84	4	0	49.8	83	4
	ACENAPHTHENE	57	61.5	68	4	50	55.7	67	3	50	55.7	67	3
	ACENAPHTHYLENE	57	61.3	72	4	58	61.0	67	3	58	63.7	75	3
	ANTHRACENE	58	65.8	73	4	67	72.3	83	3	67	67.7	69	3
	BENZO(A)ANTHRACENE	73	74.8	77	4	67	80.7	108	3	67	68.3	71	3
	BENZO(A)PYRENE	54	61.3	70	4	58	72.0	100	3	55	60.0	67	3
	BENZO(B)FLUORANTHENE	68	75.8	83	4	67	91.7	125	3	67	73.3	78	3
	BENZO(G,H,I)PERYLENE	64	82.5	100	4	58	75.0	100	3	58	71.0	83	3
	BENZO(K)FLUORANTHENE	63	72.8	78	4	67	80.7	100	3	67	72.7	76	3
	BENZYL ALCOHOL	75	92.5	110	8	80	82.8	86	4	82	90.3	97	4
	BIS(2-CHLOROETHOXY)METHANE	41	64.5	75	8	54	60.3	68	4	63	66.8	71	4
	BIS(2-CHLOROETHYL)ETHER	70	86.9	100	8	81	86.5	94	4	84	89.5	94	4
	BIS(2-ETHYLHEXYL)PHTHALATE	70	94.4	115	8	93	110.5	122	4	91	109.3	121	4
	BUTYL BENZYL PHTHALATE	65	90.0	105	8	75	91.3	103	4	73	92.5	105	4
	CHRYSENE	76	80.5	83	4	67	83.3	108	3	67	70.0	75	3
	DIBENZO(A,H)ANTHRACENE	63	80.3	92	4	58	69.3	83	3	67	77.7	83	3
	DIBENZOFURAN	80	87.5	95	8	77	83.5	89	4	81	87.5	93	4
	DIETHYL PHTHALATE	70	95.6	110	8	70	89.0	97	4	73	91.0	101	4
	DIMETHYL PHTHALATE	75	91.3	105	8	71	83.3	92	4	74	85.5	95	4

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
	DI-N-BUTYL PHTHALATE	70	98.1	115	8	69	96.3	111	4	70	98.8	111	4
	DI-N-OCTYL PHTHALATE	75	101.9	120	8	84	104.8	118	4	84	106.3	115	4
	DIPHENYLAMINE	49	76.8	90	8	54	72.3	90	4	58	71.5	84	4
	FLUORANTHENE	68	79.3	83	4	67	97.3	150	3	65	66.3	67	3
	FLUORENE	58	63.5	70	4	67	72.3	83	3	58	66.7	75	3
	FLUORENE-D10 (SURR)	64	70.0	75	4	74	79.0	84	3	77	84.0	96	3
	HEXACHLOROBENZENE	90	104.4	125	8	96	107.0	120	4	93	106.3	118	4
	HEXACHLOROBUTADIENE	45	56.3	65	8	43	47.5	55	4	39	46.5	53	4
	HEXACHLOROCYCLOPENTADIENE	16	25.6	44	8	22	26.0	31	4	22	29.5	40	4
	HEXACHLOROETHANE	44	58.0	70	8	47	50.5	56	4	44	49.3	56	4
	INDENO(1,2,3-CD)PYRENE	61	77.0	83	4	58	72.3	92	3	67	74.7	83	3
	ISOPHORONE	55	66.3	90	8	44	56.3	79	4	50	61.5	82	4
	NAPHTHALENE	48	53.3	60	4	42	50.0	58	3	42	47.3	58	3
	NITROBENZENE-D5 (SURR)	70	81.4	95	14	59	75.5	90	6	64	76.7	87	6
	N-NITROSODIMETHYLAMINE	70	82.5	100	8	66	78.0	92	4	68	82.5	96	4
	N-NITROSO-DI-N-PROPYLAMINE	85	94.4	100	8	75	82.8	95	4	81	88.8	97	4
	PHENANTHRENE	69	74.8	79	4	67	97.3	150	3	69	73.0	75	3
	PHENOL	50	66.9	80	8	35	50.3	70	4	55	64.5	71	4
	PHENOL-D5 (SURR)	47	70.2	84	14	35	61.0	82	6	59	70.3	83	6
	PYRENE	72	83.8	100	4	75	111.0	175	3	72	82.3	92	3
	PYRENE-D10 (SURR)	70	88.0	100	4	86	97.7	116	3	89	101.7	120	3
	TERPHENYL-D14 (SURR)	71	95.6	123	14	78	84.7	108	6	68	86.7	107	6
VOC	1,1,1,2-TETRACHLOROETHANE	90	101.1	114	15	98	102.3	110	7	98	101.1	108	7
	1,1,1-TRICHLOROETHANE	90	101.3	112	15	90	102.4	119	7	93	101.0	114	7
	1,1,2,2-TETRACHLOROETHANE	90	98.1	104	15	98	103.0	109	7	100	104.1	109	7
	1,1,2-TRICHLOROETHANE	88	97.5	106	15	98	100.7	105	7	97	100.6	105	7
	1,1-DICHLOROETHANE	90	100.7	112	15	91	103.3	116	7	93	101.7	114	7
	1,1-DICHLOROETHENE	76	96.5	112	15	89	98.6	117	7	90	97.4	112	7
	1,2,3-TRICHLOROPROPANE	86	97.2	106	15	94	98.6	102	7	96	100.7	104	7

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
	1,2-DIBROMO-3-CHLOROPROPANE	86	97.0	104	15	93	97.3	108	7	92	99.3	109	7
	1,2-DIBROMOETHANE	90	100.7	110	15	99	102.9	110	7	100	102.9	109	7
	1,2-DICHLOROETHANE	94	99.9	110	15	95	103.7	117	7	93	102.0	115	7
	1,2-DICHLOROETHANE-D4 (SURR)	81	96.3	107	15	88	99.0	107	7	89	98.9	108	7
	1,2-DICHLOROPROPANE	94	101.7	114	15	96	105.1	118	7	96	103.7	116	7
	2-BUTANONE	76	97.8	128	15	83	97.9	118	7	83	98.9	121	7
	2-HEXANONE	80	98.8	120	15	92	99.6	110	7	94	102.0	113	7
	4-BROMOFLUOROBENZENE (SURR)	89	97.3	105	15	92	97.1	103	7	93	98.4	108	7
	4-METHYL-2-PENTANONE	84	103.3	136	15	92	106.6	124	7	96	109.0	129	7
	ACETONE	66	95.9	134	15	72	94.1	122	7	72	97.4	128	7
	BENZENE	90	97.4	108	15	90	101.1	113	7	92	99.0	110	7
	BROMODICHLOROMETHANE	86	92.2	98	15	86	94.7	105	7	87	93.6	102	7
	BROMOFORM	80	100.6	118	15	86	97.6	115	7	86	98.0	116	7
	BROMOMETHANE	92	121.5	160	15	101	134.9	164	7	99	128.9	157	7
	CARBON DISULFIDE	70	92.1	110	15	72	89.4	110	7	70	87.3	106	7
	CARBON TETRACHLORIDE	94	103.7	114	15	94	104.6	120	7	99	103.3	115	7
	CHLOROBENZENE	88	97.8	108	15	97	100.4	107	7	96	99.0	105	7
	CHLORODIBROMOMETHANE	90	98.0	106	15	92	98.3	102	7	94	98.9	104	7
	CHLOROETHANE	94	108.0	124	15	104	115.6	132	7	100	110.7	128	7
	CHLOROFORM	92	99.7	110	15	92	102.7	115	7	94	101.3	112	7
	CHLOROMETHANE	68	94.3	118	15	80	99.4	128	7	85	97.7	119	7
	CIS-1,2-DICHLOROETHENE	90	98.0	108	15	91	100.4	109	7	92	98.9	108	7
	CIS-1,3-DICHLOROPROPENE	96	106.1	118	15	94	103.9	116	7	95	103.9	116	7
	DIBROMOFLUOROMETHANE (SURR)	91	98.0	108	15	95	99.7	108	7	95	99.7	108	7
	DIBROMOMETHANE	96	102.0	110	15	99	105.4	115	7	100	104.7	114	7
	DICHLORODIFLUOROMETHANE	46	93.7	158	15	55	97.9	142	7	59	96.0	147	7
	ETHYLBENZENE	90	99.4	108	15	100	103.0	107	7	96	100.4	105	7
	METHYL TERT-BUTYL ETHER	84.1	96.4	106	15	84	96.7	106	7	84	98.0	108	7
	METHYLENE CHLORIDE	86	96.6	108	15	85	97.3	112	7	86	96.7	110	7

TABLE H-11

PERCENT RECOVERIES FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

		LCS				MS				MSD			
Fraction	Parameter	Min	Avg	Max	Ct	Min	Avg	Max	Ct	Min	Avg	Max	Ct
	STYRENE	94	103.6	112	15	99	106.3	112	7	97	104.1	109	7
	TETRACHLOROETHENE	80	92.4	102	15	85	91.9	100	7	85	90.6	98	7
	TOLUENE	88	96.6	106	15	96	99.9	103	7	96	97.9	102	7
	TOLUENE-D8 (SURR)	90	98.0	109	15	95	99.7	109	7	93	99.0	109	7
	TOTAL XYLENES	93	102.4	113	15	101	105.1	111	7	99	102.7	110	7
	TRANS-1,2-DICHLOROETHENE	84	95.9	106	15	89	98.4	112	7	90	97.0	108	7
	TRANS-1,3-DICHLOROPROPENE	95	101.7	108	15	90	98.4	102	7	92	98.3	102	7
	TRICHLOROETHENE	90	99.3	106	15	92	99.9	112	7	94	99.0	109	7
	TRICHLOROFLUOROMETHANE	89	105.3	126	15	90	104.6	119	7	90	103.4	116	7
	VINYL CHLORIDE	76	101.7	122	15	88	105.1	126	7	88	104.3	121	7

Only results with units = % are tallied.

EXP = Explosives
HERB = Herbicides
LCS = Laboratory control sample
M = Metals, total
MF = Metals, dissolved
MS = Matrix spike (laboratory)
MSD = Matrix spike duplicate (laboratory)
MISC = Miscellaneous parameters
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds

TABLE H-12

RELATIVE PERCENT DIFFERENCE FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			DUP				MSD			
Fraction	Parameter	units	Minimum	Average	Maximum	Count	Minimum	Average	Maximum	Count
M	ANTIMONY	MG/KG	2.2	20.3	61.4	11				
	ARSENIC	MG/KG	1	30.6	96.3	11				
	CADMIUM	MG/KG	2.3	16.1	54.1	12				
	CALCIUM	MG/KG	1.3	27.5	137.1	12				
	CHROMIUM	MG/KG	0.9	26.4	95.3	12				
	COPPER	MG/KG	0.5	18.0	77.8	12				
	IRON	MG/KG	0.7	22.6	89.9	11				
	LEAD	MG/KG	0.1	28.1	76	11				
	MANGANESE	MG/KG	0.8	24.9	77.5	12				
	MERCURY	MG/KG	0	17.0	69.7	11				
	NICKEL	MG/KG	0.6	14.4	50.7	11				
	SELENIUM	MG/KG	1.1	22.7	59.6	11				
	SILVER	MG/KG	4.8	32.3	92.6	11				
	THALLIUM	MG/KG	0.7	18.9	63.2	12				
	TIN	MG/KG	0.3	24.1	98.6	12				
	VANADIUM	MG/KG	0	18.9	74.8	11				
	ZINC	MG/KG	0.1	20.3	67.8	12				
SVOC	2-METHYLNAPHTHALENE	UG/KG					2	15.1	51	13
	3,3'-DICHLOROBENZIDINE	UG/KG					0	39.9	200	13
	4-CHLOROANILINE	UG/KG					5	34.5	200	11
	ACENAPHTHENE	UG/KG					0	12.4	57	13
	ACENAPHTHYLENE	UG/KG					0	11.6	55	13
	BENZO(A)PYRENE	UG/KG					0	16.9	71	13
	BENZO(B)FLUORANTHENE	UG/KG					0	15.9	55	13
	BENZO(G,H,I)PERYLENE	UG/KG					0	14.8	64	13
	DIBENZO(A,H)ANTHRACENE	UG/KG					3	15.2	53	13
	DIPHENYLAMINE	UG/KG					0	14.7	77	13
	FLUORENE	UG/KG					0	12.1	55	13
	HEXACHLOROCYCLOPENTADIENE	UG/KG					0	23.9	200	12
	INDENO(1,2,3-CD)PYRENE	UG/KG					0	14.3	65	13
	NAPHTHALENE	UG/KG					2	15.3	54	13
VOC	1,1,1-TRICHLOROETHANE	UG/KG					1	21.0	60	12
	1,1-DICHLOROETHANE	UG/KG					1	17.8	51	12
	1,1-DICHLOROETHENE	UG/KG					0	20.8	67	12

TABLE H-12

RELATIVE PERCENT DIFFERENCE FOR SOLID SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			DUP				MSD			
Fraction	Parameter	units	Minimum	Average	Maximum	Count	Minimum	Average	Maximum	Count
	ACETONE	UG/KG					2	26.3	98	12
	BENZENE	UG/KG					1	16.8	55	12
	BROMOMETHANE	UG/KG					1	27.8	119	12
	CARBON DISULFIDE	UG/KG					0	26.0	74	12
	CARBON TETRACHLORIDE	UG/KG					0	21.6	69	12
	CHLOROETHANE	UG/KG					0	29.0	105	12
	CHLOROMETHANE	UG/KG					0	28.8	94	12
	CIS-1,2-DICHLOROETHENE	UG/KG					3	15.3	52	12
	DICHLORODIFLUOROMETHANE	UG/KG					0	25.2	93	12
	ETHYLBENZENE	UG/KG					2	16.3	57	12
	METHYLENE CHLORIDE	UG/KG					0	24.2	60	12
	TETRACHLOROETHENE	UG/KG					0	18.9	61	12
	TOLUENE	UG/KG					2	15.2	54	12
	TOTAL XYLENES	UG/KG					2	16.3	55	12
	TRANS-1,2-DICHLOROETHENE	UG/KG					0	17.7	62	12
	TRICHLOROETHENE	UG/KG					1	19.6	56	12
	TRICHLOROFLUOROMETHANE	UG/KG					1	30.3	92	12
	VINYL CHLORIDE	UG/KG					1	30.0	112	12

DUP = Laboratory duplicate
M = Metals, total
MG/KG = milligrams per kilogram
MSD = Matrix spike duplicate (laboratory)
UG/KG = micrograms per kilogram
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds

TABLE H-13

RELATIVE PERCENT DIFFERENCE FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			DUP				MSD			
Fraction	Parameter	units	Minimum	Average	Maximum	Count	Minimum	Average	Maximum	Count
HERB	HEXACHLOROPHENE	UG/L	---	---	---	---	2	13.4	31	5
	PENTACHLOROPHENOL	UG/L	---	---	---	---	0	36.4	132	5
M	ALUMINUM	UG/L	2.1	12.3	30.8	8	---	---	---	---
	ANTIMONY	UG/L	3.4	34.0	105.1	8	---	---	---	---
	BARIUM	UG/L	0.3	12.4	58.3	8	---	---	---	---
	CADMIUM	UG/L	0	16.6	62.7	8	---	---	---	---
	CALCIUM	UG/L	1.1	15.2	105.7	8	---	---	---	---
	CHROMIUM	UG/L	1.9	16.1	34.8	8	---	---	---	---
	COPPER	UG/L	0.4	12.1	65.6	8	---	---	---	---
	IRON	UG/L	0.8	37.2	182.2	8	---	---	---	---
	LEAD	UG/L	0.6	6.7	35.6	8	---	---	---	---
	MANGANESE	UG/L	0.8	14.8	63.7	8	---	---	---	---
	NICKEL	UG/L	0.1	12.4	58.6	8	---	---	---	---
	SILVER	UG/L	0	11.3	90.4	8	---	---	---	---
	TIN	UG/L	0	27.6	62.1	7	---	---	---	---
MF	ARSENIC	UG/L	5.8	23.0	36.6	3	---	---	---	---
	CADMIUM	UG/L	29.2	45.9	67.2	3	---	---	---	---
	CHROMIUM	UG/L	4.9	42.0	86.2	3	---	---	---	---
	LEAD	UG/L	27.2	36.3	47.6	3	---	---	---	---
	ZINC	UG/L	2.9	29.4	52.6	3	---	---	---	---
SVOC	2,4,5-TRICHLOROPHENOL	UG/L	---	---	---	---	5	43.0	109	4
	2,4,6-TRICHLOROPHENOL	UG/L	---	---	---	---	4	46.3	119	4
	2,4-DICHLOROPHENOL	UG/L	---	---	---	---	1	42.8	102	4
	2,4-DINITROPHENOL	UG/L	---	---	---	---	20	111.3	200	4
	2-CHLOROPHENOL	UG/L	---	---	---	---	3	38.5	90	4
	2-NITROPHENOL	UG/L	---	---	---	---	39	102.3	200	4
	3&4-METHYLPHENOL	UG/L	---	---	---	---	0	14.8	34	4
	3,3'-DICHLOROBENZIDINE	UG/L	---	---	---	---	5	89.7	139	3
	3-NITROANILINE	UG/L	---	---	---	---	6	33.5	99	4
	4,6-DINITRO-2-METHYLPHENOL	UG/L	---	---	---	---	14	120.3	200	4
	4-CHLORO-3-METHYLPHENOL	UG/L	---	---	---	---	1	17.0	31	4
	4-CHLOROANILINE	UG/L	---	---	---	---	7	41.5	125	4
	4-NITROPHENOL	UG/L	---	---	---	---	0	53.5	200	4
	BENZO(A)ANTHRACENE	UG/L	---	---	---	---	0	13.7	41	3

TABLE H-13

RELATIVE PERCENT DIFFERENCE FOR AQUEOUS SAMPLES (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			DUP				MSD			
Fraction	Parameter	units	Minimum	Average	Maximum	Count	Minimum	Average	Maximum	Count
	BENZO(A)PYRENE	UG/L	---	---	---	---	0	24.0	58	3
	BENZO(B)FLUORANTHENE	UG/L	---	---	---	---	11	26.0	46	3
	BENZO(G,H,I)PERYLENE	UG/L	---	---	---	---	0	18.0	33	3
	CHRYSENE	UG/L	---	---	---	---	11	22.3	45	3
	FLUORANTHENE	UG/L	---	---	---	---	0	30.0	79	3
	PHENANTHRENE	UG/L	---	---	---	---	0	28.3	74	3
	PHENOL	UG/L	---	---	---	---	1	28.3	58	4
	PYRENE	UG/L	---	---	---	---	10	34.3	83	3

DUP = Laboratory duplicate
HERB = Herbicides
M = Metals, total
MF = Metals, dissolved
MSD = Matrix spike duplicate (laboratory)
SVOC = Semivolatile organic compounds
UG/L = micrograms per Liter

TABLE H-14

TALLY OF QUALIFICATION RATES FOR SOIL(BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
M	ALUMINUM	A	33.3	0.0	0.0	0.0
		AF	66.7	0.0	0.0	0.0
	ANTIMONY	A	0.0	100.0	0.0	0.0
		ADE	100.0	0.0	0.0	0.0
	ARSENIC	A	3.3	0.0	0.0	0.0
		AF	30.0	0.0	0.0	0.0
		AI	66.7	0.0	0.0	0.0
	BARIUM	A	33.3	0.0	0.0	0.0
		AF	66.7	0.0	0.0	0.0
	BERYLLIUM	A	95.2	100.0	0.0	0.0
		I	4.8	0.0	0.0	0.0
	CADMIUM	A	75.0	100.0	0.0	0.0
		AP	12.5	0.0	0.0	0.0
		P	12.5	0.0	0.0	0.0
	CALCIUM	A	3.3	0.0	0.0	0.0
		AFG	66.7	0.0	0.0	0.0
		AI	30.0	0.0	0.0	0.0
	CHROMIUM	A	3.3	0.0	0.0	0.0
		ADI	30.0	0.0	0.0	0.0
		AFI	66.7	0.0	0.0	0.0
	COBALT	AI	100.0	0.0	0.0	0.0
	COPPER	A	66.7	0.0	0.0	0.0
		AD	3.3	0.0	0.0	0.0
		ADI	30.0	0.0	0.0	0.0
	IRON	A	100.0	0.0	0.0	0.0
	LEAD	A	3.3	0.0	0.0	0.0
		ADFI	30.0	0.0	0.0	0.0
		AE	66.7	0.0	0.0	0.0
	MAGNESIUM	ADI	30.0	0.0	0.0	0.0
		AFI	66.7	0.0	0.0	0.0
		DI	3.3	0.0	0.0	0.0
	MANGANESE	A	33.3	0.0	0.0	0.0
		AFI	66.7	0.0	0.0	0.0
	MERCURY	P	100.0	0.0	0.0	0.0
	NICKEL	A	3.3	0.0	0.0	0.0
		ADEFK	66.7	0.0	0.0	0.0
		AEIK	30.0	0.0	0.0	0.0
	POTASSIUM	ADI	30.0	0.0	0.0	0.0
		AFI	66.7	0.0	0.0	0.0
		AI	3.3	0.0	0.0	0.0
	SELENIUM	A	0.0	100.0	0.0	0.0
		GP	100.0	0.0	0.0	0.0
	SILVER	A	0.0	100.0	0.0	0.0
	SODIUM	A	100.0	100.0	0.0	0.0

