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Monitored Natural Attenuation Report
for
Cast High Explosives Fill/Building 146 (SWMU 16)

Round 8

Naval Surface Warfare Center Crane
Crane, Indiana

Contract Task Order 0377

November 2007

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Naval Facilities Engineering Command
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PITT-11-7-065

November 21, 2007

Project No. 112G00041

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Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0377

Subject: NSWC Crane
SWMU 16 Cast High Explosives Fill/Building
Monitored Natural Attenuation Report for Round 8

Dear Mr. Hickey:

Enclosed you will find one copy of the SWMU 16 (Cast High Explosives Fill/Building) Monitored Natural Attenuation Report for Round 8.

Please contact me at (412) 921-8308 (e-mail: Ralph.Basinski@tetratech.com) or Joe Lucas at (412) 921-8882 (e-mail: Joe.Lucas@tetratech.com) regarding any questions or comments.

Sincerely,

Joseph H. Lucas for

Ralph R. Basinski
Task Order Manager

RRB/mlg
Enclosure

cc: Mr. Tom Brent, NSWC Crane (1 copy of enclosure)
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REVISION 0
NOVEMBER 2007

MONITORED NATURAL ATTENUATION REPORT
FOR
CAST HIGH EXPLOSIVES FILL/BUILDING 146 (SWMU 16)
ROUND 8

NAVAL SURFACE WARFARE CENTER, CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
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Southeast
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North Charleston, South Carolina 29406

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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0377

NOVEMBER 2007

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LIST OF ACRONYMS

asml	above mean sea level
B146	Building 146
CMS	Corrective Measures Study
DNX	hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine
DO	Dissolved Oxygen
mL	milliliters
MNA	Monitored natural attenuation
MNX	hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NSWC	Naval Surface Warfare Center
ORP	Oxidation-reduction potential
Plz	Pennsylvania Lower Water Bearing Zone
Pmz	Pennsylvania Middle Water Bearing Zone
Puz	Pennsylvania Upper Water Bearing Zone
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RFI	RCRA Facility Investigation
SOPs	Standard operating procedures
SVOC	Semivolatile organic compound
SWMU	Solid waste management unit
TCE	trichloroethene
TNX	hexahydro-1,3,5-trinitroso-1,3,5-triazine
TtNUS	Tetra Tech NUS
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile organic compound

1.0 INTRODUCTION

A Phase III Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) has been conducted at the Naval Surface Warfare Center (NSWC) Crane Cast High Explosives Fill/Building 146 (B146) Incinerator, also known as solid waste management unit (SWMU) 16. The purpose of the RFI was to determine whether explosives in the groundwater, surface water, and sediment present unacceptable risk or if any residual explosives in soil present unacceptable levels of risk to human health or the environment. The RFI was conducted at SWMU 16 in accordance with applicable RCRA corrective action requirements and provides data on the nature and extent of select explosive, metal, volatile organic compound (VOC), semivolatile organic compound (SVOC), and other miscellaneous parameter concentrations in surface soil, subsurface soil, sediment, surface water and groundwater. The RFI showed there was excess risk as a result of explosives and volatile organic compounds (VOCs) in the groundwater.

SWMU 16 originally consisted of B146 and three oil-fired, rotary kiln incinerators with fuel storage tanks. B146 is still in existence and was previously used as an explosive fill and pressure washout facility. The incinerators and fuel storage tanks have been removed. During operation, incinerator ash was stored in waste piles adjacent to the incinerator. These ash piles have also been removed. In previous investigations, exterior sumps receiving roof drain waters and process waters were found to contain trichloroethene (TCE). These sumps discharged into nearby ditches. After this discovery, a remedial action was conducted during the period 1996 to 1998 in which an air stripper was used to remove VOCs from liquids within the sumps and the roof drain waters were rerouted to a separate line discharging into a ditch. After TCE concentrations in the sump were reduced to acceptable levels, the sump drains were rerouted to the sanitary sewer system.

A corrective measures study (CMS) will be conducted at SWMU 16. Among the remedial alternatives expected to be evaluated will be the potential for natural attenuation to reduce the concentrations of explosives and VOCs in the groundwater in a reasonable time frame. The United States Environmental Protection Agency (U.S. EPA) Region 5 has established a framework entitled "Region 5 Framework for Monitored Natural Attenuation Decisions for Groundwater" (U.S. EPA, 2000). This framework provides technical direction for the collection of adequate monitoring data to support evaluations of the effectiveness of monitored natural attenuation (MNA) decisions. The guidance recommends collection of at least two years of quarterly sampling data. In order to determine whether residual explosives are naturally degrading at SWMU 16, a long-term groundwater monitoring plan for explosives, explosives degradation products, and VOCs is being conducted. To date, 8 rounds of sampling and analyses have

been completed at SWMU 16. Rounds 1 through 3 included groundwater, soils, sediments, and surface water sampling, whereas Rounds 4 through 8 included only groundwater and surface water sampling. Information regarding the results of Rounds 1 through 3 is presented in the SWMU 16 RFI (Tetra Tech NUS [TtNUS], Inc., 2005a). The results show the presence of explosives, primarily RDX, and VOCs above risk-based concentrations in groundwater and surface water. The results for Round 4 through 7 have been provided in separate reports (TtNUS, 2005b, 2006a, and 2006b).