TABLE H-14

TALLY OF QUALIFICATION RATES FOR SOIL(BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	THALLIUM	A	0.0	100.0	0.0	0.0
		ACEP	33.3	0.0	0.0	0.0
		AI	33.3	0.0	0.0	0.0
		API	33.3	0.0	0.0	0.0
	TIN	A	18.2	100.0	0.0	0.0
		P	81.8	0.0	0.0	0.0
	VANADIUM	ADI	31.0	0.0	0.0	0.0
		AI	69.0	0.0	0.0	0.0
	ZINC	A	30.0	0.0	0.0	0.0
		AIK	3.3	0.0	0.0	0.0
		D	66.7	0.0	0.0	0.0
PEST/PCB	4,4'-DDD	C	0.0	0.0	100.0	0.0
SVOC	1,2,4,5-TETRACHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,2,4-TRICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,2-DICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,3-DICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,4-DICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,4-DIOXANE	R	0.0	0.0	100.0	0.0
	1,4-NAPHTHOQUINONE	R	0.0	0.0	100.0	0.0
	1,4-PHENYLENEDIAMINE	R	0.0	0.0	100.0	0.0
	1-NAPHTHYLAMINE	R	0.0	0.0	100.0	0.0
	2,2'-OXYBIS(1-CHLOROPROPANE)	R	0.0	0.0	100.0	0.0
	2-ACETYLAMINOFLUORENE	CNR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	2-CHLORONAPHTHALENE	R	0.0	0.0	100.0	0.0
	2-METHYLNAPHTHALENE	P	100.0	0.0	0.0	0.0
	2-NAPHTHYLAMINE	R	0.0	0.0	100.0	0.0
	2-NITROANILINE	R	0.0	0.0	100.0	0.0
	2-PICOLINE	R	0.0	0.0	100.0	0.0
	3,3'-DICHLOROBENZIDINE	R	0.0	0.0	100.0	0.0
	3,3'-DIMETHYLBENZIDINE	C	0.0	0.0	90.0	0.0
		CR	0.0	0.0	10.0	0.0
	3-METHYLCHOLANTHRENE	R	0.0	0.0	100.0	0.0
	3-NITROANILINE	R	0.0	0.0	100.0	0.0
	4-AMINOBIPHENYL	R	0.0	0.0	100.0	0.0
	4-BROMOPHENYL PHENYL ETHER	R	0.0	0.0	100.0	0.0
	4-CHLOROANILINE	R	0.0	0.0	100.0	0.0
	4-CHLOROPHENYL PHENYL ETHER	R	0.0	0.0	100.0	0.0
	4-NITROANILINE	R	0.0	0.0	100.0	0.0
	4-NITROQUINOLINE-1-OXIDE	C	0.0	0.0	0.0	100.0
	5-NITRO-O-TOLUIDINE	R	0.0	0.0	100.0	0.0
	7,12-DIMETHYLBENZ(A)ANTHRACENE	R	0.0	0.0	100.0	0.0
	A,A-DIMETHYLPHENETHYLAMINE	CR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0

TABLE H-14

TALLY OF QUALIFICATION RATES FOR SOIL(BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	ACETOPHENONE	R	0.0	0.0	100.0	0.0
	ANILINE	R	0.0	0.0	100.0	0.0
	ANTHRACENE	P	100.0	0.0	0.0	0.0
	ARAMITE	NR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	BENZO(A)ANTHRACENE	P	100.0	0.0	0.0	0.0
	BENZO(A)PYRENE	P	100.0	0.0	0.0	0.0
	BENZO(B)FLUORANTHENE	P	100.0	0.0	0.0	0.0
	BENZO(G,H,I)PERYLENE	C	100.0	0.0	100.0	0.0
	BENZO(K)FLUORANTHENE	P	100.0	0.0	0.0	0.0
	BENZYL ALCOHOL	R	0.0	0.0	100.0	0.0
	BIS(2-CHLOROETHOXY)METHANE	R	0.0	0.0	100.0	0.0
	BIS(2-CHLOROETHYL)ETHER	R	0.0	0.0	100.0	0.0
	BIS(2-ETHYLHEXYL)PHTHALATE	NR	0.0	0.0	50.0	0.0
		P	100.0	0.0	0.0	0.0
		R	0.0	0.0	50.0	0.0
	BUTYL BENZYL PHTHALATE	NR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	CHLOROBENZILATE	NR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	CHRYSENE	P	100.0	0.0	0.0	0.0
	DIALLATE	R	0.0	0.0	100.0	0.0
	DIBENZO(A,H)ANTHRACENE	C	100.0	0.0	100.0	0.0
	DIBENZOFURAN	R	0.0	0.0	100.0	0.0
	DIETHYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DIMETHYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DI-N-BUTYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DI-N-OCTYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DIPHENYLAMINE	R	0.0	0.0	100.0	0.0
	ETHYL METHANE SULFONATE	R	0.0	0.0	100.0	0.0
	FLUORANTHENE	P	100.0	0.0	0.0	0.0
	FLUORENE	P	100.0	0.0	0.0	0.0
	HEXACHLOROBENZENE	R	0.0	0.0	100.0	0.0
	HEXACHLOROBUTADIENE	R	0.0	0.0	100.0	0.0
	HEXACHLOROCYCLOPENTADIENE	C	0.0	0.0	93.3	0.0
		CR	0.0	0.0	6.7	0.0
	HEXACHLOROETHANE	R	0.0	0.0	100.0	0.0
	HEXACHLOROPROPENE	R	0.0	0.0	100.0	0.0
	INDENO(1,2,3-CD)PYRENE	C	100.0	0.0	100.0	0.0
	ISODRIN	R	0.0	0.0	100.0	0.0
	ISOPHORONE	R	0.0	0.0	100.0	0.0
	ISOSAFROLE	R	0.0	0.0	100.0	0.0
	KEPONE	C	0.0	0.0	92.9	100.0
		CNR	0.0	0.0	7.1	0.0

TABLE H-14

TALLY OF QUALIFICATION RATES FOR SOIL(BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	METHAPYRILENE	C	0.0	0.0	93.1	0.0
		CR	0.0	0.0	6.9	0.0
	METHYL METHANE SULFONATE	R	0.0	0.0	100.0	0.0
	NAPHTHALENE	P	100.0	0.0	0.0	0.0
	N-NITROSODIETHYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSODIMETHYLAMINE	CR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	N-NITROSO-DI-N-BUTYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSO-DI-N-PROPYLAMINE	CR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	N-NITROSODIPHENYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSOMETHYLETHYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSOMORPHOLINE	CR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	N-NITROSOPIPERIDINE	R	0.0	0.0	100.0	0.0
	N-NITROSOPYRROLIDINE	CR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	R	0.0	0.0	100.0	0.0
	O-TOLUIDINE	R	0.0	0.0	100.0	0.0
	P-(DIMETHYLAMINO)AZOBENZENE	NR	0.0	0.0	50.0	0.0
		R	0.0	0.0	50.0	0.0
	PENTACHLOROBENZENE	R	0.0	0.0	100.0	0.0
	PENTACHLOROETHANE	R	0.0	0.0	100.0	0.0
	PENTACHLORONITROBENZENE	R	0.0	0.0	100.0	0.0
	PHENACETIN	R	0.0	0.0	100.0	0.0
	PHENANTHRENE	P	100.0	0.0	0.0	0.0
	PHENOL	R	0.0	0.0	100.0	0.0
	PRONAMIDE	R	0.0	0.0	100.0	0.0
	PYRENE	P	100.0	0.0	0.0	0.0
	PYRIDINE	R	0.0	0.0	100.0	0.0
	SAFROLE	R	0.0	0.0	100.0	0.0
VOC	1,1,1,2-TETRACHLOROETHANE	N	0.0	0.0	100.0	0.0
	1,1,1-TRICHLOROETHANE	N	50.0	0.0	100.0	0.0
		P	50.0	0.0	0.0	0.0
	1,1,2,2-TETRACHLOROETHANE	N	0.0	0.0	100.0	0.0
	1,1,2-TRICHLOROETHANE	N	0.0	0.0	100.0	0.0
		P	100.0	0.0	0.0	0.0
	1,1-DICHLOROETHANE	N	100.0	0.0	100.0	0.0
	1,1-DICHLOROETHENE	N	0.0	0.0	100.0	0.0
		P	100.0	0.0	0.0	0.0
	1,2,3-TRICHLOROPROPANE	N	0.0	0.0	100.0	0.0
	1,2-DIBROMO-3-CHLOROPROPANE	N	0.0	0.0	100.0	0.0
	1,2-DIBROMOETHANE	N	0.0	0.0	100.0	0.0
	1,2-DICHLOROETHANE	N	100.0	0.0	100.0	0.0

TABLE H-14

TALLY OF QUALIFICATION RATES FOR SOIL(BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	1,2-DICHLOROPROPANE	N	0.0	0.0	100.0	0.0
	2-BUTANONE	N	4.0	0.0	100.0	0.0
		P	96.0	0.0	0.0	0.0
	2-HEXANONE	CP	20.0	0.0	0.0	0.0
		N	0.0	0.0	100.0	0.0
		P	80.0	0.0	0.0	0.0
	3-CHLOROPROPENE	N	0.0	0.0	100.0	0.0
	4-METHYL-2-PENTANONE	C	0.0	0.0	20.0	0.0
		N	0.0	0.0	80.0	0.0
	ACETONE	A	0.0	100.0	0.0	0.0
		AC	29.8	0.0	0.0	0.0
		ACG	4.3	0.0	0.0	0.0
		ACN	6.4	0.0	0.0	0.0
		ACP	59.6	0.0	0.0	0.0
		C	0.0	0.0	92.9	100.0
		N	0.0	0.0	7.1	0.0
	ACETONITRILE	C	0.0	0.0	0.0	100.0
	ACROLEIN	C	0.0	0.0	0.0	100.0
	ACRYLONITRILE	C	0.0	0.0	20.0	0.0
		N	0.0	0.0	80.0	0.0
	BENZENE	N	0.0	0.0	100.0	0.0
		P	100.0	0.0	0.0	0.0
	BROMODICHLOROMETHANE	N	0.0	0.0	100.0	0.0
	BROMOFORM	C	0.0	0.0	83.3	0.0
		CN	0.0	0.0	4.2	0.0
		N	0.0	0.0	12.5	0.0
	BROMOMETHANE	N	0.0	0.0	100.0	0.0
	CARBON DISULFIDE	C	0.0	0.0	42.9	0.0
		N	0.0	0.0	57.1	0.0
		P	100.0	0.0	0.0	0.0
	CARBON TETRACHLORIDE	N	0.0	0.0	100.0	0.0
	CHLOROBENZENE	N	0.0	0.0	100.0	0.0
	CHLORODIBROMOMETHANE	N	0.0	0.0	100.0	0.0
	CHLOROETHANE	N	0.0	0.0	100.0	0.0
	CHLOROFORM	N	0.0	0.0	100.0	0.0
	CHLOROMETHANE	N	0.0	0.0	100.0	0.0
	CHLOROPRENE	N	0.0	0.0	100.0	0.0
	CIS-1,2-DICHLOROETHENE	N	0.0	0.0	100.0	0.0
		NP	11.1	0.0	0.0	0.0
		P	88.9	0.0	0.0	0.0
	CIS-1,3-DICHLOROPROPENE	N	0.0	0.0	100.0	0.0
	DIBROMOMETHANE	N	0.0	0.0	100.0	0.0
	DICHLORODIFLUOROMETHANE	C	0.0	0.0	80.0	100.0
		N	0.0	0.0	20.0	0.0

TABLE H-14

TALLY OF QUALIFICATION RATES FOR SOIL(BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	ETHYL METHACRYLATE	N	0.0	0.0	100.0	0.0
	ETHYLBENZENE	N	0.0	0.0	100.0	0.0
		NP	50.0	0.0	0.0	0.0
		P	50.0	0.0	0.0	0.0
	ISOBUTANOL	C	0.0	0.0	0.0	100.0
	METHACRYLONITRILE	C	0.0	0.0	20.0	0.0
		N	0.0	0.0	80.0	0.0
	METHYL IODIDE	N	0.0	0.0	100.0	0.0
	METHYL METHACRYLATE	C	0.0	0.0	25.0	0.0
		N	0.0	0.0	75.0	0.0
	METHYL TERT-BUTYL ETHER	N	0.0	0.0	100.0	0.0
	METHYLENE CHLORIDE	AC	60.0	0.0	0.0	0.0
		ACG	5.0	0.0	0.0	0.0
		ACGP	5.0	0.0	0.0	0.0
		ACN	10.0	0.0	0.0	0.0
		ACP	10.0	0.0	0.0	0.0
		ACR	5.0	0.0	0.0	0.0
		C	0.0	0.0	98.6	0.0
		CN	0.0	0.0	1.4	0.0
		CP	5.0	0.0	0.0	0.0
	PROPIONITRILE	C	0.0	0.0	0.0	100.0
	STYRENE	N	0.0	0.0	100.0	0.0
	TETRACHLOROETHENE	N	0.0	0.0	100.0	0.0
	TOLUENE	N	100.0	0.0	100.0	0.0
	TOTAL XYLENES	N	33.3	0.0	100.0	0.0
		P	66.7	0.0	0.0	0.0
	TRANS-1,2-DICHLOROETHENE	N	100.0	0.0	100.0	0.0
	TRANS-1,3-DICHLOROPROPENE	N	0.0	0.0	100.0	0.0
	TRANS-1,4-DICHLORO-2-BUTENE	N	0.0	0.0	100.0	0.0
	TRICHLOROETHENE	L	20.0	0.0	0.0	0.0
		N	0.0	0.0	100.0	0.0
		NP	40.0	0.0	0.0	0.0
		P	40.0	0.0	0.0	0.0
	TRICHLOROFLUOROMETHANE	N	9.1	0.0	100.0	0.0
		NP	18.2	0.0	0.0	0.0
		P	72.7	0.0	0.0	0.0
	VINYL ACETATE	C	0.0	0.0	42.9	0.0
		N	0.0	0.0	57.1	0.0
	VINYL CHLORIDE	N	0.0	0.0	100.0	0.0
		P	100.0	0.0	0.0	0.0

M = Metals, total
PEST/PCB = Pesticides/polychlorinated biphenyls
SVOC = Semivolatile organic compounds

TABLE H-14

TALLY OF QUALIFICATION RATES FOR SOIL(BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR

VOC = Volatile organic compounds

J = Result is estimated
U = Analyte was not detected at the indicated detection limit
UJ = Analyte was not detected at the indicated detection limit and result is estimated
UR = Result is not usable and was reported as not detected

A = Lab Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
I = ICP Serial Dilution Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
N = Internal Standard Noncompliance
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
R = Surrogates Recovery Noncompliance

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
M	ANTIMONY	A	100.0	100.0	0.0	0.0
	ARSENIC	AI	100.0	0.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	BERYLLIUM	P	100.0	0.0	0.0	0.0
	CADMIUM	P	100.0	0.0	0.0	0.0
	CALCIUM	ADGI	100.0	0.0	0.0	0.0
	CHROMIUM	ADFGI	100.0	0.0	0.0	0.0
	COBALT	AFI	100.0	0.0	0.0	0.0
	COPPER	ADFI	100.0	0.0	0.0	0.0
	IRON	DFI	100.0	0.0	0.0	0.0
	LEAD	AI	100.0	0.0	0.0	0.0
	MAGNESIUM	DFI	100.0	0.0	0.0	0.0
	MANGANESE	A	100.0	0.0	0.0	0.0
	MERCURY	P	100.0	0.0	0.0	0.0
	NICKEL	AI	100.0	0.0	0.0	0.0
	POTASSIUM	AI	100.0	0.0	0.0	0.0
	SELENIUM	A	50.0	100.0	0.0	0.0
		AP	50.0	0.0	0.0	0.0
	SILVER	A	0.0	100.0	0.0	0.0
	SODIUM	A	0.0	100.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
	TIN	A	50.0	100.0	0.0	0.0
		AGP	50.0	0.0	0.0	0.0
	VANADIUM	AI	100.0	0.0	0.0	0.0
	ZINC	ADFI	28.6	0.0	0.0	0.0
		ADFIK	71.4	0.0	0.0	0.0
MISC	PERCHLORATE	P	33.3	0.0	0.0	0.0
		PY	33.3	0.0	0.0	0.0
		Y	33.3	0.0	0.0	0.0
	PERCHLORATE-8321	A	0.0	100.0	0.0	0.0
		Y	0.0	0.0	100.0	0.0
SVOC	1,2,4,5-TETRACHLOROBENZENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1,2,4-TRICHLOROBENZENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1,2-DICHLOROBENZENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1,3-DICHLOROBENZENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1,4-DICHLOROBENZENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1,4-DIOXANE	C	0.0	0.0	76.9	0.0
		CY	0.0	0.0	7.7	0.0
		H	0.0	0.0	7.7	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		Y	0.0	0.0	7.7	0.0
	1,4-NAPHTHOQUINONE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1,4-PHENYLENEDIAMINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1-NAPHTHYLAMINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	2,2'-OXYBIS(1-CHLOROPROPANE)	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	2,3,4,6-TETRACHLOROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2,4,5-TRICHLOROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2,4,6-TRICHLOROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2,4-DICHLOROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2,4-DIMETHYLPHENOL	D	0.0	0.0	0.0	100.0
		H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2,4-DINITROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2,6-DICHLOROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2-ACETYLAMINOFLUORENE	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	2-CHLORONAPHTHALENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	2-CHLOROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2-METHYLNAPHTHALENE	P	33.3	0.0	0.0	0.0
		Y	66.7	0.0	0.0	0.0
	2-METHYLPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	2-NAPHTHYLAMINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	2-NITROANILINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	2-NITROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	2-PICOLINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	3&4-METHYLPHENOL	H	0.0	0.0	50.0	0.0
		P	33.3	0.0	0.0	0.0
		PY	66.7	0.0	0.0	0.0
		R	0.0	0.0	50.0	0.0
	3,3'-DICHLOROBENZIDINE	D	0.0	0.0	0.0	100.0
		H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	3,3'-DIMETHYLBENZIDINE	C	0.0	0.0	76.9	0.0
		CY	0.0	0.0	15.4	0.0
		H	0.0	0.0	7.7	0.0
	3-METHYLCHOLANTHRENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	3-NITROANILINE	D	0.0	0.0	25.0	0.0
		H	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	4,6-DINITRO-2-METHYLPHENOL	H	0.0	0.0	25.0	0.0
		NY	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	25.0	0.0
	4-AMINOBIPHENYL	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	4-BROMOPHENYL PHENYL ETHER	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	4-CHLORO-3-METHYLPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	4-CHLOROANILINE	D	0.0	0.0	0.0	100.0
		H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	4-CHLOROPHENYL PHENYL ETHER	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	4-NITROANILINE	H	0.0	0.0	33.3	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		Y	0.0	0.0	66.7	0.0
	4-NITROPHENOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	4-NITROQUINOLINE-1-OXIDE	C	0.0	0.0	0.0	96.2
		CY	0.0	0.0	0.0	3.8
	5-NITRO-O-TOLUIDINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	7,12-DIMETHYLBENZ(A)ANTHRACENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	A,A-DIMETHYLPHENETHYLAMINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	ACENAPHTHENE	N	33.3	0.0	0.0	0.0
		P	33.3	0.0	0.0	0.0
		PY	33.3	0.0	0.0	0.0
		Y	0.0	0.0	100.0	0.0
	ACENAPHTHYLENE	N	100.0	0.0	0.0	0.0
		Y	0.0	0.0	100.0	0.0
	ACETOPHENONE	C	0.0	0.0	71.4	0.0
		CY	0.0	0.0	7.1	0.0
		H	0.0	0.0	7.1	0.0
		R	0.0	0.0	7.1	0.0
		Y	0.0	0.0	7.1	0.0
	ANILINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	ANTHRACENE	N	0.0	0.0	50.0	0.0
		NY	0.0	0.0	50.0	0.0
	ARAMITE	CY	0.0	0.0	33.3	0.0
		H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
	BENZO(A)ANTHRACENE	N	100.0	0.0	0.0	0.0
		NY	0.0	0.0	100.0	0.0
	BENZO(A)PYRENE	NY	0.0	0.0	50.0	0.0
		Y	0.0	0.0	50.0	0.0
	BENZO(B)FLUORANTHENE	NY	0.0	0.0	50.0	0.0
		Y	0.0	0.0	50.0	0.0
	BENZO(G,H,I)PERYLENE	Y	0.0	0.0	100.0	0.0
	BENZO(K)FLUORANTHENE	NY	0.0	0.0	50.0	0.0
		Y	0.0	0.0	50.0	0.0
	BENZYL ALCOHOL	H	0.0	0.0	25.0	0.0
		R	0.0	0.0	25.0	0.0
		Y	0.0	0.0	50.0	0.0
	BIS(2-CHLOROETHOXY)METHANE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	BIS(2-CHLOROETHYL)ETHER	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	BIS(2-ETHYLHEXYL)PHTHALATE	G	22.2	0.0	0.0	0.0
		HP	11.1	0.0	0.0	0.0
		P	44.4	0.0	0.0	0.0
		Y	22.2	0.0	0.0	0.0
	BUTYL BENZYL PHTHALATE	H	0.0	0.0	33.3	0.0
		P	100.0	0.0	0.0	0.0
		Y	0.0	0.0	66.7	0.0
	CHLOROBENZILATE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	CHRYSENE	N	100.0	0.0	0.0	0.0
		NY	0.0	0.0	100.0	0.0
	DIALLATE	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	DIBENZO(A,H)ANTHRACENE	NY	0.0	0.0	50.0	0.0
		Y	0.0	0.0	50.0	0.0
	DIBENZOFURAN	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	DIETHYL PHTHALATE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	DIMETHYL PHTHALATE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	DI-N-BUTYL PHTHALATE	H	0.0	0.0	50.0	0.0
		NPY	33.3	0.0	0.0	0.0
		P	66.7	0.0	0.0	0.0
		Y	0.0	0.0	50.0	0.0
	DI-N-OCTYL PHTHALATE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	DIPHENYLAMINE	D	0.0	0.0	25.0	0.0
		H	0.0	0.0	25.0	0.0
		NY	0.0	0.0	25.0	0.0
		Y	0.0	0.0	25.0	0.0
	ETHYL METHANE SULFONATE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	FLUORANTHENE	N	100.0	0.0	0.0	0.0
		NY	0.0	0.0	100.0	0.0
	FLUORENE	N	33.3	0.0	0.0	0.0
		P	33.3	0.0	0.0	0.0
		Y	33.3	0.0	100.0	0.0
	HEXACHLOROBENZENE	C	0.0	0.0	88.5	0.0
		CNY	0.0	0.0	3.8	0.0
		CY	0.0	0.0	3.8	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		H	0.0	0.0	3.8	0.0
	HEXACHLOROBUTADIENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	HEXACHLOROCYCLOPENTADIENE	C	0.0	0.0	88.5	0.0
		CY	0.0	0.0	7.7	0.0
		H	0.0	0.0	3.8	0.0
	HEXACHLOROETHANE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	HEXACHLOROPROPENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	INDENO(1,2,3-CD)PYRENE	NY	0.0	0.0	50.0	0.0
		Y	0.0	0.0	50.0	0.0
	ISODRIN	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	ISOPHORONE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	ISOSAFROLE	H	0.0	0.0	33.3	0.0
		P	100.0	0.0	0.0	0.0
		Y	0.0	0.0	66.7	0.0
	KEPONE	C	0.0	0.0	83.3	100.0
		CY	0.0	0.0	16.7	0.0
	METHAPYRILENE	C	0.0	0.0	76.9	0.0
		CNY	0.0	0.0	7.7	0.0
		CY	0.0	0.0	7.7	0.0
		H	0.0	0.0	7.7	0.0
	METHYL METHANE SULFONATE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	NAPHTHALENE	P	60.0	0.0	0.0	0.0
		Y	40.0	0.0	0.0	0.0
	N-NITROSODIETHYLAMINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	N-NITROSODIMETHYLAMINE	C	0.0	0.0	76.9	0.0
		CY	0.0	0.0	15.4	0.0
		H	0.0	0.0	7.7	0.0
	N-NITROSO-DI-N-BUTYLAMINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	N-NITROSO-DI-N-PROPYLAMINE	CY	0.0	0.0	33.3	0.0
		H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	N-NITROSODIPHENYLAMINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	N-NITROSOMETHYLETHYLAMINE	C	0.0	0.0	76.9	0.0
		CY	0.0	0.0	7.7	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		H	0.0	0.0	7.7	0.0
		Y	0.0	0.0	7.7	0.0
	N-NITROSOMORPHOLINE	CY	0.0	0.0	33.3	0.0
		H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	N-NITROSOPIPERIDINE	CY	0.0	0.0	33.3	0.0
		H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	N-NITROSOPYRROLIDINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	O-TOLUIDINE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	P-(DIMETHYLAMINO)AZOBENZENE	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	PENTACHLOROBENZENE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	PENTACHLOROETHANE	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	PENTACHLORONITROBENZENE	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	PHENACETIN	H	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	PHENANTHRENE	N	50.0	0.0	0.0	0.0
		NY	50.0	0.0	0.0	0.0
	PHENOL	H	0.0	0.0	33.3	0.0
		PY	100.0	0.0	0.0	0.0
		R	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	PRONAMIDE	H	0.0	0.0	33.3	0.0
		NY	0.0	0.0	33.3	0.0
		Y	0.0	0.0	33.3	0.0
	PYRENE	E	22.2	0.0	0.0	0.0
		EN	33.3	0.0	0.0	0.0
		EP	44.4	0.0	0.0	0.0
		NY	0.0	0.0	100.0	0.0
	PYRIDINE	C	0.0	0.0	76.9	0.0
		CY	0.0	0.0	7.7	0.0
		H	0.0	0.0	7.7	0.0
		Y	0.0	0.0	7.7	0.0
	SAFROLE	H	0.0	0.0	33.3	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		Y	0.0	0.0	66.7	0.0
VOC	1,1,1,2-TETRACHLOROETHANE	D	0.0	0.0	50.0	0.0
		Y	0.0	0.0	50.0	0.0
	1,1,1-TRICHLOROETHANE	P	66.7	0.0	0.0	0.0
		Y	33.3	0.0	0.0	0.0
	1,1,2,2-TETRACHLOROETHANE	Y	0.0	0.0	100.0	0.0
	1,1,2-TRICHLOROETHANE	Y	0.0	0.0	100.0	0.0
	1,1-DICHLOROETHANE	G	20.0	0.0	0.0	0.0
		GPR	20.0	0.0	0.0	0.0
		P	20.0	0.0	0.0	0.0
		Y	40.0	0.0	0.0	0.0
	1,1-DICHLOROETHENE	P	50.0	0.0	0.0	0.0
		Y	50.0	0.0	0.0	0.0
	1,2,3-TRICHLOROPROPANE	Y	0.0	0.0	100.0	0.0
	1,2-DIBROMO-3-CHLOROPROPANE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	1,2-DIBROMOETHANE	D	0.0	0.0	50.0	0.0
		Y	0.0	0.0	50.0	0.0
	1,2-DICHLOROETHANE	Y	0.0	0.0	100.0	0.0
	1,2-DICHLOROPROPANE	Y	0.0	0.0	100.0	0.0
	2-BUTANONE	G	50.0	0.0	0.0	0.0
		GR	50.0	0.0	0.0	0.0
		Y	0.0	0.0	100.0	0.0
	2-HEXANONE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	3-CHLOROPROPENE	Y	0.0	0.0	100.0	0.0
	4-METHYL-2-PENTANONE	C	0.0	0.0	33.3	0.0
		GP	50.0	0.0	0.0	0.0
		GR	50.0	0.0	0.0	0.0
		Y	0.0	0.0	66.7	0.0
	ACETONE	A	0.0	100.0	0.0	0.0
		C	0.0	0.0	66.7	0.0
		CY	0.0	0.0	16.7	0.0
		G	50.0	0.0	0.0	0.0
		GR	50.0	0.0	0.0	0.0
		Y	0.0	0.0	16.7	0.0
	ACETONITRILE	C	0.0	0.0	0.0	100.0
	ACROLEIN	C	0.0	0.0	0.0	100.0
	ACRYLONITRILE	Y	0.0	0.0	100.0	0.0
	BENZENE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	BROMODICHLOROMETHANE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	BROMOFORM	Y	0.0	0.0	100.0	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	BROMOMETHANE	Y	0.0	0.0	100.0	0.0
	CARBON DISULFIDE	P	100.0	0.0	0.0	0.0
		Y	0.0	0.0	100.0	0.0
	CARBON TETRACHLORIDE	Y	0.0	0.0	100.0	0.0
	CHLOROBENZENE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	CHLORODIBROMOMETHANE	Y	0.0	0.0	100.0	0.0
	CHLOROETHANE	PY	66.7	0.0	0.0	0.0
		R	33.3	0.0	0.0	0.0
	CHLOROFORM	Y	0.0	0.0	100.0	0.0
	CHLOROMETHANE	Y	0.0	0.0	100.0	0.0
	CHLOROPRENE	Y	0.0	0.0	100.0	0.0
	CIS-1,2-DICHLOROETHENE	Y	100.0	0.0	0.0	0.0
	CIS-1,3-DICHLOROPROPENE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	DIBROMOMETHANE	Y	0.0	0.0	100.0	0.0
	DICHLORODIFLUOROMETHANE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	ETHYL METHACRYLATE	Y	0.0	0.0	100.0	0.0
	ETHYLBENZENE	D	0.0	0.0	25.0	0.0
		G	0.0	0.0	25.0	0.0
		GR	100.0	0.0	0.0	0.0
		Y	0.0	0.0	50.0	0.0
	ISOBUTANOL	C	0.0	0.0	0.0	100.0
	METHACRYLONITRILE	Y	0.0	0.0	100.0	0.0
	METHYL IODIDE	Y	0.0	0.0	100.0	0.0
	METHYL METHACRYLATE	Y	0.0	0.0	100.0	0.0
	METHYL TERT-BUTYL ETHER	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	METHYLENE CHLORIDE	A	0.0	100.0	0.0	0.0
		C	0.0	0.0	81.8	0.0
		Y	0.0	0.0	18.2	0.0
	PROPIONITRILE	C	0.0	0.0	0.0	100.0
	STYRENE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	TETRACHLOROETHENE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	TOLUENE	D	0.0	0.0	100.0	0.0
		G	16.7	0.0	0.0	0.0
		GR	16.7	0.0	0.0	0.0
		P	33.3	0.0	0.0	0.0
		PY	16.7	0.0	0.0	0.0
		Y	16.7	0.0	0.0	0.0
	TOTAL XYLENES	D	0.0	0.0	33.3	0.0

TABLE H-15

TALLY OF QUALIFICATION RATES FOR SEDIMENT (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		G	33.3	0.0	0.0	0.0
		GR	33.3	0.0	0.0	0.0
		P	33.3	0.0	0.0	0.0
		Y	0.0	0.0	66.7	0.0
	TRANS-1,2-DICHLOROETHENE	P	50.0	0.0	0.0	0.0
		PY	50.0	0.0	0.0	0.0
		Y	0.0	0.0	100.0	0.0
	TRANS-1,3-DICHLOROPROPENE	D	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	TRANS-1,4-DICHLORO-2-BUTENE	Y	0.0	0.0	100.0	0.0
	TRICHLOROETHENE	D	0.0	0.0	100.0	0.0
		E	14.3	0.0	0.0	0.0
		P	57.1	0.0	0.0	0.0
		Y	28.6	0.0	0.0	0.0
	TRICHLOROFLUOROMETHANE	Y	0.0	0.0	100.0	0.0
	VINYL ACETATE	C	0.0	0.0	33.3	0.0
		Y	0.0	0.0	66.7	0.0
	VINYL CHLORIDE	Y	0.0	0.0	100.0	0.0

M = Metals, total
MISC = Miscellaneous parameters
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds

J = Result is estimated
U = Analyte was not detected at the indicated detection limit
UJ = Analyte was not detected at the indicated detection limit and result is estimated
UR = Result is not usable and was reported as not detected

A = Lab Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
N = Internal Standard Noncompliance
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
R = Surrogates Recovery Noncompliance
Y = Percent solids <30%

TABLE H-16

TALLY OF QUALIFICATION RATES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
M	ALUMINUM	A	35.3	100.0	0.0	0.0
		AF	64.7	0.0	0.0	0.0
	ANTIMONY	A	100.0	100.0	0.0	0.0
	ARSENIC	A	100.0	100.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	BERYLLIUM	A	0.0	100.0	0.0	0.0
		AP	100.0	0.0	0.0	0.0
	CADMIUM	A	12.5	100.0	0.0	0.0
		P	87.5	0.0	0.0	0.0
	CALCIUM	A	55.0	0.0	0.0	0.0
		AG	45.0	0.0	0.0	0.0
	CHROMIUM	A	41.2	0.0	0.0	0.0
		AP	23.5	0.0	0.0	0.0
		P	35.3	0.0	0.0	0.0
	COBALT	P	100.0	0.0	0.0	0.0
	COPPER	A	84.6	100.0	0.0	0.0
		AP	15.4	0.0	0.0	0.0
	IRON	A	91.7	0.0	0.0	0.0
		P	8.3	0.0	0.0	0.0
	LEAD	A	45.5	100.0	0.0	0.0
		AP	9.1	0.0	0.0	0.0
		P	45.5	0.0	0.0	0.0
	MAGNESIUM	A	100.0	0.0	0.0	0.0
	MANGANESE	A	90.9	0.0	0.0	0.0
		AP	9.1	0.0	0.0	0.0
	NICKEL	P	100.0	0.0	0.0	0.0
	POTASSIUM	A	100.0	0.0	0.0	0.0
	SELENIUM	A	0.0	100.0	0.0	0.0
		P	100.0	0.0	0.0	0.0
	SILVER	A	0.0	100.0	0.0	0.0
	SODIUM	A	100.0	0.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
	TIN	A	100.0	100.0	0.0	0.0
	VANADIUM	P	100.0	0.0	0.0	0.0
	ZINC	A	50.0	100.0	0.0	0.0
		AK	37.5	0.0	0.0	0.0
		AKP	12.5	0.0	0.0	0.0
MF	ALUMINUM	A	50.0	100.0	0.0	0.0
		P	50.0	0.0	0.0	0.0
	ANTIMONY	A	0.0	100.0	0.0	0.0
	ARSENIC	A	100.0	100.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	BERYLLIUM	A	0.0	100.0	0.0	0.0

TABLE H-16

TALLY OF QUALIFICATION RATES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

	CADMIUM	A	0.0	100.0	0.0	0.0
		P	100.0	0.0	0.0	0.0
	CALCIUM	A	100.0	0.0	0.0	0.0
	CHROMIUM	A	10.0	100.0	0.0	0.0
		P	90.0	0.0	0.0	0.0
	COBALT	A	6.7	0.0	0.0	0.0
		AP	66.7	0.0	0.0	0.0
		P	26.7	0.0	0.0	0.0
	COPPER	A	0.0	100.0	0.0	0.0
		I	18.2	0.0	0.0	0.0
		IP	81.8	0.0	0.0	0.0
	IRON	A	73.3	0.0	0.0	0.0
		P	26.7	0.0	0.0	0.0
	LEAD	A	11.8	0.0	0.0	0.0
		AP	41.2	0.0	0.0	0.0
		P	47.1	0.0	0.0	0.0
	MAGNESIUM	A	100.0	0.0	0.0	0.0
	MANGANESE	AI	36.4	0.0	0.0	0.0
		AIK	9.1	0.0	0.0	0.0
		AIKP	45.5	0.0	0.0	0.0
		AP	9.1	0.0	0.0	0.0
	MERCURY	A	0.0	100.0	0.0	0.0
	NICKEL	K	68.8	0.0	0.0	0.0
		P	31.3	0.0	0.0	0.0
	POTASSIUM	A	100.0	0.0	0.0	0.0
	SELENIUM	A	0.0	100.0	0.0	0.0
		P	100.0	0.0	0.0	0.0
	SILVER	A	0.0	100.0	0.0	0.0
	SODIUM	A	100.0	0.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
		AP	100.0	0.0	0.0	0.0
	TIN	A	0.0	100.0	0.0	0.0
		AP	100.0	0.0	0.0	0.0
	ZINC	A	0.0	100.0	0.0	0.0
		AIK	17.6	0.0	0.0	0.0
		AIKP	29.4	0.0	0.0	0.0
		K	5.9	0.0	0.0	0.0
		KP	47.1	0.0	0.0	0.0
SVOC	1,4-DIOXANE	P	100.0	0.0	0.0	0.0
	2,2'-OXYBIS(1-CHLOROPROPANE)	C	0.0	0.0	100.0	0.0
	2,3,4,6-TETRACHLOROPHENOL	N	0.0	0.0	100.0	0.0
		R	0.0	0.0	0.0	100.0
	2,4,5-TRICHLOROPHENOL	N	0.0	0.0	100.0	0.0
		R	0.0	0.0	0.0	100.0
	2,4,6-TRICHLOROPHENOL	N	0.0	0.0	100.0	0.0

TABLE H-16

TALLY OF QUALIFICATION RATES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

	R	0.0	0.0	0.0	100.0
2,4-DICHLOROPHENOL	R	0.0	0.0	0.0	100.0
2,4-DIMETHYLPHENOL	R	0.0	0.0	0.0	100.0
2,4-DINITROPHENOL	C	0.0	0.0	83.3	0.0
	CD	0.0	0.0	16.7	0.0
	E	0.0	0.0	0.0	75.0
	R	0.0	0.0	0.0	25.0
2,6-DICHLOROPHENOL	R	0.0	0.0	0.0	100.0
2-CHLORONAPHTHALENE	N	0.0	0.0	100.0	0.0
2-CHLOROPHENOL	R	0.0	0.0	0.0	100.0
2-METHYLPHENOL	P	100.0	0.0	0.0	0.0
	R	0.0	0.0	0.0	100.0
2-NITROANILINE	N	0.0	0.0	100.0	0.0
2-NITROPHENOL	D	0.0	0.0	100.0	0.0
	R	0.0	0.0	0.0	100.0
3&4-METHYLPHENOL	R	0.0	0.0	0.0	100.0
3,3'-DIMETHYLBENZIDINE	C	0.0	0.0	100.0	0.0
3-NITROANILINE	N	0.0	0.0	100.0	0.0
4,6-DINITRO-2-METHYLPHENOL	D	0.0	0.0	10.0	0.0
	E	0.0	0.0	70.0	0.0
	EN	0.0	0.0	20.0	0.0
	R	0.0	0.0	0.0	100.0
4-BROMOPHENYL PHENYL ETHER	N	0.0	0.0	100.0	0.0
4-CHLORO-3-METHYLPHENOL	R	0.0	0.0	0.0	100.0
4-CHLOROPHENYL PHENYL ETHER	N	0.0	0.0	100.0	0.0
4-NITROANILINE	N	0.0	0.0	100.0	0.0
4-NITROPHENOL	C	0.0	0.0	83.3	0.0
	D	0.0	0.0	0.0	25.0
	N	0.0	0.0	16.7	0.0
	R	0.0	0.0	0.0	75.0
4-NITROQUINOLINE-1-OXIDE	C	0.0	0.0	0.0	100.0
A,A-DIMETHYLPHENETHYLAMINE	C	0.0	0.0	100.0	0.0
ACENAPHTHENE	P	100.0	0.0	0.0	0.0
ACETOPHENONE	C	0.0	0.0	100.0	0.0
	P	100.0	0.0	0.0	0.0
ANTHRACENE	N	0.0	0.0	100.0	0.0
BENZO(A)ANTHRACENE	N	0.0	0.0	100.0	0.0
BENZO(A)PYRENE	N	0.0	0.0	100.0	0.0
BENZO(B)FLUORANTHENE	N	0.0	0.0	100.0	0.0
BENZO(G,H,I)PERYLENE	N	0.0	0.0	100.0	0.0
BENZO(K)FLUORANTHENE	N	0.0	0.0	100.0	0.0
BENZYL ALCOHOL	P	100.0	0.0	0.0	0.0
BIS(2-ETHYLHEXYL)PHTHALATE	P	100.0	0.0	0.0	0.0
CHRYSENE	N	0.0	0.0	100.0	0.0
DIBENZO(A,H)ANTHRACENE	N	0.0	0.0	100.0	0.0

TABLE H-16

TALLY OF QUALIFICATION RATES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

	DIETHYL PHTHALATE	N	0.0	0.0	100.0	0.0
	DIMETHYL PHTHALATE	N	0.0	0.0	100.0	0.0
	DI-N-BUTYL PHTHALATE	N	0.0	0.0	100.0	0.0
	DI-N-OCTYL PHTHALATE	C	0.0	0.0	100.0	0.0
	ETHYL METHANE SULFONATE	C	0.0	0.0	100.0	0.0
	FLUORANTHENE	N	0.0	0.0	100.0	0.0
	HEXACHLOROBENZENE	C	0.0	0.0	50.0	0.0
		N	0.0	0.0	50.0	0.0
	HEXACHLOROCYCLOPENTADIENE	C	0.0	0.0	55.0	0.0
		E	0.0	0.0	40.0	0.0
		EN	0.0	0.0	5.0	0.0
	INDENO(1,2,3-CD)PYRENE	N	0.0	0.0	100.0	0.0
	KEPONE	C	0.0	0.0	100.0	100.0
	METHAPYRILENE	C	0.0	0.0	100.0	0.0
	NAPHTHALENE	P	100.0	0.0	0.0	0.0
	N-NITROSODIMETHYLAMINE	C	0.0	0.0	100.0	0.0
	N-NITROSODIPHENYLAMINE	N	0.0	0.0	100.0	0.0
	N-NITROSOMETHYLETHYLAMINE	C	0.0	0.0	100.0	0.0
	N-NITROSOMORPHOLINE	C	0.0	0.0	100.0	0.0
	PHENANTHRENE	N	100.0	0.0	0.0	0.0
	PHENOL	R	0.0	0.0	0.0	100.0
	PYRENE	N	0.0	0.0	100.0	0.0
VOC	1,1,1-TRICHLOROETHANE	P	100.0	0.0	0.0	0.0
	2-BUTANONE	P	100.0	0.0	0.0	0.0
	2-HEXANONE	P	100.0	0.0	0.0	0.0
	3-CHLOROPROPENE	C	0.0	0.0	100.0	0.0
	4-METHYL-2-PENTANONE	P	100.0	0.0	0.0	0.0
	ACETONE	A	20.0	0.0	0.0	0.0
		AC	6.7	0.0	0.0	0.0
		ACP	13.3	0.0	0.0	0.0
		AP	40.0	0.0	0.0	0.0
		C	20.0	0.0	100.0	0.0
	ACETONITRILE	C	0.0	0.0	0.0	100.0
	ACROLEIN	C	0.0	0.0	0.0	100.0
	BROMOMETHANE	C	0.0	0.0	100.0	0.0
	DICHLORODIFLUOROMETHANE	DE	0.0	0.0	11.1	0.0
		E	0.0	0.0	88.9	0.0
	ETHYL METHACRYLATE	C	0.0	0.0	100.0	0.0
	ISOBUTANOL	C	0.0	0.0	0.0	100.0
	METHYL METHACRYLATE	C	0.0	0.0	100.0	0.0
	METHYLENE CHLORIDE	C	0.0	0.0	100.0	0.0
	PROPIONITRILE	C	0.0	0.0	0.0	100.0
	TRANS-1,2-DICHLOROETHENE	P	100.0	0.0	0.0	0.0
	TRICHLOROETHENE	P	100.0	0.0	0.0	0.0
	VINYL CHLORIDE	P	100.0	0.0	0.0	0.0

TABLE H-16

TALLY OF QUALIFICATION RATES FOR SURFACE WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

M = Metals, total
MF = Metals, dissolved
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds

J = Result is estimated
U = Analyte was not detected at the indicated detection limit
UJ = Analyte was not detected at the indicated detection limit and result is estimated
UR = Result is not usable and was reported as not detected

A = Lab Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
I = ICP Serial Dilution Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
N = Internal Standard Noncompliance
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
R = Surrogates Recovery Noncompliance

TABLE H-17

TALLY OF QUALIFICATION RATES FOR SUMP (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
M	ALUMINUM	A	0.0	100.0	0.0	0.0
	ANTIMONY	A	0.0	100.0	0.0	0.0
	ARSENIC	AP	100.0	0.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	CADMIUM	P	100.0	0.0	0.0	0.0
	CALCIUM	AG	100.0	0.0	0.0	0.0
	CHROMIUM	P	100.0	0.0	0.0	0.0
	COBALT	P	100.0	0.0	0.0	0.0
	COPPER	A	0.0	100.0	0.0	0.0
	LEAD	P	100.0	0.0	0.0	0.0
	SELENIUM	P	100.0	0.0	0.0	0.0
	SILVER	A	0.0	100.0	0.0	0.0
	SODIUM	A	100.0	0.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
	TIN	A	0.0	100.0	0.0	0.0
	ZINC	AK	100.0	0.0	0.0	0.0
MF	ANTIMONY	A	0.0	100.0	0.0	0.0
	ARSENIC	AP	100.0	0.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	CADMIUM	A	0.0	100.0	0.0	0.0
	CALCIUM	A	100.0	0.0	0.0	0.0
	CHROMIUM	P	100.0	0.0	0.0	0.0
	COBALT	P	100.0	0.0	0.0	0.0
	COPPER	A	0.0	100.0	0.0	0.0
	LEAD	P	100.0	0.0	0.0	0.0
	SELENIUM	P	100.0	0.0	0.0	0.0
	SODIUM	A	100.0	0.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
	TIN	A	0.0	100.0	0.0	0.0
	ZINC	K	100.0	0.0	0.0	0.0
SVOC	1,4-DIOXANE	P	100.0	0.0	0.0	0.0
	4-NITROQUINOLINE-1-OXIDE	C	0.0	0.0	0.0	100.0
	BIS(2-ETHYLHEXYL)PHTHALATE	P	100.0	0.0	0.0	0.0
	HEXACHLOROCYCLOPENTADIENE	E	0.0	0.0	100.0	0.0
	KEPONE	C	0.0	0.0	0.0	100.0
VOc	ACETONE	CP	100.0	0.0	0.0	0.0
	ACETONITRILE	C	0.0	0.0	0.0	100.0
	ACROLEIN	C	0.0	0.0	0.0	100.0
	BROMOMETHANE	C	0.0	0.0	100.0	0.0
	DICHLORODIFLUOROMETHANE	E	0.0	0.0	100.0	0.0
	ISOBUTANOL	C	0.0	0.0	0.0	100.0
	METHYLENE CHLORIDE	C	0.0	0.0	100.0	0.0
	PROPIONITRILE	C	0.0	0.0	0.0	100.0

TABLE H-17

TALLY OF QUALIFICATION RATES FOR SUMP (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

M = Metals, total
MF = Metals, dissolved
SVOC = Semivolatile organic compounds
VOC = Volatile organic compounds

J = Result is estimated
U = Analyte was not detected at the indicated detection limit
UJ = Analyte was not detected at the indicated detection limit and result is estimated
UR = Result is not usable and was reported as not detected

A = Lab Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
E = LCS/LCSD Recovery Noncompliance
G = Field Duplicate Imprecision
K = ICP Interference - includes ICS % R Noncompliance
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)

TABLE H-18

TALLY OF QUALIFICATION RATES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
EXP	4-AMINO-2,6-DINITROTOLUENE	U	100.0	0.0	0.0	0.0
	HMX	U	100.0	0.0	0.0	0.0
M	ALUMINUM	A	41.7	100.0	0.0	0.0
		AI	41.7	0.0	0.0	0.0
		AIP	16.7	0.0	0.0	0.0
	ANTIMONY	A	100.0	100.0	0.0	0.0
	ARSENIC	A	44.4	100.0	0.0	0.0
		AI	44.4	0.0	0.0	0.0
		AP	11.1	0.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	BERYLLIUM	A	16.7	100.0	0.0	0.0
		ADP	16.7	0.0	0.0	0.0
		AP	66.7	0.0	0.0	0.0
		D	0.0	0.0	100.0	0.0
	CADMIUM	A	21.4	100.0	0.0	0.0
		G	14.3	0.0	0.0	0.0
		GP	42.9	0.0	0.0	0.0
		P	21.4	0.0	0.0	0.0
	CALCIUM	A	50.0	0.0	0.0	0.0
		AG	25.0	0.0	0.0	0.0
		I	25.0	0.0	0.0	0.0
	CHROMIUM	A	27.3	100.0	0.0	0.0
		P	72.7	0.0	0.0	0.0
	COBALT	A	33.3	0.0	0.0	0.0
		AG	66.7	0.0	0.0	0.0
	COPPER	A	28.6	100.0	0.0	0.0
		AI	57.1	0.0	0.0	0.0
		AIP	14.3	0.0	0.0	0.0
	IRON	A	30.8	0.0	0.0	0.0
		AGI	61.5	0.0	0.0	0.0
		P	7.7	0.0	0.0	0.0
	LEAD	A	0.0	100.0	0.0	0.0
		AI	30.0	0.0	0.0	0.0
		AP	60.0	0.0	0.0	0.0
		P	10.0	0.0	0.0	0.0
	MAGNESIUM	A	66.7	0.0	0.0	0.0
		AI	33.3	0.0	0.0	0.0
	MANGANESE	A	66.7	0.0	0.0	0.0
		AI	33.3	0.0	0.0	0.0
	MERCURY	D	0.0	0.0	100.0	0.0
		DP	66.7	0.0	0.0	0.0
		P	33.3	0.0	0.0	0.0
	NICKEL	AGI	27.3	0.0	0.0	0.0
		AGIK	36.4	0.0	0.0	0.0

TABLE H-18

TALLY OF QUALIFICATION RATES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		GK	0.0	0.0	100.0	0.0
		K	36.4	0.0	0.0	0.0
	POTASSIUM	A	33.3	0.0	0.0	0.0
		I	66.7	0.0	0.0	0.0
	SELENIUM	A	12.5	100.0	0.0	0.0
		AP	25.0	0.0	0.0	0.0
		P	62.5	0.0	0.0	0.0
	SILVER	A	0.0	100.0	0.0	0.0
	SODIUM	A	75.0	0.0	0.0	0.0
		AI	25.0	0.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
		AP	25.0	0.0	0.0	0.0
		IP	75.0	0.0	0.0	0.0
	TIN	A	0.0	100.0	0.0	0.0
		AP	100.0	0.0	0.0	0.0
	VANADIUM	A	100.0	0.0	0.0	0.0
	ZINC	A	7.7	100.0	0.0	0.0
		AGI	15.4	0.0	0.0	0.0
		AGIK	23.1	0.0	0.0	0.0
		AGIKP	15.4	0.0	0.0	0.0
		AI	15.4	0.0	0.0	0.0
		AIK	7.7	0.0	0.0	0.0
		AK	7.7	0.0	0.0	0.0
		AKP	7.7	0.0	0.0	0.0
MF	ALUMINUM	A	0.0	100.0	0.0	0.0
		P	100.0	0.0	0.0	0.0
	ANTIMONY	A	100.0	100.0	0.0	0.0
	ARSENIC	A	100.0	100.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	BERYLLIUM	D	0.0	0.0	100.0	0.0
	CADMIUM	A	33.3	100.0	0.0	0.0
		AP	33.3	0.0	0.0	0.0
		GP	33.3	0.0	0.0	0.0
	CALCIUM	A	100.0	0.0	0.0	0.0
	CHROMIUM	A	0.0	100.0	0.0	0.0
		AF	25.0	0.0	0.0	0.0
		P	75.0	0.0	0.0	0.0
	COBALT	A	50.0	0.0	0.0	0.0
		AG	25.0	0.0	0.0	0.0
		AP	25.0	0.0	0.0	0.0
	COPPER	A	0.0	100.0	0.0	0.0
		AI	33.3	0.0	0.0	0.0
		AIP	66.7	0.0	0.0	0.0
	IRON	ADI	75.0	0.0	0.0	0.0

TABLE H-18

TALLY OF QUALIFICATION RATES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
		F	0.0	0.0	100.0	0.0
		P	25.0	0.0	0.0	0.0
	LEAD	A	0.0	100.0	0.0	0.0
		AI	33.3	0.0	0.0	0.0
		AP	33.3	0.0	0.0	0.0
		P	33.3	0.0	0.0	0.0
	MAGNESIUM	A	100.0	0.0	0.0	0.0
	MANGANESE	A	25.0	0.0	0.0	0.0
		AI	25.0	0.0	0.0	0.0
		AIK	50.0	0.0	0.0	0.0
	NICKEL	AGK	25.0	0.0	0.0	0.0
		K	75.0	0.0	0.0	0.0
	POTASSIUM	A	100.0	0.0	0.0	0.0
	SELENIUM	AP	25.0	0.0	0.0	0.0
		P	75.0	0.0	0.0	0.0
	SILVER	A	0.0	100.0	0.0	0.0
	SODIUM	A	40.0	100.0	0.0	0.0
		AI	60.0	0.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
		P	100.0	0.0	0.0	0.0
	TIN	A	0.0	100.0	0.0	0.0
		AP	100.0	0.0	0.0	0.0
	VANADIUM	AP	100.0	0.0	0.0	0.0
	ZINC	A	0.0	100.0	0.0	0.0
		AGK	25.0	0.0	0.0	0.0
		AI	25.0	0.0	0.0	0.0
		K	25.0	0.0	0.0	0.0
		KP	25.0	0.0	0.0	0.0
SVOC	1,2,4,5-TETRACHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,2,4-TRICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,2-DICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,3-DICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,4-DICHLOROBENZENE	R	0.0	0.0	100.0	0.0
	1,4-DIOXANE	C	14.3	0.0	50.0	0.0
		P	71.4	0.0	0.0	0.0
		R	14.3	0.0	50.0	0.0
	1,4-NAPHTHOQUINONE	R	0.0	0.0	100.0	0.0
	1,4-PHENYLENEDIAMINE	R	0.0	0.0	100.0	0.0
	1-NAPHTHYLAMINE	R	0.0	0.0	100.0	0.0
	2,2'-OXYBIS(1-CHLOROPROPANE)	R	0.0	0.0	100.0	0.0
	2,4-DIMETHYLPHENOL	P	100.0	0.0	0.0	0.0
	2,4-DINITROPHENOL	C	0.0	0.0	100.0	0.0
	2-ACETYLAMINOFLUORENE	C	0.0	0.0	66.7	0.0
		CR	0.0	0.0	33.3	0.0

TABLE H-18

TALLY OF QUALIFICATION RATES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	2-CHLORONAPHTHALENE	R	0.0	0.0	100.0	0.0
	2-METHYLNAPHTHALENE	P	100.0	0.0	0.0	0.0
	2-NAPHTHYLAMINE	R	0.0	0.0	100.0	0.0
	2-NITROANILINE	R	0.0	0.0	100.0	0.0
	2-PICOLINE	R	0.0	0.0	100.0	0.0
	3,3'-DICHLOROBENZIDINE	R	0.0	0.0	100.0	0.0
	3,3'-DIMETHYLBENZIDINE	R	0.0	0.0	100.0	0.0
	3-METHYLCHOLANTHRENE	R	0.0	0.0	100.0	0.0
	3-NITROANILINE	R	0.0	0.0	100.0	0.0
	4-AMINOBIPHENYL	R	0.0	0.0	100.0	0.0
	4-BROMOPHENYL PHENYL ETHER	R	0.0	0.0	100.0	0.0
	4-CHLOROANILINE	R	0.0	0.0	100.0	0.0
	4-CHLOROPHENYL PHENYL ETHER	R	0.0	0.0	100.0	0.0
	4-NITROANILINE	R	0.0	0.0	100.0	0.0
	4-NITROPHENOL	C	0.0	0.0	100.0	0.0
	4-NITROQUINOLINE-1-OXIDE	C	0.0	0.0	0.0	100.0
	5-NITRO-O-TOLUIDINE	R	0.0	0.0	100.0	0.0
	7,12-DIMETHYLBENZ(A)ANTHRACENE	R	0.0	0.0	100.0	0.0
	A,A-DIMETHYLPHENETHYLAMINE	C	0.0	0.0	66.7	0.0
		CR	0.0	0.0	33.3	0.0
	ACETOPHENONE	R	0.0	0.0	100.0	0.0
	ANILINE	R	0.0	0.0	100.0	0.0
	ARAMITE	R	0.0	0.0	100.0	0.0
	BENZYL ALCOHOL	R	0.0	0.0	100.0	0.0
	BIS(2-CHLOROETHOXY)METHANE	R	0.0	0.0	100.0	0.0
	BIS(2-CHLOROETHYL)ETHER	R	0.0	0.0	100.0	0.0
	BIS(2-ETHYLHEXYL)PHTHALATE	C	0.0	0.0	66.7	0.0
		R	0.0	0.0	33.3	0.0
	BUTYL BENZYL PHTHALATE	R	0.0	0.0	100.0	0.0
	CHLOROBENZILATE	R	0.0	0.0	100.0	0.0
	DIALLATE	R	0.0	0.0	100.0	0.0
	DIBENZOFURAN	R	0.0	0.0	100.0	0.0
	DIETHYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DIMETHYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DI-N-BUTYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DI-N-OCTYL PHTHALATE	R	0.0	0.0	100.0	0.0
	DIPHENYLAMINE	R	0.0	0.0	100.0	0.0
	ETHYL METHANE SULFONATE	R	0.0	0.0	100.0	0.0
	FLUORANTHENE	P	100.0	0.0	0.0	0.0
	HEXACHLOROBENZENE	C	0.0	0.0	66.7	0.0
		R	0.0	0.0	33.3	0.0
	HEXACHLOROBUTADIENE	R	0.0	0.0	100.0	0.0
	HEXACHLOROCYCLOPENTADIENE	C	0.0	0.0	75.0	0.0
		R	0.0	0.0	25.0	0.0

TABLE H-18

TALLY OF QUALIFICATION RATES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	HEXACHLOROETHANE	R	0.0	0.0	100.0	0.0
	HEXACHLOROPROPENE	R	0.0	0.0	100.0	0.0
	ISODRIN	R	0.0	0.0	100.0	0.0
	ISOPHORONE	R	0.0	0.0	100.0	0.0
	ISOSAFROLE	R	0.0	0.0	100.0	0.0
	KEPONE	C	0.0	0.0	75.0	0.0
		CR	0.0	0.0	25.0	0.0
	METHAPYRILENE	C	0.0	0.0	75.0	0.0
		CR	0.0	0.0	25.0	0.0
	METHYL METHANE SULFONATE	R	0.0	0.0	100.0	0.0
	N-NITROSODIETHYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSODIMETHYLAMINE	C	0.0	0.0	50.0	0.0
		CR	0.0	0.0	50.0	0.0
	N-NITROSO-DI-N-BUTYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSO-DI-N-PROPYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSODIPHENYLAMINE	R	0.0	0.0	100.0	0.0
	N-NITROSOMETHYLETHYLAMINE	C	0.0	0.0	75.0	0.0
		CR	0.0	0.0	25.0	0.0
	N-NITROSOMORPHOLINE	R	0.0	0.0	100.0	0.0
	N-NITROSOPIPERIDINE	R	0.0	0.0	100.0	0.0
	N-NITROSOPYRROLIDINE	R	0.0	0.0	100.0	0.0
	O,O,O-TRIETHYL PHOSPHOROTHIOATE	R	0.0	0.0	100.0	0.0
	O-TOLUIDINE	R	0.0	0.0	100.0	0.0
	P-(DIMETHYLAMINO)AZOBENZENE	R	0.0	0.0	100.0	0.0
	PENTACHLOROBENZENE	R	0.0	0.0	100.0	0.0
	PENTACHLOROETHANE	R	0.0	0.0	100.0	0.0
	PENTACHLORONITROBENZENE	R	0.0	0.0	100.0	0.0
	PHENACETIN	R	0.0	0.0	100.0	0.0
	PHENANTHRENE	P	100.0	0.0	0.0	0.0
	PHENOL	P	100.0	0.0	0.0	0.0
	PRONAMIDE	R	0.0	0.0	100.0	0.0
	PYRENE	P	100.0	0.0	0.0	0.0
	PYRIDINE	C	0.0	0.0	66.7	0.0
		R	0.0	0.0	33.3	0.0
	SAFROLE	R	0.0	0.0	100.0	0.0
VOC	1,1-DICHLOROETHANE	P	100.0	0.0	0.0	0.0
	1,1-DICHLOROETHENE	P	100.0	0.0	0.0	0.0
	1,2-DICHLOROETHANE	P	100.0	0.0	0.0	0.0
	2-HEXANONE	P	100.0	0.0	0.0	0.0
	ACETONE	A	40.0	0.0	0.0	0.0
		AP	40.0	0.0	0.0	0.0
		B	0.0	100.0	0.0	0.0
		BC	20.0	0.0	0.0	0.0
		C	0.0	0.0	100.0	0.0

TABLE H-18

TALLY OF QUALIFICATION RATES FOR GROUNDWATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
	ACETONITRILE	C	0.0	0.0	0.0	100.0
	ACROLEIN	C	0.0	0.0	0.0	100.0
	BENZENE	P	100.0	0.0	0.0	0.0
	BROMOMETHANE	C	0.0	0.0	100.0	0.0
	CHLOROFORM	P	100.0	0.0	0.0	0.0
	CIS-1,2-DICHLOROETHENE	P	100.0	0.0	0.0	0.0
	DICHLORODIFLUOROMETHANE	C	0.0	0.0	80.0	0.0
		E	0.0	0.0	20.0	0.0
	ETHYLBENZENE	P	100.0	0.0	0.0	0.0
	ISOBUTANOL	C	0.0	0.0	0.0	100.0
	METHYLENE CHLORIDE	C	0.0	0.0	100.0	0.0
	PROPIONITRILE	C	0.0	0.0	0.0	100.0
	TETRACHLOROETHENE	P	100.0	0.0	0.0	0.0
	TOLUENE	P	100.0	0.0	0.0	0.0
	TRANS-1,2-DICHLOROETHENE	P	100.0	0.0	0.0	0.0
	TRICHLOROETHENE	P	100.0	0.0	0.0	0.0

EXP = Explosives
M = Metals, total
MF = Metals, dissolved
SVOc = Semivolatile organic compounds
VOC = Volatile organic compounds

J = Result is estimated
U = Analyte was not detected at the indicated detection limit
UJ = Analyte was not detected at the indicated detection limit and result is estimated
UR = Result is not usable and was reported as not detected

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
I = ICP Serial Dilution Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
R = Surrogates Recovery Noncompliance
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC

TABLE H-19

TALLY OF QUALIFICATION RATES FOR SEEP WATER (BEFORE OCTOBER 2006)
SWMU 8 - BUILDING 106 POND AREA
NSWC CRANE
CRANE, INDIANA

			Validation Qualifier			
fraction	parameter	qual_code	J	U	UJ	UR
M	ALUMINUM	A	100.0	0.0	0.0	0.0
	ANTIMONY	A	0.0	100.0	0.0	0.0
	ARSENIC	A	100.0	0.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	BERYLLIUM	A	100.0	0.0	0.0	0.0
	CALCIUM	AG	100.0	0.0	0.0	0.0
	COPPER	A	100.0	0.0	0.0	0.0
	MERCURY	P	100.0	0.0	0.0	0.0
	SELENIUM	P	100.0	0.0	0.0	0.0
	SODIUM	A	100.0	0.0	0.0	0.0
	THALLIUM	AP	100.0	0.0	0.0	0.0
	TIN	AP	100.0	0.0	0.0	0.0
	ZINC	AK	100.0	0.0	0.0	0.0
MF	ANTIMONY	A	0.0	100.0	0.0	0.0
	ARSENIC	A	0.0	100.0	0.0	0.0
	BARIUM	A	100.0	0.0	0.0	0.0
	CADMIUM	A	0.0	100.0	0.0	0.0
	CALCIUM	A	100.0	0.0	0.0	0.0
	CHROMIUM	P	100.0	0.0	0.0	0.0
	COPPER	A	0.0	100.0	0.0	0.0
	LEAD	P	100.0	0.0	0.0	0.0
	SELENIUM	P	100.0	0.0	0.0	0.0
	SODIUM	A	100.0	0.0	0.0	0.0
	THALLIUM	A	0.0	100.0	0.0	0.0
	TIN	A	0.0	100.0	0.0	0.0
	ZINC	KP	100.0	0.0	0.0	0.0
VOC	ACETONE	C	0.0	0.0	100.0	0.0
	ACETONITRILE	C	0.0	0.0	0.0	100.0
	ACROLEIN	C	0.0	0.0	0.0	100.0
	BROMOMETHANE	C	0.0	0.0	100.0	0.0
	DICHLORODIFLUOROMETHANE	E	0.0	0.0	100.0	0.0
	ISOBUTANOL	C	0.0	0.0	0.0	100.0
	METHYLENE CHLORIDE	C	0.0	0.0	100.0	0.0
	PROPIONITRILE	C	0.0	0.0	0.0	100.0

M = Metals, total
MF = Metals, dissolved
VOC = Volatile organic compounds

J = Result is estimated
U = Analyte was not detected at the indicated detection limit
UJ = Analyte was not detected at the indicated detection limit and result is estimated
UR = Result is not usable and was reported as not detected

A = Lab Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
E = LCS/LCSD Recovery Noncompliance
G = Field Duplicate Imprecision
K = ICP Interference - includes ICS % R Noncompliance
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)

APPENDIX I

SUPPORTING DOCUMENTATION FOR THE HUMAN HEALTH RISK ASSESSMENT

(See separate subfolder on this CD for Appendix I information)

APPENDIX J

SUPPORTING DOCUMENTATION FOR THE ECOLOGICAL RISK ASSESSMENT

APPENDIX J.1
CHECKLIST FOR ECOLOGICAL RISK ASSESSMENT/SAMPLING

Checklist for Ecological Assessment/Sampling

I. SITE DESCRIPTION

1. Site Name: NSWC CRANE

   Location: SWMU 08 - BUILDING 106 POND

   County: MARTIN City: CRANE State: IN

2. Latitude: 38.8354393206 Longitude: -86.8646048211

3. What is the approximate area of the site? 5.8 ACRES

4. Is this the first site visit? ☑ yes ☐ no If no, attach trip report of previous site visit(s), if available.

   Date(s) of previous site visit(s): 1st VISIT FOR ecological assessment. Other visits were made to collect groundwater, SURFACE WATER, SOIL & SEDIMENT (SEE RFI - to WHICH this Checklist is Attached)

5. Please attach to the checklist USGS topographic map(s) of the site, if available.

   SEE FIGURE J-1 OF this REPORT.

6. Are aerial or other site photographs available? ☐ yes ☐ no If yes, please attach any available photo(s) to the site map at the conclusion of this section.

   AERIAL PHOTOGRAPHY - SEE FIGURE J-2 (SHOWING SWMU 08 BOUNDARY) and FIGURE J-3 (SHOWING one mile RADIUS) of this REPORT.

   GROUND PHOTOGRAPHY - SEE PHOTOS Attached to this Checklist (PHOTOS A → F) and APPENDIX A of the RFI of WHICH this Checklist is Attached.

7. The land use on the site is:

- % Urban
- % Rural
- % Residential
31.0 % Industrial (☒ light ☐ heavy)
- % Agricultural
(Crops: NA)
- % Recreational
(Describe; note if it is a park, etc.)
NA
- % Undisturbed
69 % Other { WOODED - 40.0 %; MAINTAINED GRASS - 27.5 %; POND - 1.5 % }

The area surrounding the site is:
one mile radius

- % Urban
- % Rural
- % Residential
.3 % Industrial (☐ light ☐ heavy)
- % Agricultural
(Crops: NA)
- % Recreational
(Describe; note if it is a park, etc.)
NA
- % Undisturbed
88.7 % Other { WOODED - 75.3 %; MAINTAINED GRASS - 13.4 % }

8. Has any movement of soil taken place at the site? ☐ yes ☒ no. If yes, please identify the most likely cause of this disturbance: Not RECENTLY.

_____ Agricultural Use _____ Heavy Equipment _____ Mining

_____ Natural Events _____ Erosion _____ Other

Please describe:

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information.*

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

SWMU 08 is outside of FEMAs Floodplain (Zone A). Martin County Soil Survey considers this site as poor to very poor for wetland plants and very poor for wetland wildlife.

10. What type of facility is located at the site?

☐ Chemical ☑ Manufacturing ☐ Mixing ☐ Waste disposal

☐ Other (specify)_____

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels?

See Section 3, 5, etc. of the RFI to which this checklist is attached.

12. Check any potential routes of off-site migration of contaminants observed at the site:

☑ Swales ☐ Depressions ☑ Drainage ditches

☑ Runoff ☐ Windblown particulates ☐ Vehicular traffic

☑ Other (specify) intermittent stream

13. If known, what is the approximate depth to the water table? 7-20 ft - shallow wells (12/05)

14. Is the direction of surface runoff apparent from site observations? ☑ yes ☐ no If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

☑ Surface water ☐ Groundwater ☐ Sewer ☐ Collection impoundment

15. Is there a navigable waterbody or tributary to a navigable waterbody? ☐ yes ☑ no

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist -- Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist -- Flowing Systems.

☑ yes (approx. distance on site, 106 pond) ☐ no However, this pond WAS AN impoundment in the past - RECEIVING drinage WATER discharge FROM BUILDINGS 106 & 107 (See Section 1.2.2 to WHICH this checklist is attached.

17. Is there evidence of flooding? ☐ yes ☑ no *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information.* If yes, complete Section V: Wetland Habitat Checklist.

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. [Use a blank sheet if additional space is needed for text.]

NA

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? ☐ yes ☑ no *If yes, you are required to verify this information with the U.S. Fish and Wildlife Service.* If species' identities are known, please list them next.

For additional information see section 8.2.1.1 to WHICH this checklist is attached.

20. Record weather conditions at the time this checklist was prepared:

DATE: 10/16/05

60's Temperature (°C/°F) — Normal daily high temperature

CALM Wind (direction/speed) NONE Precipitation (rain, snow)

Mostly Sunny Cloud cover 0-10%

IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

SWMU 08 is approximately 5.8 acres in size – light industry comprises 31.0% (1.8 acres) and consists of several buildings (B-106, 107 and 2722), asphalt roads (including H-105, etc.), railroad (R-1), a pumping station, an electric substation and a gravel storage lay down area. An overview of this land use type (associated with light industry) can be seen in Photos A, B, C, E and F. Other comprises 69% of SWMU 08 and consists of 40% (2.3 acres) wooded, 27.5% (1.6 acres) maintained grass associated with the aforementioned buildings and a transmission line corridor and 1.5% (0.1 acre) pond.

The on site pond (106 pond) currently receives no discharge water or surface runoff nor does it have a discharge point. Historically it received discharge from Buildings 106 and 107 via drainage pipes (See "Site History" Section 1.2.2 of the report to which this "Checklist" is attached). The pond was void of emergent aquatic vegetation (See Photo D). Other aquatic vegetation at 106 pond wasn't observed; additionally, the Marten County Soil Survey considers this site as poor to very poor for supporting wetland plants.

The wooded area within the boundary of SWMU 08 (See Figure J-1) is a strongly sloping woodlot with black oak, red oak, sycamore, tulip poplar, black locust, red maple and black walnut as common species in the tree canopy. Sassafras, hawthorn sp., flowering dogwood, American elm and red maple are common species in the understory.

The intermittent stream dissecting the wooded area in the southwest portion of SWMU 08 receives most of the SWMU's surface water runoff, as well as, the drainage from the ditches located on both sides of the site's access road (H-105). This intermittent stream diverts the surface water from SWMU 08 to Boggs Creek tributaries. Boggs Creek in turn flows into Lake Gallimore near the southern boundary of NSWC Crane then continues to flow out of Lake Gallimore until it ultimately discharges into the East Fork of the White River.

Wildlife sign observed on site included whitetail deer.

See attached aerials (Figures J-2 and J-3) and ground photographs (associated with Figure J-1 and discussed above) to enhance site familiarity; also, see ground photographs associated with site surface water drainage in Appendix A of the report to which this "Checklist" is attached.

Completed by: Terry Rojahn Affiliation: Tetra Tech NUS

Additional Preparers_____

Site Manager – Ralph Basinski

Date: 2/07/2006

II. TERRESTRIAL HABITAT CHECKLIST

IIA. WOODED

1. Are there any wooded areas at the site? ☑ yes ☐ no If no, go to Section IIB: Shrub/Scrub.

2. What percentage or area of the site is wooded? (40 % 2.3 acres). Indicate the wooded area on the site map which is attached to a copy of this checklist. Please identify what information was used to determine the wooded area of the site. Combination of ground truthing and aerial photography (See Figure J-2 of this checklist).

3. What is the dominant type of vegetation in the wooded area? (Circle one: Evergreen/Deciduous/Mixed) Provide a photograph, if available.

   Dominant plant, if known: SEE Section IA of this Checklist.

4. What is the predominant size of the trees at the site? Use diameter at breast height.

   ☐ 0-6 in. ☑ 6-12 in. ☐ > 12 in.

5. Specify type of understory present, if known. Provide a photograph, if available.

   SEE SECTION IA of this Checklist.

IIB. SHRUB/SCRUB -- only under wooded AREA.

1. Is shrub/scrub vegetation present at the site? ☐ yes ☑ no If no, go to Section IIC: Open Field.

2. What percentage of the site is covered by scrub/shrub vegetation? (_____% _____ acres). Indicate the areas of shrub/scrub on the site map. Please identify what information was used to determine this area.

3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photograph, if available.

4. What is the approximate average height of the scrub/shrub vegetation?

   ☐ 0-2 ft. ☐ 2-5 ft. ☐ > 5 ft.

5. Based on site observations, how dense is the scrub/shrub vegetation?

☐ Dense ☐ Patchy ☐ Sparse

IIC. OPEN FIELD

1. Are there open (bare, barren) field areas present at the site? ☐ yes ☑ no If yes, please indicate the type below:

☐ Prairie/plains ☐ Savannah ☐ Old field ☐ Other (specify)_____

2. What percentage of the site is open field? (_____% _____ acres). Indicate the open fields on the site map.

3. What is/are the dominant plant(s)? Provide a photograph, if available.

4. What is the approximate average height of the dominant plant?_____

5. Describe the vegetation cover: ☐ Dense ☐ Sparse ☐ Patchy

IID. MISCELLANEOUS

1. Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub, and open field? ☑ yes ☐ no If yes, identify and describe them below.

Maintained grassy areas associated with buildings and transmission line corridor (see Figure J-1) and photos A & E.

2. Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map.

Areas of dense maintained grass are shown on Figure J-1 of this Checklist.

. if any, were made at the site regarding the presence and/or absence of insects, fish, birds,

/ deer sign

ns in Section I to determine if any additional habitat checklists should be completed for this site.

Photo A – Building 106 Pond behind fence (note the gate – photo center) and pumping station (right)

Photo B – Gravel lay down area with wooded area in the background

Photo C – South end of SWMU 08

Photo D – Building 106 Pond

Photo E – Building 2722 with maintained grass in foreground

Photo F – General view of SWMU 08 facing south from the SWMU's northern boundary

APPENDIX J.2
PHYSICAL AND CHEMICAL CHARACTERISTICS OF ECOLOGICAL COPC CLASSES

APPENDIX J.2

This appendix presents a discussion of the different chemical classes that were detected in environmental media at SWMU 8, including toxicity information, potential food chain and trophic transfer, and bioaccumulation potential. Appendix Table J.2-1 presents the bioaccumulation factors (BAFs) that were used in the surrogate species' food-chain models for the individual constituents that are detected at SWMU 8. The sources for most of the BAFs are presented in section 8.4.2.1 of the Ecological Risk Assessment (ERA), while the text below discusses some additional sources of the BAFs, where necessary. Note that dry weight BAFs were used for this ERA.

Volatile Organic Compounds

VOCs are usually very mobile in the environment because they are poorly adsorbed to soil and sediment particles. Also, because they are very volatile, they typically are only detected in surface water, surface soil, and sediment at low concentrations.

Most VOCs have very little potential to bioaccumulate in ecological receptors; therefore, biomagnification through the food chain does not appear to be significant. VOCs are not expected to biomagnify in plants and are typically only toxic to ecological receptors at relatively high concentrations.

Semivolatile Organic Compounds

The most common semivolatile organic compounds that are found at naval facilities include PAHs and phthalates. PAHs are a diverse group of compounds consisting of two or more substituted and unsubstituted polynuclear aromatic rings formed by the incomplete combustion of carbonaceous materials. PAHs are ubiquitous in the modern environment and are common constituents of coal tar, soot, vehicle exhaust, cigarette smoke, certain petroleum products, road tar, mineral oils, creosote, and many cooked foods. PAHs also are released to the environment through natural sources such as volcanoes and forest fires.

PAHs are transferred from surface water by volatilization and sorption to settling particles. The compounds are transformed in surface water by photooxidation, chemical oxidation, and microbial metabolism (ATSDR, 1989). In soil and sediments, microbial metabolism is the major process for degradation of PAHs (ATSDR, 1989). Although PAHs accumulate in terrestrial and aquatic plants, many organisms are able to metabolize and eliminate these compounds. Vertebrates can readily metabolize PAHs, but lower forms (insects and worms) cannot

metabolize PAHs as quickly. However, food chain uptake does not appear to be a major exposure source to PAHs for aquatic animals (ATSDR, 1989).

PAHs vary substantially in their toxicity to aquatic organisms. In general, toxicity increases as molecular weight increases, with the exception of some high molecular weight PAHs that have low acute toxicity. Most species of aquatic organisms rapidly accumulate PAHs that occur at low concentrations in the ambient medium. However, uptake of PAHs is highly species-specific, it is higher in algae, mollusks, and other species that are incapable of metabolizing PAHs (Eisler, 1987). The ability of fish to metabolize PAHs may explain why benzo(a)pyrene is frequently not detected or is found at only very low levels in fish from environments heavily contaminated with PAHs (ATSDR, 1989).

Phthalates are semivolatile organic compounds that are used in production of plastics (ATSDR, 1993). Most phthalates are expected to sorb to soil or sediment particles after their release because of their high Log K_{OC} values (Howard, 1989). Some phthalates may bioconcentrate in aquatic organisms [Spectrum Laboratories, 1999; Howard, 1989; ATSDR, 1989].

Metals

Many metals occur naturally at various concentrations in the surface water and sediment primarily to chemical weathering of rocks and fallout from volcanoes. Most metals are toxic to aquatic (i.e., fish, invertebrates) and terrestrial (i.e., plants, invertebrates, vertebrates) ecological receptors above certain concentrations, with some metals being more toxic at lower concentrations than others. Also, different chemical forms of the metals may be more toxic than others. For example, hexavalent chromium is typically more toxic than trivalent chromium, and methyl mercury is more toxic than inorganic mercury. In addition, the toxicity of several metals (cadmium, chromium, copper, lead, nickel, silver, and zinc) to aquatic receptors in freshwater systems decreases with increasing water hardness.

Many factors (e.g., pH, Eh, clay content, organic matter content) influence the bioavailability of metals to invertebrates in sediment. One way to estimate the bioavailable portion of certain divalent metals (cadmium, copper, lead, nickel, and zinc) in sediment is to measure the amount of acid volatile sulfides (AVS) and simultaneously extracted metals (SEM) in a sediment sample. If the molar concentration of AVS is higher than the molar concentration of SEM, then the SEM metals are expected to be unavailable and non-toxic to aquatic invertebrates. AVS plays little or no role in determining interstitial water concentrations of metals in aerobic systems or those with

low productivity (i.e., where the absence of organic carbon limits sulfate reduction) (Ankley et al., 1995), or when ingestion of sediments is the primary exposure route (Lee et al., 2000).

References:

Agency for Toxic Substances and Disease Registry (ATSDR). 1989a. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. U.S. Public Health Service. Atlanta, Georgia. October.

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological Profile for Di(2-ethylhexyl)phthatate. U.S. Public Health Service, as found in Lakes Environmental Toxic Factsheet web site (http://www.lakes-environmental.com).

Ankley, Gerald T., D.M. Di Toro, D.J. Hansen, and W.J. Berry. 1995. Technical Basis and Proposal for Deriving Sediment Quality Criteria for Metals. Environmental Toxicology and Chemistry. Vol. 15(12), pp. 2056-2066.

Eisler, Ronald. 1987. Polycyclic Aromatic Hydrocarbon Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review. US Department of Interior - Fish and Wildlife Service. Biological Report 85 (1.11). May

Howard, Philip, ed. 1989. Handbook and Environmental Fate and Exposure Data for Organic Chemicals, Volume I – Large Production and Priority Pollutants. Lewis Publishers, Inc.

Lee, Byeong-Gweon, Sarah B. Griscom, Jung-Suk Lee, Heesun J. Choi, Chul-Hwan Koh, Samuel N Lucoma, and Nicvholas S. Fisher. 2000. Influences of Dietary Uptake and Reactive Sulfides on Metal Bioavailability from Aquatic Sediments. Science, Volume 287, pp. 282-284. January 14.

Spectrum Laboratories, 1999. Chemical Facts sheets, (http://www.spectrum.com)

TABLE J.2-1
DRY WEIGHT BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, FISH, AND SEDIMENT INVERTEBRATES

Chemicals	Plant BAFs[1,2]		Earthworm BAFs[3]		Fish BSAFs[4]		Sediment Invertebrate BSAFs[5]	
	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]
Semivolatile Organics								
Acenaphthylene	2.70E-01	2.70E-01	6.69E-01	2.56E-01	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Pyrene	5.50E-02	5.50E-02	6.69E-01	2.56E-01	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Inorganics								
Arsenic	1.10E+00	3.75E-02	5.23E-01	2.24E-01	1.00E+00	1.00E+00	6.90E-01	1.43E-01
Cadmium	3.25E+00	5.86E-01	4.07E+01	7.71E+00	1.00E+00	1.00E+00	7.99E+00	6.00E-01
Chromium	8.39E-02	4.10E-02	3.16E+00	3.06E-01	1.00E+00	1.00E+00	4.68E-01	1.00E-01
Copper	6.25E-01	1.24E-01	1.53E+00	5.15E-01	1.00E+00	1.00E+00	5.25E+00	1.56E+00
Lead	4.68E-01	3.89E-02	1.52E+00	2.66E-01	1.00E+00	1.00E+00	6.07E-01	7.10E-02
Mercury	5.00E+00	6.52E-01	2.06E+01	1.69E+00	1.00E+00	1.00E+00	2.87E+00	1.14E+00
Nickel	1.41E+00	1.80E-02	4.73E+00	1.06E+00	1.00E+00	1.00E+00	2.32E+00	4.86E-01
Selenium	3.01E+00	6.72E-01	1.34E+00	9.85E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Zinc	1.82E+00	3.66E-01	1.29E+01	3.20E+00	1.00E+00	1.00E+00	7.53E+00	1.94E+00

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median value
3 - Sample et al., (February, 1998) for all chemicals; conservative value is 90th percentile; average value is median value
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures. Values for organic chemicals are the same for wet-weight and dry weight.
5 - ORNL (August, 1998) for all chemicals; conservative value is 90th percentile; average value is median value
6 - Conservative and average refers to the exposure scenarios for which the uptake factors are used

Default value of 1 is assigned to parameters without uptake factors

APPENDIX J.3
SURROGATE TERRESTRIAL RECEPTOR PROFILES

APPENDIX J.3

The following sections present the receptor profiles for the representative herbivorous, insectivorous, and piscivorous receptors chosen for foodchain modeling at SWMU 8. The majority of the information for the profiles was obtained from the Wildlife Exposure Factors Handbook (U.S. EPA, 1993). The data for the incidental soil ingestion rates were obtained from the Estimates of Soil Ingestion by Wildlife (Beyer, 1994) or the U.S. EPA Ecological Soil Screening Guidance (U.S. EPA, 2005).

The food and water ingestion rates are listed in g/g (of body weight)-day on a wet weight basis but were converted to dry weight for the ERA using the exposure factors presented below. The home ranges are presented in hectares in U.S. EPA (1993) but were converted to acres by multiplying the number of hectares by 2.471. The only exception is the kingfisher's range, which is presented in km of shoreline. Also note that the estimated percent of soil in the diets are listed in dry weight.

Short-Tailed Shrew (*Blarina brevicauda*)

Shrews inhabit a wide variety of habitats and are common in areas with abundant vegetative cover. They need cool, moist habitats because of their high metabolic and water-loss rates. The short-tailed shrew is primarily carnivorous, eating insects and other invertebrates such as earthworms, slugs, and snails.

The adult body weight for the short-tailed shrew in various habitats ranged from 0.015 to 0.01921 kg with an average of 0.0169 kg. The listed food ingestion rates for shrews are between 0.43 and 0.96 g/g-day (wet-weight). The water ingestion rate was listed as 0.223 g/g-day. The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown on Table 8-14. The food ingestion rates were then multiplied by 0.16 in the food chain model, which is the percent solids of worms (Sample et al., 1997) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (3% for conservative food chain model and 0.9% for the average food chain model) from U.S. EPA (February 2005). 3% is the 90th percentile value and 0.9% is the 50th percentile value from U.S. EPA (February 2005). The only available home range for the shrew (0. 9699 acres) was calculated using data from a tamarack bog in Manitoba (only value available).

American Woodcock (*Scolopax minor*)

Woodcocks inhabit both woodlands and abandoned fields, particularly those with rich and moderately to poorly drained loamy soils, which tend to support abundant earthworm populations. They feed primarily on invertebrates found in moist upland soils by probing the soil with their long prehensile-tipped bill. Earthworms are their preferred diet, but seeds and other plant matter may also be consumed.

The adult body weight for the woodcock ranges from 0.166 to 0.213 kg with an average of 0.190 kg. The listed food ingestion rates for the woodcock are between 0.73 and 1.0 g/g-day (wet-weight). The water ingestion rate is listed as 0.1 g/g-day. The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown in Table 8-14. The food ingestion rates were then multiplied by 0.16 in the food chain model, which is the percent solids of worms (Sample et al., 1997) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 16.4% for conservative food chain model and 6.4% for the average food chain model) from U.S. EPA (February 2005). 16.4% is the 90th percentile value and 6.4% is the 50th percentile value from U.S. EPA (February 2005).

The range of home range sizes for the woodcock is 7.66 to 182 acres with an average home range of 61 acres.

Meadow Vole (*Microtus pennsylvanicus*)

Meadow voles inhabit grassy fields, marshes, and bogs; however, they prefer fields with more grass, more cover, and fewer woody plants. They typically consume green succulent vegetation, sedges, seeds, roots, bark, fungi, insects, and animal matter. However, green succulent vegetation makes up the majority of their diet.

The adult body weight for the vole ranges from 0.0329 to 0.0391 kg with an average of 0.0366 kg. The only listed food ingestion rates for voles range from 0.30 to 0.35 g/g-day (wet-weight), with an average of 0.325 g/g-day. The water ingestion rates are 0.14 (estimated) and 0.21 g/g-day, with an average of 0.175 g/g-day. The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown in Table 8-14. The food ingestion rates were then multiplied by 0.15 in the food chain model, which is the percent solids of plant foliage (U.S. EPA, February 2005), to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 3.2% for conservative food chain model and 1.2% for the average food chain model) from U.S. EPA (February 2005). 3.2% is the 90th percentile value and 1.2% is the 50th percentile value from U.S. EPA (February 2005).

The range of home range sizes for the meadow vole is 0.0297 to 1.06 acres with an average home range of 0.16 acres.

Northern Bobwhite Quail (*Colinus virginianus*)

Quails inhabit grasslands, idle fields, pastures, and large clumps of grasses. Bobwhite quails forage in areas with open vegetation, some bare ground, and light litter. Seeds from weeds, woody plants, and grasses comprise the majority of an adult's diet, although green vegetation has been found to dominate the diet of this

species in winter in the southern areas of the United States.

The adult body weight for the bobwhite quail ranges from 0.162 to 0.186 kg with an average of 0.177 kg. The listed food ingestion rates for quails range from 0.067 to 0.093 g/g-day (wet-weight), with an average of 0.082 g/g-day. The water ingestion rate ranges from 0.086 to 0.131 g/g-day, with an average water ingestion rate of 0.104 g/g-day. The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown on Table 8-14. The food ingestion rates were then multiplied by 0.15 in the food chain model, which is the percent solids of plant foliage (U.S. EPA, February 2005), to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (assumed 13.9% for conservative food chain model and 6.1% for the average food chain model) from U.S. EPA (February 2005). 13.9% is the 90th percentile value and 6.1% is the 50th percentile value for the mourning dove from U.S. EPA (February 2005).

The home range for the quail ranges from 16 to 41 acres with an average home range of 29 acres.

Belted Kingfisher *Ceryle alcyon)*

Belted kingfishers are typically found along rivers, streams, and the edges of lakes and ponds. They are also common along seacoasts and estuaries. They prefer water that is free of thick vegetation and overhanging trees that obscure the view of the water. Because kingfishers eat primarily fish that swim near the surface or in shallow water, they require relatively clear water to see and catch their prey. Although kingfishers feed predominantly on fish, they have been know to consume crayfish, crabs, mussels, lizards, frogs, toads, small snakes, turtles, insects, salamanders, newts, young birds, mice, and berries.

Based on data from Michigan, Pennsylvania, Ohio, and Minnesota; the adult body weights range from 0.136 to 0.170 kg, with an average of 0.152 kg. Based on data from Michigan, the listed food ingestion rates range from 0.41 to 0.5 g/g-day. The water ingestion rate is estimated as 0.11 g/g-day. The food ingestion rates were then multiplied by 0.25 in the food chain model, which is the percent solids of fish (Sample et al., 1997) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental sediment ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (3.3 percent), based on the mallard in Beyer (1994).

The home range for the kingfisher ranges from 0.39 to 2.185 km of shoreline, based on data from streams in Pennsylvania and Ohio.

Mink (Mustela vison)

Minks are the most abundant and widespread carnivorous mammals in North America. They are found associated with every type of aquatic habitat including waterways such as rivers, streams, lakes, ditches,

swamps, marshes, and backwater areas. Minks prefer irregular shorelines and tend to use brushy or wooded cover adjacent to the water, where prey is abundant and downfall and debris provide den sites. Mammals are minks' most important prey year round in many parts of their range, but they also hunt aquatic species such as fish, amphibians, and crustaceans.

The adult body weight for the mink in various habitats ranged from 0.55 to 1.734 kg with an average of 1.02 kg. The listed food ingestion rates for minks range from 0.12 to 0.22 g/g-day (wet-weight). The water ingestion rates range from 0.028 to 0.11 g/g-day. The food and water ingestion rates in kg/day and L/day, respectively, were calculated as shown in Table 8-14. The food ingestion rates were then multiplied by 0.25 in the food chain model, which is the percent solids of fish (Sample et al., 1997) to convert the ingestion rate from a wet-weight value to a dry-weight value. The incidental sediment ingestion rate was calculated by multiplying the ingestion rate by the percentage of sediment that is incidentally ingested (4.3% for conservative food chain model and 1.3% for the average food chain model) from U.S. EPA (February 2005). 4.3% is the 90th percentile value and 1.3% is the 50th percentile value for the weasel from U.S. EPA (February 2005), because an incidental sediment ingestion rate is not available for the mink.

The home range for the mink in riverine areas ranged from 19.3 to 50.4 acres, with an average of 34.85 acres. (U.S. EPA, 1993).

References:

Beyer, N., E. Connor, and S. Gerould. 1994. Estimates of Soil Ingestion by Wildlife. Journal of Wildlife Management 58(2) pp. 375-382.

Sample, B.E., M.S. Aplin, R.A. Efroymson, G.W., Suter II, and C.J.E. Welsh. 1997. Methods and Tools for Estimation of the Exposure of Terrestrial Wildlife to Contaminants. Oak Ridge National Laboratory. October. ORNL/TM-13391.

U.S. EPA (U.S. Environmental Protection Agency), 1993. Wildlife Exposure Factors Handbook. U.S. Environmental Protection Agency. Office of Research and Development. Washington, D.C. December 1993. EPA/600/R-93/187a.

U.S. EPA (U.S. Environmental Protection Agency), 2005. Ecological Soil Screening Level Guidance. Office of Emergency and Remedial Response. February

TABLE J.3-1

CALCULATION OF EXPOSURE PARAMETERS FOR SURROGATE WILDLIFE RECEPTORS

Exposure Parameters	Meadow Vole		Short-Tailed Shrew		American Woodcock	Bobwhite Quail		Belted Kingfisher	Mink
Body Weights (g)	32.9		17.61	16.87	168	180	181	150	1734
	39.1		17.33	15.58	209	168	183	136	974
	35.5		19.21	15.7	166	162	179	158	1040
	39		17.4	15.25	212	175	175	147	1233
					169	178	183.2	148	550
					213	179	185.5	170	586
						180	173		
						162.8	180.4		
Minimum	***32.9***		***15.25***		***166***	***162***		***136***	***550***
Maximum	***39.1***		***19.21***		***213***	***186***		***170.0***	***1734***
Average	***36.6***		***16.87***		***190***	***177***		***152***	***1019.5***
Food Ingestion Rate (g/g-day) (1)	0.3		0.49	0.77	1.0	0.067	0.079	0.5	0.13
	0.35		0.62	0.55	0.77	0.072	0.093	0.41	0.12
			0.43	0.96	0.73	0.09	0.089		0.16
			0.52	0.54					0.22
Minimum	***0.3***		***0.43***		***0.73***	***0.067***		***0.41***	***0.12***
Maximum	***0.35***		***0.96***		***1.0***	***0.093***		***0.5***	***0.22***
Average	***0.325***		***0.61***		***0.8***	***0.082***		***0.455***	***0.1575***
Food Ingestion Rate (kg/day)									
Conservative	***1.28E-02***		***1.62E-02***		***1.90E-01***	***1.64E-02***		***0.0758***	***0.2243***
Average	***1.19E-02***		***1.03E-02***		***1.58E-01***	***1.44E-02***		***0.0689***	***0.1606***
Water Ingestion Rate (g/g-day) (1)	0.14	0.21	0.223		0.1	0.115	0.1	0.11	0.11
					0.1	0.106	0.131		0.099
						0.093	0.101		0.028
						0.086	0.102		
						0.11	0.1		
Minimum	***0.14***		***0.223***		***0.1***	***0.086***		***0.11***	***0.028***
Maximum	***0.21***		***0.223***		***0.1***	***0.131***		***0.11***	***0.11***
Average	***0.175***		***0.223***		***0.1***	***0.104***		***0.110***	***0.079***
Water Ingestion Rate (L/day)									
Conservative	***7.69E-03***		***4.28E-03***		***2.13E-02***	***2.31E-02***		***0.0187***	***0.1907***
Average	***6.41E-03***		***3.76E-03***		***1.90E-02***	***1.84E-02***		***0.0167***	***0.0805***
Home Range (Ha)(2)	0.43	0.097	0.3925		4.5	7.6		2.185	7.8
	0.019	0.041			32.4	16.7		1.028	20.4
	0.013	0.033			3.1	6.4		1.03	
	0.012	0.013			73.6	15.6		0.39	
	0.043	0.057			10.5				
	0.023	0.032							
	0.051	0.078							
	0.058	0.061							
Minimum (acres)	***0.0297***		***0.97***		***7.7***	***16***		***0.39***	***19***
Maximum (acres)	***1.06***		***0.97***		***182***	***41***		***2.19***	***50***
Average (acres)	***0.16***		***0.97***		***61***	***29***		***1.16***	***35***

Notes:
Source of data is U.S. EPA (1993). If values from several studies are available, they are given.
The minimum, maximum, and average values are derived from these studies.

Footnotes:
(1) - Ingestion Rates (kg/day or L/day) (if more than 1 ingestion rate is available)
- Conservative value = Max Ingestion Rate (g/g-day) * Avg. Body Weight
- Average value = Avg. Ingestion Rate (g/g-day) * Avg. Body Weight

Ingestion Rates (L/day) (if only 1 ingestion rate is available)
- Conservative value = Ingestion Rate (g/g-day) * Max. Body Weight
- Average value = Ingestion Rate (g/g-day) * Avg. Body Weight

(2) - The home range units for the Belted Kingfisher are kilometers of shoreline instead of hectares or acres.

APPENDIX J.4
TOXICITY REFERENCE VALUES

TABLE J.4-1

BODY WEIGHTS OF TEST SPECIES USED FOR BODY WEIGHT SCALING AND EXPOSURE PARAMETERS FOR SURROGATE WILDLIFE
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA

Species	Body Weight (kg)			Food Ingestion Rate (kg/day)		Water Ingestion Rate (L/day)		Soil Ingestion Rate (kg/day)		Home Range (acres)		
	Avg.	Min.	Max.	Avg.	Conserv.	Avg.	Conserv.	Avg.	Conserv.	Avg.	Min.	Max.
Potential Test Species[1]												
Rat[2]	0.35	NA	NA	NA		NA		NA		NA		
Old field mouse[3]	0.014	NA	NA	NA		NA		NA		NA		
Mouse[2]	0.03	NA	NA	NA		NA		NA		NA		
Rabbit	3.8	NA	NA	NA		NA		NA		NA		
Mink[4]	1	NA	NA	NA		NA		NA		NA		
Rhesus monkey[4]	5	NA	NA	NA		NA		NA		NA		
Beagle[2]	10	NA	NA	NA		NA		NA		NA		
Surrogate Wildlife Species[5]												
Short-Tailed Shrew	0.01687	0.01525	0.01921	0.0103	0.0162	0.0038	0.0043	0.0002142	0.000337	0.97	0.97	0.97
Meadow Vole	0.03663	0.0329	0.0391	0.0119	0.0128	0.0064	0.0077	0.00008568	0.00009216	0.16	0.03	1.06
Mink	1.02	0.55	1.734	0.1606	0.2243	0.0805	0.1907	0.000522	0.002411	35	19	50

Notes:
See Table 8-14 for the exposure factors.
NA - Not Applicable
1 - Only one value was provided so it was placed in the average column and some generic body weights may have been replaced by study-specific body weights.
2 - U.S. EPA, 1998
3 - Silva and Downing, 1996
4 - U.S. EPA 1993
5 - Source is U.S. EPA, 1993 for all factors except soil ingestion; Beyer (1993).

TABLE J.4-2

MAMMALIAN TRVS USED IN THE CONSERVATIVE SCENARIO FOOD-CHAIN MODELS

Parameter	Mammals				Short-tailed Shrew		Meadow Vole		Mink	
	NOAEL	LOAEL	Test Species	Body Weight (kg)	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
SEMIVOLATILES (mg/kg)										
Acenaphthylene	70	700	mouse	0.03	109.3	1093.2	53.7	537.1	1.2	12.1
Pyrene	7.5	12.5	mouse	0.03	11.7	19.5	5.8	9.6	0.1	0.2
INORGANICS (mg/kg)										
Arsenic	0.126	1.26	mouse	0.03	0.20	2.0	0.10	1.0	0.00	0.02
Cadmium	1	10	rat	0.303	15.77	157.7	7.7	77.5	0.2	1.7
Chromium	3.28	13.14	rat	0.35	59.8	239.4	29.4	117.6	0.7	2.7
Copper	11.71	15.14	mink	1	609.6	788.1	299.5	387.2	6.8	8.7
Lead	8	80	rat	0.35	145.8	1458	71.6	716.1	1.6	16.1
Mercury	0.032	0.16	mink	1	1.7	8.3	0.8	4.1	0.0	0.1
Nickel	40	80	rat	0.35	728.8	1458	358.1	716.1	8.1	16.1
Selenium	0.2	0.33	rat	0.35	3.6	6.0	1.8	3.0	0.0	0.1
Zinc	160	320	rat	0.35	2915.1	5830	1432	2864.5	32.3	65

Acronyms:
NA = Not Applicable or Not Available
NV = No value available
NOAEL = No Observed Adverse Effect Level
LOAEL = Lowest Observed Adverse Effect Level

Maximum Body Weights (kg)
Shrew: 0.01921
Vole: 0.0391
Mink: 1.734

Derivation NOAEL/LOAEL Equation:
Derived NOAEL = NOAEL*(test species body weight/surrogate species maximum body weight
Derived LOAEL = LOAEL*(test species body weight/surrogate species maximum body weight)

Only the chemicals for which NOAELs and LOAELs are available are shown. Chemicals not having NOAELs and LOAELs are not included in this table.

TABLE J.4-3

MAMMALIAN TRVS USED IN THE AVERAGE EXPOSURE SCENARIO FOOD-CHAIN MODELS

Parameter	Mammals				Short-tailed Shrew		Meadow Vole		Mink	
	NOAEL	LOAEL	Test Species	Body Weight (kg)	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
SEMIVOLATILES (mg/kg)										
Acenaphthylene	70	700	mouse	0.03	124.5	1244.8	57.3	573.3	2.1	20.6
Pyrene	7.5	12.5	mouse	0.03	13.3	22.2	6.1	10.2	0.2	0.4
INORGANICS (mg/kg)										
Arsenic	0.126	1.26	mouse	0.03	0.22	2.2	0.10	1.0	0.00	0.04
Cadmium	1	10	rat	0.303	18.0	179.6	8.3	82.7	0.3	3.0
Chromium	3.28	13.14	rat	0.35	68.0	272.6	31.3	125.6	1.1	4.5
Copper	11.71	15.14	mink	1	694.1	897.5	319.7	413.3	11.5	14.9
Lead	8	80	rat	0.35	166.0	1660	76.4	764	2.7	27.5
Mercury	0.032	0.16	mink	1	1.90	9.48	0.87	4.37	0.03	0.16
Nickel	40	80	rat	0.35	829.9	1660	382.2	764	13.7	27.5
Selenium	0.2	0.33	rat	0.35	4.15	6.85	1.91	3.15	0.07	0.11
Zinc	160	320	rat	0.35	3320	6639	1529	3058	54.9	110

Acronyms:
NA = Not Applicable or Not Available
NV = No value available
NOAEL = No Observed Adverse Effect Level
LOAEL = Lowest Observed Adverse Effect Level

Average Body Weights (kg)
Shrew: 0.01687
Vole: 0.03663
Mink: 1.0195

Derivation NOAEL/LOAEL Equation:
Derived NOAEL = NOAEL*(test species body weight/surrogate species average body weight)
Derived LOAEL = LOAEL*(test species body weight/surrogate species average body weight)

Only the chemicals for which NOAELs and LOAELs are available are shown. Chemicals not having NOAELs and LOAELs are not included in this table.

TABLE J.4-4

NOAELS AND LOAELS FOR BIRDS
NAVAL SURFACE WARFARE CENTER CRANE, INDIANA

Parameter	NOAEL	LOAEL
SEMIVOLATILES (mg/kg)		
Acenaphthylene	2	20
Pyrene	2	20
INORGANICS (mg/kg)		
Arsenic	2.46	7.38
Cadmium	1.45	20
Chromium	1	5
Copper	46.97	61.72
Lead	1.13	11.3
Mercury	0.0064	0.064
Nickel	77.4	107
Selenium	0.4	0.8
Zinc	14.49	130.9

Footnotes:
1 - The sources of these NOAELS and LOAELS are presented in the table J.4-5.
The NOAELS and LOAELS in the source table were divided by 10 if a subchronic study was the basis for the value.
Also, if only a NOAEL was available, the value was multiplied by 10 to estimate the LOAEL and if only a LOAEL was available, the value was divided by 10 to estimate the NOAEL.

Acronyms:
NOAEL = No Observed Adverse Effect Level
LOAEL = Lowest Observed Adverse Effect Level
NV = No value available

TABLE J.4-5

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
NSWC CRANE
CRANE, INDIANA

Parameters	Concentration (mg/kg-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Semivolatiles Organics							
Acenaphthylene	700	NOAEL	mortality/BW	subchronic	mouse	USEPA, 1989a	PRC, 1996
Pyrene	75	NOAEL	systemic	subchronic	mouse	USEPA, 1989c	IRIS, 2002
Pyrene	125	LOAEL	systemic	subchronic	mouse	USEPA, 1989c	IRIS, 2002
Inorganics							
Arsenic	1.261	LOAEL	reproductive	chronic	mouse	Schroeder and Mitchner, 1971	Sample et.al., 1996
Arsenic	2.46	NOAEL	mortality	chronic	brown-headed cowbird	USFWS, 1969	Sample et.al., 1996
Arsenic	7.38	LOAEL	mortality	chronic	brown-headed cowbird	USFWS, 1969	Sample et.al., 1996
Cadmium	1	NOAEL	reproductive	chronic	rat	Sutou et al., 1980	Sample et.al., 1996
Cadmium	10	LOAEL	reproductive	chronic	rat	Sutou et al., 1980	Sample et.al., 1996
Cadmium	1.45	NOAEL	reproductive	chronic	mallard duck	White and Finely, 1978	Sample et.al., 1996
Cadmium	20	LOAEL	reproductive	chronic	mallard duck	White and Finely, 1978	Sample et.al., 1996
Chromium(III)	1	NOAEL	reproductive	chronic	black duck	Haseltine et al., 1985	Sample et.al., 1996
Chromium(III)	5	LOAEL	reproductive	chronic	black duck	Haseltine et al., 1985	Sample et.al., 1996
Copper	11.71	NOAEL	reproductive	chronic	mink	Aulerich et al., 1982	ATSDR, 1989
Copper	15.14	LOAEL	reproductive	chronic	mink	Aulerich et al., 1982	ATSDR, 1989
Copper	46.97	NOAEL	mortality	chronic	chicks	Mehring et al., 1960	Sample et.al., 1996
Copper	61.72	LOAEL	mortality	chronic	chicks	Mehring et al., 1960	Sample et.al., 1996
Lead	8	NOAEL	reproductive	chronic	rat	Azar et al., 1973	Sample et.al., 1996
Lead	80	LOAEL	reproductive	chronic	rat	Azar et al., 1973	Sample et.al., 1996
Lead	1.13	NOAEL	reproductive	chronic	Japanese quail	Edens et al., 1976	Sample et.al., 1996
Lead	11.3	LOAEL	reproductive	chronic	Japanese quail	Edens et al., 1976	Sample et.al., 1996
Mercury	0.064	LOAEL	reproductive	chronic	mallard duck	Heinz, 1979	Sample et.al., 1996
Mercury	0.032	NOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Mercury	0.16	LOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Nickel	40	NOAEL	reproductive	chronic	rat	Ambrose et al., 1976	Sample et.al., 1996
Nickel	80	LOAEL	reproductive	chronic	rat	Ambrose et al., 1976	Sample et.al., 1996
Nickel	77.4	NOAEL	mortality	chronic	mallard duck	Cain and Pafford, 1981	Sample et.al., 1996
Nickel	107	LOAEL	mortality	chronic	mallard duck	Cain and Pafford, 1981	Sample et.al., 1996
Selenium	0.4	NOAEL	reproductive	chronic	mallard duck	Heinz et al., 1989	Sample et.al., 1996
Selenium	0.8	LOAEL	reproductive	chronic	mallard duck	Heinz et al., 1989	Sample et.al., 1996
Selenium	0.2	NOAEL	reproductive	chronic	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996
Selenium	0.33	LOAEL	reproductive	chronic	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996
Zinc	160	NOAEL	reproductive	chronic	rat	Schlicker and Cox, 1968	Sample et.al., 1996
Zinc	320	LOAEL	reproductive	chronic	rat	Schlicker and Cox, 1968	Sample et.al., 1996
Zinc	14.49	NOAEL	reproductive	chronic	white leghorn hen	Stahl et al., 1990	Sample et.al., 1996
Zinc	130.9	LOAEL	reproductive	chronic	white leghorn hen	Stahl et al., 1990	Sample et.al., 1996

Notes: The NOAELS and LOAELS for the PAHs that do not have values are based on the benzo(a)pyrene values
The NOAELS and LOAELS for the PAHs for birds were based on 7,12-dimethylbenz(a)anthracene.

1 - The LOAEL of 0.052 mg/kg-day was the recalculated LOAEL for the referenced study by assumming a lag time for the reduction of DDT (see USEPA, 1995)
The NOAEL of 0.009 was calculated by dividing the original LOAEL of the referenced study (0.027 mg/kg-day by an uncertainty factor of 3.

NOAEL = No Observed Adverse Effect Level
LOAEL = Lowest Observed Adverse Effect Level

APPENDIX J.5
PERCENT LIPIDS IN FISH CALCULATION

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT SWMU 8, Crane	JOB NUMBER
SUBJECT percent lipid calculation	
BASED ON USEPA, 1997. (EPA 823-R-97-006)	DRAWING NUMBER
BY R. Young / CHECKED BY A. Berchert	APPROVED BY / DATE 9/23/05

Percent lipid content in fish:

Species	Whole fish % lipid content *
Redbreast sunfish	3.6
Green sunfish	3.2
Pumpkinseed	3.9
Longear sunfish	2.8
Bluegill sunfish	3.5
Bluegill sunfish	4.4
	3.566 ≈ 3.6%

wet-weight lipid for fish

To adjust lipid for fish to dry-weight, divide by 25%, which is the percent solids of fish from Sample et al., 1997.

$$\frac{3.6}{25} \times 100 = 14.4\%$$ dry-weight lipid for fish

* Values taken from Appendix C, Table C-3b, USEPA, 1997 The Incidence and Severity of Sediment Contamination in Surface Waters of the United States.

Sample, BE, MS Aplin, RA Efroymson, GW Suter + CJE Welsh, 1997. Methods and Tools for Estimation of the Exposure of Terrestrial Wildlife to Contaminants. Oak Ridge National Laboratory October. ORNL/TM-13391

APPENDIX J.6
FOOD-CHAIN MODEL CALCULATIONS

MEADOW VOLE - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Soil Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Vegetation	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	5.50E-01	1.10E-03	3.25E+00	1.79E+00	1.03E-03	2.57E-04	1.04E-01	1.06E-01	7.75E+00	7.75E+01	1.36E-02	1.36E-03
COPPER	1.32E+01	2.84E-02	6.25E-01	8.25E+00	2.47E-02	6.65E-03	4.81E-01	5.13E-01	2.99E+02	3.87E+02	1.71E-03	1.32E-03
LEAD	3.11E+01	2.98E-02	4.68E-01	1.46E+01	5.81E-02	6.97E-03	8.49E-01	9.14E-01	7.16E+01	7.16E+02	1.28E-02	1.28E-03
MERCURY	3.30E-02	6.80E-05	5.00E+00	1.65E-01	6.16E-05	1.59E-05	9.63E-03	9.71E-03	8.18E-01	4.09E+00	1.19E-02	2.37E-03
NICKEL	1.13E+01	4.73E-02	1.41E+00	1.59E+01	2.11E-02	1.11E-02	9.30E-01	9.63E-01	3.58E+02	7.16E+02	2.69E-03	1.34E-03
ZINC	1.28E+02	7.98E-02	1.82E+00	2.33E+02	2.39E-01	1.87E-02	1.36E+01	1.39E+01	1.43E+03	2.86E+03	9.67E-03	4.84E-03

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	3.290E-02	kg
Food Ingestion Rate = (If)	1.920E-03	kg/day
Water Ingestion Rate = (Iw)	7.700E-03	L/day
Soil Ingestion Rate = (Is)	6.144E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (vegetation)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Cv = Contaminant conc. in vegetation (=soil conc. * Bioaccumulation Factor)

MEADOW VOLE - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Soil Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Vegetation	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	2.23E-01	1.59E-04	5.86E-01	1.31E-01	1.30E-04	2.78E-05	6.37E-03	6.53E-03	8.27E+00	8.27E+01	7.89E-04	7.89E-05
COPPER	9.38E+00	3.63E-03	1.24E-01	1.16E+00	5.48E-03	6.34E-04	5.66E-02	6.28E-02	3.20E+02	4.13E+02	1.96E-04	1.52E-04
LEAD	1.53E+01	2.97E-03	3.89E-02	5.96E-01	8.95E-03	5.20E-04	2.90E-02	3.85E-02	7.64E+01	7.64E+02	5.04E-04	5.04E-05
MERCURY	1.21E-02	1.91E-05	6.52E-01	7.91E-03	7.09E-06	3.33E-06	3.85E-04	3.96E-04	8.74E-01	4.37E+00	4.53E-04	9.06E-05
NICKEL	9.38E+00	5.87E-03	1.80E-02	1.69E-01	5.48E-03	1.03E-03	8.22E-03	1.47E-02	3.82E+02	7.64E+02	3.85E-05	1.93E-05
ZINC	4.40E+01	1.54E-02	3.66E-01	1.61E+01	2.57E-02	2.69E-03	7.84E-01	8.12E-01	1.53E+03	3.06E+03	5.31E-04	2.66E-04

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	3.663E-02	kg
Food Ingestion Rate = (If)	1.785E-03	kg/day
Water Ingestion Rate = (Iw)	6.400E-03	L/day
Soil Ingestion Rate = (Is)	2.142E-05	kg/day
Home Range = (HR)	1.640E-01	acres
Contaminated Area = (CA)	Assume equal to home range	
H=HR/CA (Assume = to 1 for maximum exposure)		

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (vegetation)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Cv = Contaminant conc. in vegetation (=soil conc. * Bioaccumulation Factor)

SHORT-TAILED SHREW - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Soil Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Inverts.	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	5.50E-01	1.10E-03	4.07E+01	2.24E+01	2.80E-03	3.10E-04	3.80E+00	3.81E+00	1.58E+01	1.58E+02	2.41E-01	2.41E-02
COPPER	1.32E+01	2.84E-02	1.53E+00	2.02E+01	6.73E-02	8.01E-03	3.43E+00	3.51E+00	6.10E+02	7.88E+02	5.76E-03	4.45E-03
LEAD	3.11E+01	2.98E-02	1.52E+00	4.73E+01	1.59E-01	8.40E-03	8.05E+00	8.21E+00	1.46E+02	1.46E+03	5.63E-02	5.63E-03
MERCURY	3.30E-02	6.80E-05	2.06E+01	6.81E-01	1.68E-04	1.92E-05	1.16E-01	1.16E-01	1.67E+00	8.33E+00	6.96E-02	1.39E-02
NICKEL	1.13E+01	4.73E-02	4.73E+00	5.34E+01	5.76E-02	1.33E-02	9.08E+00	9.16E+00	7.29E+02	1.46E+03	1.26E-02	6.28E-03
ZINC	1.28E+02	7.98E-02	1.29E+01	1.65E+03	6.53E-01	2.25E-02	2.80E+02	2.81E+02	2.92E+03	5.83E+03	9.64E-02	4.82E-02

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	1.525E-02	kg
Food Ingestion Rate = (If)	2.592E-03	kg/day
Water Ingestion Rate = (Iw)	4.300E-03	L/day
Soil Ingestion Rate = (Is)	7.776E-05	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (invertebrates) = (Ci * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (invertebrates)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Ci = Contaminant conc. in soil invertebrates (=soil conc. * Bioaccumulation Factor)

SHORT-TAILED SHREW - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Soil Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Inverts.	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	2.23E-01	1.59E-04	7.71E+00	1.72E+00	1.96E-04	3.59E-05	1.68E-01	1.68E-01	1.80E+01	1.80E+02	9.37E-03	9.37E-04
COPPER	9.38E+00	3.63E-03	5.15E-01	4.83E+00	8.24E-03	8.17E-04	4.72E-01	4.81E-01	6.94E+02	8.97E+02	6.93E-04	5.36E-04
LEAD	1.53E+01	2.97E-03	2.66E-01	4.07E+00	1.35E-02	6.70E-04	3.98E-01	4.12E-01	1.66E+02	1.66E+03	2.48E-03	2.48E-04
MERCURY	1.21E-02	1.91E-05	1.69E+00	2.05E-02	1.07E-05	4.30E-06	2.01E-03	2.02E-03	1.90E+00	9.48E+00	1.07E-03	2.13E-04
NICKEL	9.38E+00	5.87E-03	1.06E+00	9.93E+00	8.24E-03	1.32E-03	9.70E-01	9.79E-01	8.30E+02	1.66E+03	1.18E-03	5.90E-04
ZINC	4.40E+01	1.54E-02	3.20E+00	1.41E+02	3.87E-02	3.46E-03	1.37E+01	1.38E+01	3.32E+03	6.64E+03	4.15E-03	2.08E-03

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	1.687E-02	kg
Food Ingestion Rate = (If)	1.648E-03	kg/day
Water Ingestion Rate = (Iw)	3.800E-03	L/day
Soil Ingestion Rate = (Is)	1.483E-05	kg/day
Home Range = (HR)	9.700E-01	acres
Contaminated Area = (CA)	Assume equal to home range	
H=HR/CA (Assume = to 1 for maximum exposure)		

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (invertebrates) = (Ci * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (invertebrates)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Ci = Contaminant conc. in soil invertebrates (=soil conc. * Bioaccumulation Factor)

BOBWHITE QUAIL - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Soil Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Vegetation	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	5.50E-01	1.10E-03	3.25E+00	1.79E+00	1.16E-03	1.57E-04	2.71E-02	2.85E-02	1.45E+00	2.00E+01	1.96E-02	1.42E-03
COPPER	1.32E+01	2.84E-02	6.25E-01	8.25E+00	2.79E-02	4.05E-03	1.25E-01	1.57E-01	4.70E+01	6.17E+01	3.35E-03	2.55E-03
LEAD	3.11E+01	2.98E-02	4.68E-01	1.46E+01	6.56E-02	4.25E-03	2.21E-01	2.91E-01	1.13E+00	1.13E+01	2.57E-01	2.57E-02
MERCURY	3.30E-02	6.80E-05	5.00E+00	1.65E-01	6.97E-05	9.70E-06	2.51E-03	2.58E-03	6.40E-03	6.40E-02	4.04E-01	4.04E-02
NICKEL	1.13E+01	4.73E-02	1.41E+00	1.59E+01	2.39E-02	6.74E-03	2.42E-01	2.73E-01	7.74E+01	1.07E+02	3.52E-03	2.55E-03
ZINC	1.28E+02	7.98E-02	1.82E+00	2.33E+02	2.70E-01	1.14E-02	3.54E+00	3.82E+00	1.45E+01	1.31E+02	2.64E-01	2.92E-02

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	1.620E-01	kg
Food Ingestion Rate = (If)	2.460E-03	kg/day
Water Ingestion Rate = (Iw)	2.310E-02	L/day
Soil Ingestion Rate = (Is)	3.419E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (vegetation)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Cv = Contaminant conc. in vegetation (=soil conc. * Bioaccumulation Factor)

BOBWHITE QUAIL - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Soil Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Vegetation	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	2.23E-01	1.59E-04	5.86E-01	1.31E-01	1.66E-04	1.66E-05	1.60E-03	1.78E-03	1.45E+00	2.00E+01	1.23E-03	8.89E-05
COPPER	9.38E+00	3.63E-03	1.24E-01	1.16E+00	6.98E-03	3.77E-04	1.42E-02	2.15E-02	4.70E+01	6.17E+01	4.59E-04	3.49E-04
LEAD	1.53E+01	2.97E-03	3.89E-02	5.96E-01	1.14E-02	3.09E-04	7.27E-03	1.90E-02	1.13E+00	1.13E+01	1.68E-02	1.68E-03
MERCURY	1.21E-02	1.91E-05	6.52E-01	7.91E-03	9.03E-06	1.98E-06	9.65E-05	1.07E-04	6.40E-03	6.40E-02	1.68E-02	1.68E-03
NICKEL	9.38E+00	5.87E-03	1.80E-02	1.69E-01	6.98E-03	6.10E-04	2.06E-03	9.65E-03	7.74E+01	1.07E+02	1.25E-04	9.02E-05
ZINC	4.40E+01	1.54E-02	3.66E-01	1.61E+01	3.27E-02	1.60E-03	1.96E-01	2.31E-01	1.45E+01	1.31E+02	1.59E-02	1.76E-03

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	1.770E-01	kg
Food Ingestion Rate = (If)	2.160E-03	kg/day
Water Ingestion Rate = (Iw)	1.840E-02	L/day
Soil Ingestion Rate = (Is)	1.318E-04	kg/day
Home Range = (HR)	2.860E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (vegetation) = (Cv * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (vegetation)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Cv = Contaminant conc. in vegetation (=soil conc. * Bioaccumulation Factor)

AMERICAN WOODCOCK - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Soil Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Inverts.	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	5.50E-01	1.10E-03	4.07E+01	2.24E+01	1.65E-02	1.41E-04	4.09E+00	4.10E+00	1.45E+00	2.00E+01	2.83E+00	2.05E-01
COPPER	1.32E+01	2.84E-02	1.53E+00	2.02E+01	3.95E-01	3.64E-03	3.69E+00	4.09E+00	4.70E+01	6.17E+01	8.71E-02	6.63E-02
LEAD	3.11E+01	2.98E-02	1.52E+00	4.73E+01	9.32E-01	3.82E-03	8.65E+00	9.58E+00	1.13E+00	1.13E+01	8.48E+00	8.48E-01
MERCURY	3.30E-02	6.80E-05	2.06E+01	6.81E-01	9.89E-04	8.73E-06	1.24E-01	1.25E-01	6.40E-03	6.40E-02	1.96E+01	1.96E+00
NICKEL	1.13E+01	4.73E-02	4.73E+00	5.34E+01	3.38E-01	6.07E-03	9.76E+00	1.01E+01	7.74E+01	1.07E+02	1.31E-01	9.45E-02
ZINC	1.28E+02	7.98E-02	1.29E+01	1.65E+03	3.83E+00	1.02E-02	3.01E+02	3.05E+02	1.45E+01	1.31E+02	2.11E+01	2.33E+00

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	1.660E-01	kg
Food Ingestion Rate = (If)	3.032E-02	kg/day
Water Ingestion Rate = (Iw)	2.130E-02	L/day
Soil Ingestion Rate = (Is)	4.972E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (invertebrates) = (Ci * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (invertebrates)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Ci = Contaminant conc. in soil invertebrates (=soil conc. * Bioaccumulation Factor)

AMERICAN WOODCOCK - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Soil Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day) from: Surface Soil	Surface Water	Inverts.	Total Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ
Inorganics												
CADMIUM	2.23E-01	1.59E-04	7.71E+00	1.72E+00	1.90E-03	1.60E-05	2.29E-01	2.31E-01	1.45E+00	2.00E+01	1.59E-01	1.16E-02
COPPER	9.38E+00	3.63E-03	5.15E-01	4.83E+00	8.00E-02	3.64E-04	6.44E-01	7.24E-01	4.70E+01	6.17E+01	1.54E-02	1.17E-02
LEAD	1.53E+01	2.97E-03	2.66E-01	4.07E+00	1.31E-01	2.98E-04	5.43E-01	6.74E-01	1.13E+00	1.13E+01	5.96E-01	5.96E-02
MERCURY	1.21E-02	1.91E-05	1.69E+00	2.05E-02	1.03E-04	1.91E-06	2.74E-03	2.84E-03	6.40E-03	6.40E-02	4.44E-01	4.44E-02
NICKEL	9.38E+00	5.87E-03	1.06E+00	9.93E+00	8.00E-02	5.88E-04	1.32E+00	1.40E+00	7.74E+01	1.07E+02	1.81E-02	1.31E-02
ZINC	4.40E+01	1.54E-02	3.20E+00	1.41E+02	3.75E-01	1.54E-03	1.88E+01	1.91E+01	1.45E+01	1.31E+02	1.32E+00	1.46E-01

Cells are shaded if the EEQ is greater than 1.0.
Mercury and nickel were COPCs in surface water only.

Body Weight = (BW)	1.895E-01	kg
Food Ingestion Rate = (If)	2.526E-02	kg/day
Water Ingestion Rate = (Iw)	1.900E-02	L/day
Soil Ingestion Rate = (Is)	1.617E-03	kg/day
Home Range = (HR)	6.133E+01	acres
Contaminated Area = (CA)	Assume equal to home range	
H=HR/CA (Assume = to 1 for maximum exposure)		

Dose (surface soil) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (invertebrates) = (Ci * If)(H)/BW
Total Dose = Dose (surface soil) + Dose (surface water) + Dose (invertebrates)

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Ci = Contaminant conc. in soil invertebrates (=soil conc. * Bioaccumulation Factor)

MINK - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT TRIBUTARY
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Sediment Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (sed to fish)(1)	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ 100% SUF	LOAEL EEQ 100% SUF	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Semivolatile Organics															
ACENAPHTHYLENE	1.10E-02	0.00E+00	2.90E-01	4.59E-02	4.82E-05	0.00E+00	4.68E-03	4.73E-03	4.73E-04	1.21E+00	1.21E+01	3.91E-03	3.91E-04	3.91E-04	3.91E-05
PYRENE	2.10E-01	0.00E+00	2.90E-01	8.77E-01	9.21E-04	0.00E+00	8.94E-02	9.03E-02	9.03E-03	1.30E-01	2.16E-01	6.96E-01	4.18E-01	6.96E-02	4.18E-02
Inorganics															
ARSENIC	1.87E+01	7.50E-03	6.90E-01	1.29E+01	8.20E-02	2.60E-03	1.32E+00	1.40E+00	1.40E-01	2.18E-03	2.18E-02	6.42E+02	6.42E+01	6.42E+01	6.42E+00
CADMIUM	8.60E-01	1.10E-03	7.99E+00	6.87E+00	3.77E-03	3.81E-04	7.01E-01	7.05E-01	7.05E-02	1.75E-01	1.75E+00	4.03E+00	4.03E-01	4.03E-01	4.03E-02
CHROMIUM	6.04E+01	2.38E-02	4.68E-01	2.83E+01	2.65E-01	8.25E-03	2.88E+00	3.16E+00	3.16E-01	6.62E-01	2.65E+00	4.77E+00	1.19E+00	4.77E-01	1.19E-01
COPPER	1.59E+01	2.84E-02	5.25E+00	8.35E+01	6.97E-02	9.85E-03	8.51E+00	8.59E+00	8.59E-01	6.75E+00	8.73E+00	1.27E+00	9.84E-01	1.27E-01	9.84E-02
LEAD	3.49E+01	2.98E-02	6.07E-01	2.12E+01	1.53E-01	1.03E-02	2.16E+00	2.32E+00	2.32E-01	1.61E+00	1.61E+01	1.44E+00	1.44E-01	1.44E-01	1.44E-02
MERCURY	2.90E-02	6.80E-05	2.87E+00	8.32E-02	1.27E-04	2.36E-05	8.48E-03	8.63E-03	8.63E-04	1.85E-02	9.23E-02	4.68E-01	9.35E-02	4.68E-02	9.35E-03
NICKEL	1.71E+01	4.73E-02	2.32E+00	3.97E+01	7.50E-02	1.64E-02	4.04E+00	4.14E+00	4.14E-01	8.07E+00	1.61E+01	5.12E-01	2.56E-01	5.12E-02	2.56E-02
SELENIUM	7.50E-01	5.80E-04	1.00E+00	7.50E-01	3.29E-03	2.01E-04	7.65E-02	8.00E-02	8.00E-03	4.04E-02	6.66E-02	1.98E+00	1.20E+00	1.98E-01	1.20E-01

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.

Body Weight = (BW)	5.500E-01	kg
Food Ingestion Rate = (If)	5.608E-02	kg/day
Water Ingestion Rate = (Iw)	1.907E-01	L/day
Sediment Ingestion Rate = (Is)	2.411E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF = Bioaccumulation Factor
BSAF = Biota Sediment Accumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix J.4)
% TOC = 1.0 %

MINK - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT TRIBUTARY
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Sediment Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (sed to fish)(1)	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ 100% SUF	LOAEL EEQ 100% SUF	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Semivolatile Organics															
ACENAPHTHYLENE	3.85E-03	0.00E+00	2.90E-01	1.61E-02	1.97E-06	0.00E+00	6.33E-04	6.35E-04	6.35E-05	2.06E+00	2.06E+01	3.08E-04	3.08E-05	3.08E-05	3.08E-06
PYRENE	4.66E-02	0.00E+00	2.90E-01	1.95E-01	2.39E-05	0.00E+00	7.66E-03	7.69E-03	7.69E-04	2.21E-01	3.68E-01	3.48E-02	2.09E-02	3.48E-03	2.09E-03
Inorganics															
ARSENIC	1.19E+01	1.39E-03	1.43E-01	1.70E+00	6.09E-03	1.09E-04	6.70E-02	7.32E-02	7.32E-03	3.71E-03	3.71E-02	1.97E+01	1.97E+00	1.97E+00	1.97E-01
CADMIUM	5.30E-01	2.29E-04	6.00E-01	3.18E-01	2.71E-04	1.81E-05	1.25E-02	1.28E-02	1.28E-03	2.97E-01	2.97E+00	4.31E-02	4.31E-03	4.31E-03	4.31E-04
CHROMIUM	3.87E+01	4.05E-03	1.00E-01	3.87E+00	1.98E-02	3.19E-04	1.52E-01	1.72E-01	1.72E-02	1.13E+00	4.51E+00	1.53E-01	3.82E-02	1.53E-02	3.82E-03
COPPER	1.23E+01	5.29E-03	1.56E+00	1.91E+01	6.29E-03	4.17E-04	7.53E-01	7.60E-01	7.60E-02	1.15E+01	1.49E+01	6.62E-02	5.12E-02	6.62E-03	5.12E-03
LEAD	2.24E+01	4.74E-03	7.10E-02	1.59E+00	1.14E-02	3.74E-04	6.25E-02	7.43E-02	7.43E-03	2.75E+00	2.75E+01	2.70E-02	2.70E-03	2.70E-03	2.70E-04
MERCURY	2.55E-02	2.16E-05	1.14E+00	2.90E-02	1.30E-05	1.71E-06	1.14E-03	1.16E-03	1.16E-04	3.14E-02	1.57E-01	3.68E-02	7.36E-03	3.68E-03	7.36E-04
NICKEL	1.42E+01	9.06E-03	4.86E-01	6.90E+00	7.27E-03	7.15E-04	2.72E-01	2.80E-01	2.80E-02	1.37E+01	2.75E+01	2.04E-02	1.02E-02	2.04E-03	1.02E-03
SELENIUM	4.85E-01	1.70E-04	1.00E+00	4.85E-01	2.48E-04	1.34E-05	1.91E-02	1.94E-02	1.94E-03	6.87E-02	1.13E-01	2.82E-01	1.71E-01	2.82E-02	1.71E-02

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.

Body Weight = (BW)	1.020E+00	kg
Food Ingestion Rate = (If)	4.015E-02	kg/day
Water Ingestion Rate = (Iw)	8.050E-02	L/day
Sediment Ingestion Rate = (Is)	5.220E-04	kg/day
Home Range = (HR)	3.484E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF = Bioaccumulation Factor
BSAF = Biota Sediment Accumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix J.4)
% TOC = 1.0 %

BELTED KINGFISHER - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT TRIBUTARY
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Sediment Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (sed to fish)(1)	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ 100% SUF	LOAEL EEQ 100% SUF	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Semivolatile Organics															
ACENAPHTHYLENE	1.10E-02	0.00E+00	2.90E-01	4.59E-02	5.06E-05	0.00E+00	6.40E-03	6.45E-03	6.45E-04	2.00E+00	2.00E+01	3.23E-03	3.23E-04	3.23E-04	3.23E-05
PYRENE	2.10E-01	0.00E+00	2.90E-01	8.77E-01	9.66E-04	0.00E+00	1.22E-01	1.23E-01	1.23E-02	2.00E+00	2.00E+01	6.16E-02	6.16E-03	6.16E-03	6.16E-04
Inorganics															
ARSENIC	1.87E+01	7.50E-03	1.00E+00	1.87E+01	8.60E-02	1.03E-03	2.61E+00	2.69E+00	2.69E-01	2.46E+00	7.38E+00	1.09E+00	3.65E-01	1.09E-01	3.65E-02
CADMIUM	8.60E-01	1.10E-03	1.00E+00	8.60E-01	3.95E-03	1.51E-04	1.20E-01	1.24E-01	1.24E-02	1.45E+00	2.00E+01	8.55E-02	6.20E-03	8.55E-03	6.20E-04
CHROMIUM	6.04E+01	2.38E-02	1.00E+00	6.04E+01	2.78E-01	3.27E-03	8.42E+00	8.70E+00	8.70E-01	1.00E+00	5.00E+00	8.70E+00	1.74E+00	8.70E-01	1.74E-01
COPPER	1.59E+01	2.84E-02	1.00E+00	1.59E+01	7.31E-02	3.91E-03	2.22E+00	2.29E+00	2.29E-01	4.70E+01	6.17E+01	4.88E-02	3.71E-02	4.88E-03	3.71E-03
LEAD	3.49E+01	2.98E-02	1.00E+00	3.49E+01	1.60E-01	4.10E-03	4.86E+00	5.03E+00	5.03E-01	1.13E+00	1.13E+01	4.45E+00	4.45E-01	4.45E-01	4.45E-02
MERCURY	2.90E-02	6.80E-05	1.00E+00	2.90E-02	1.33E-04	9.35E-06	4.04E-03	4.18E-03	4.18E-04	6.40E-03	6.40E-02	6.54E-01	6.54E-02	6.54E-02	6.54E-03
NICKEL	1.71E+01	4.73E-02	1.00E+00	1.71E+01	7.86E-02	6.50E-03	2.38E+00	2.47E+00	2.47E-01	7.74E+01	1.07E+02	3.19E-02	2.31E-02	3.19E-03	2.31E-03
SELENIUM	7.50E-01	5.80E-04	1.00E+00	7.50E-01	3.45E-03	7.98E-05	1.05E-01	1.08E-01	1.08E-02	4.00E-01	8.00E-01	2.70E-01	1.35E-01	2.70E-02	1.35E-02

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.
NA = Not Applicable
NV = No Value Available

Body Weight = (BW)	1.360E-01	kg
Food Ingestion Rate = (If)	1.895E-02	kg/day
Water Ingestion Rate = (Iw)	1.870E-02	L/day
Sediment Ingestion Rate = (Is)	6.254E-04	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF = Bioaccumulation Factor
BSAF = Biota Sediment Accumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix J.4)
% TOC = 1.0 %

BELTED KINGFISHER - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT TRIBUTARY
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Sediment Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (sed to fish)(1)	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ 100% SUF	LOAEL EEQ 100% SUF	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Semivolatile Organics															
ACENAPHTHYLENE	3.85E-03	0.00E+00	2.90E-01	1.61E-02	1.44E-05	0.00E+00	1.82E-03	1.84E-03	1.84E-04	2.00E+00	2.00E+01	9.18E-04	9.18E-05	9.18E-05	9.18E-06
PYRENE	4.66E-02	0.00E+00	2.90E-01	1.95E-01	1.74E-04	0.00E+00	2.21E-02	2.22E-02	2.22E-03	2.00E+00	2.00E+01	1.11E-02	1.11E-03	1.11E-03	1.11E-04
Inorganics															
ARSENIC	1.19E+01	1.39E-03	1.00E+00	1.19E+01	4.45E-02	1.52E-04	1.35E+00	1.39E+00	1.39E-01	2.46E+00	7.38E+00	5.66E-01	1.89E-01	5.66E-02	1.89E-02
CADMIUM	5.30E-01	2.29E-04	1.00E+00	5.30E-01	1.98E-03	2.51E-05	6.01E-02	6.21E-02	6.21E-03	1.45E+00	2.00E+01	4.28E-02	3.10E-03	4.28E-03	3.10E-04
CHROMIUM	3.87E+01	4.05E-03	1.00E+00	3.87E+01	1.45E-01	4.45E-04	4.38E+00	4.52E+00	4.52E-01	1.00E+00	5.00E+00	4.52E+00	9.05E-01	4.52E-01	9.05E-02
COPPER	1.23E+01	5.29E-03	1.00E+00	1.23E+01	4.60E-02	5.81E-04	1.39E+00	1.44E+00	1.44E-01	4.70E+01	6.17E+01	3.07E-02	2.33E-02	3.07E-03	2.33E-03
LEAD	2.24E+01	4.74E-03	1.00E+00	2.24E+01	8.36E-02	5.21E-04	2.53E+00	2.62E+00	2.62E-01	1.13E+00	1.13E+01	2.32E+00	2.32E-01	2.32E-01	2.32E-02
MERCURY	2.55E-02	2.16E-05	1.00E+00	2.55E-02	9.54E-05	2.38E-06	2.89E-03	2.99E-03	2.99E-04	6.40E-03	6.40E-02	4.67E-01	4.67E-02	4.67E-02	4.67E-03
NICKEL	1.42E+01	9.06E-03	1.00E+00	1.42E+01	5.31E-02	9.96E-04	1.61E+00	1.66E+00	1.66E-01	7.74E+01	1.07E+02	2.15E-02	1.55E-02	2.15E-03	1.55E-03
SELENIUM	4.85E-01	1.70E-04	1.00E+00	4.85E-01	1.81E-03	1.86E-05	5.50E-02	5.68E-02	5.68E-03	4.00E-01	8.00E-01	1.42E-01	7.10E-02	1.42E-02	7.10E-03

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.
NA = Not Applicable
NV = No Value Available

Body Weight = (BW)	1.520E-01	kg
Food Ingestion Rate = (If)	1.723E-02	kg/day
Water Ingestion Rate = (Iw)	1.670E-02	L/day
Sediment Ingestion Rate = (Is)	5.684E-04	kg/day
Home Range = (HR)	1.160E+00	km
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF = Bioaccumulation Factor
BSAF = Biota Sediment Accumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish
Metals = sediment concentration * BAF
Organics = (sediment concentration * BSAF * %lipids)/(% total organic carbon)
Where:
% Lipids = 14.4 % (see Appendix J.4)
% TOC = 1.0 %

MINK - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT MAIN STREAM
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Sediment Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (sed to inv)[1]	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Inorganics															
ARSENIC	1.97E+01	0.00E+00	6.90E-01	1.36E+01	8.64E-02	0.00E+00	1.39E+00	1.47E+00	1.47E-01	2.18E-03	2.18E-02	6.75E+02	6.75E+01	6.75E+01	6.75E+00
CHROMIUM	6.12E+01	9.70E-04	4.68E-01	2.86E+01	2.68E-01	3.36E-04	2.92E+00	3.19E+00	3.19E-01	6.62E-01	2.65E+00	4.82E+00	1.20E+00	4.82E-01	1.20E-01
SELENIUM	5.90E-01	0.00E+00	1.00E+00	5.90E-01	2.59E-03	0.00E+00	6.02E-02	6.27E-02	6.27E-03	4.04E-02	6.66E-02	1.55E+00	9.42E-01	1.55E-01	9.42E-02

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.

Body Weight = (BW)	5.500E-01	kg
Food Ingestion Rate = (If)	5.608E-02	kg/day
Water Ingestion Rate = (Iw)	1.907E-01	L/day
Sediment Ingestion Rate = (Is)	2.411E-03	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF - Bioaccumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish (sediment concentration * BAF)

MINK - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT MAIN STREAM
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Sediment Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (sed to inv)(1)	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Inorganics															
ARSENIC	1.97E+01	0.00E+00	1.43E-01	2.82E+00	1.01E-02	0.00E+00	1.11E-01	1.21E-01	1.21E-02	3.71E-03	3.71E-02	3.26E+01	3.26E+00	3.26E+00	3.26E-01
CHROMIUM	6.12E+01	6.74E-04	1.00E-01	6.12E+00	3.13E-02	5.32E-05	2.41E-01	2.72E-01	2.72E-02	1.13E+00	4.51E+00	2.42E-01	6.04E-02	2.42E-02	6.04E-03
SELENIUM	5.90E-01	0.00E+00	1.00E+00	5.90E-01	3.02E-04	0.00E+00	2.32E-02	2.35E-02	2.35E-03	6.87E-02	1.13E-01	3.43E-01	2.08E-01	3.43E-02	2.08E-02

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.

Body Weight = (BW)	1.020E+00	kg
Food Ingestion Rate = (If)	4.015E-02	kg/day
Water Ingestion Rate = (Iw)	8.050E-02	L/day
Sediment Ingestion Rate = (Is)	5.220E-04	kg/day
Home Range = (HR)	3.484E+01	acres
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF - Bioaccumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish (sediment concentration * BAF)

BELTED KINGFISHER - CONSERVATIVE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT MAIN STREAM
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Max Sediment Concentration (mg/kg)	Max SW Concentration (mg/L)	Bioaccumulation Factor (sed to inv)(1)	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Inorganics															
ARSENIC	1.97E+01	0.00E+00	6.90E-01	1.36E+01	9.06E-02	0.00E+00	1.89E+00	1.98E+00	1.98E-01	2.46E+00	7.38E+00	8.07E-01	2.69E-01	8.07E-02	2.69E-02
CHROMIUM	6.12E+01	9.70E-04	4.68E-01	2.86E+01	2.81E-01	1.33E-04	3.99E+00	4.27E+00	4.27E-01	1.00E+00	5.00E+00	4.27E+00	8.54E-01	4.27E-01	8.54E-02
SELENIUM	5.90E-01	0.00E+00	1.00E+00	5.90E-01	2.71E-03	0.00E+00	8.22E-02	8.49E-02	8.49E-03	4.00E-01	8.00E-01	2.12E-01	1.06E-01	2.12E-02	1.06E-02

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.

Body Weight = (BW) 1.360E-01 kg
Food Ingestion Rate = (If) 1.895E-02 kg/day
Water Ingestion Rate = (Iw) 1.870E-02 L/day
Sediment Ingestion Rate = (Is) 6.254E-04 kg/day
Home Range = (HR) Assume 100% on site
Contaminated Area = (CA) Assume equal to home range
H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF - Bioaccumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish (sediment concentration * BAF)

BELTED KINGFISHER - AVERAGE INPUTS
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
DOWNGRADIENT MAIN STREAM
SWMU 8 (BUILDING 106 POND)
NSWC CRANE, INDIANA

Parameter	Avg Sediment Concentration (mg/kg)	Avg SW Concentration (mg/L)	Bioaccumulation Factor (sed to inv)(1)	Fish Concentration (mg/kg)	Dose (mg/kg/day) from: Sediment	Surface Water	Fish	Total Dose (mg/kg/day)	Site Use Factor of 10%	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQ	LOAEL EEQ	NOAEL EEQ 10% SUF	LOAEL EEQ 10% SUF
Inorganics															
ARSENIC	1.97E+01	0.00E+00	1.43E-01	2.82E+00	7.37E-02	0.00E+00	3.19E-01	3.93E-01	3.93E-02	2.46E+00	7.38E+00	1.60E-01	5.32E-02	1.60E-02	5.32E-03
CHROMIUM	6.12E+01	6.74E-04	1.00E-01	6.12E+00	2.29E-01	7.41E-05	6.94E-01	9.22E-01	9.22E-02	1.00E+00	5.00E+00	9.22E-01	1.84E-01	9.22E-02	1.84E-02
SELENIUM	5.90E-01	0.00E+00	1.00E+00	5.90E-01	2.21E-03	0.00E+00	6.69E-02	6.91E-02	6.91E-03	4.00E-01	8.00E-01	1.73E-01	8.63E-02	1.73E-02	8.63E-03

Cells are shaded if the EEQ is greater than 1.0.
(1) - The sediment to invertebrate BAF was used for metals because no sediment to fish BAFs were available for metals.

Body Weight = (BW)	1.520E-01	kg
Food Ingestion Rate = (If)	1.723E-02	kg/day
Water Ingestion Rate = (Iw)	1.670E-02	L/day
Sediment Ingestion Rate = (Is)	5.684E-04	kg/day
Home Range = (HR)	1.160E+00	km
Contaminated Area = (CA)	Assume equal to home range	

H=HR/CA (Assume = to 1 for maximum exposure)

Dose (sediment) = (Cs * Is)(H)/BW
Dose (surface water) = (Cw * Iw)(H)/BW
Dose (fish) = (Cf * If)(H)/BW
Total Dose = Dose (sediment) + Dose (surface water) + Dose (fish)

Definitions:
BAF - Bioaccumulation Factor
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
SUF - Site Use Factor
Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cf = Contaminant concentration in fish (sediment concentration * BAF)