The purpose of this report is to present the results of groundwater and surface water monitoring activities at SWMU 16 in Round 8, including field documentation, and to provide the framework for evaluation of data after all nine rounds of sampling have been completed. Field documentation associated with Round 8 is provided in Appendices A, B, and C of this report. Analytical results for Round 8 are presented in Appendix D. The final monitoring report (Round 9) will contain an evaluation as to whether residual explosives and VOCs may be naturally degrading and whether MNA is a viable remedial option for contaminated groundwater and surface water at SWMU 16. Information obtained from the long term monitoring program will be used in the CMS to evaluate the effectiveness of MNA. The MNA program being conducted at SWMU 16 meets the U.S. EPA Region 5 MNA requirements.

2.0 FIELD INVESTIGATION

This section presents sampling activities, procedures, and documentation utilized during Round 8 field operations performed in 2006 for NSWC Crane SWMU 16.

2.1 OVERVIEW

Field activities were conducted in May 2006 and all work performed was conducted in accordance with the procedures and methodologies described in the U.S. EPA-approved Quality Assurance Project Plan (QAPP) Addendum No. 2 to the approved QAPP (TtNUS, 2004). Standard operating procedures (SOPs) that governed the field work are included in Appendix C of Addendum No. 2 to the approved QAPP.

All field activities were electronically recorded and copies of all field forms, records, daily activities, and health and safety documentation associated with the field investigation for Round 8 are provided in Appendices A through C of this document.

2.2 MOBILIZATION/DEMOBILIZATION

Upon mobilizing for Round 8 field activities, all field team members reviewed the Addendum No. 2 to the approved QAPP, associated appendices, and the Health and Safety Plan (HASP). In addition, the Field Operations Leader (FOL) held field team orientation meetings to ensure that personnel were familiar with the scope of the field activities. Health and safety documentation is contained in Appendix C.

Prior to the initiation of fieldwork, the FOL arrived at the site and began on-site mobilization activities. These activities included coordination with base personnel, and having the equipment required for the field activities shipped to the site. At the conclusion of the field activities, the FOL completed the decontamination and demobilization of all equipment.

2.3 SAMPLING OPERATIONS

This section describes the methodology for groundwater and surface water sampling activities performed at SWMU 16 during Round 8. Table 2-1 contains well construction information and water level/elevation data for Rounds 1 through 8. A listing of all SWMU 16 sample analytical fractions conducted for groundwater and surface water samples in Round 8 is provided in Table 2-2. Further discussion of the specific target analytes for each fraction is presented in Section 3 of the QAPP Addendum No. 2. Instruments used in the field were calibrated daily prior to use according to manufacturer's requirements

and in accordance with all applicable standard operating procedures (SOPs). No nonconformances or suspected deficiencies occurred during sampling in Round 8.

2.3.1 Groundwater Purging and Sampling

During Round 8 the majority of groundwater wells were sampled using dedicated bladder pumps. In monitoring well 16MWT11, the initial water level was below the dedicated pump intake and therefore the pump was pulled and the well was purged and sampled via a dedicated Teflon bailer Groundwater quality parameters including pH, specific conductance, temperature, dissolved oxygen (DO), and oxidation reduction potential (ORP) were measured during purging at 5- to 10-minute intervals using a multi-parameter water quality meter and flow-through cell. Longer intervals were used for slower pumping wells. 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 CTO166-15 and SOP CTO166-16. To the extent possible, the pumping rates were adjusted to prevent drawdown from exceeding 0.3 foot during 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.

Sample containers were filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. All pertinent field data, including sampling methods, purge information, pump intake depths, and locations were recorded electronically on low-flow purge data forms and groundwater sample log sheets (see Appendix A.1). See Figure 2-1 for all groundwater sampling locations.

All 12 proposed groundwater samples were collected at SWMU 16 during Round 8 (See Table 2-2). As noted above, monitoring well 16MWT11 had an initial water level below the dedicated pump intake. The dedicated pump was temporarily removed and the well was purged with a Teflon bailer and then sampled the following day. Monitoring well 16MWT15 was purged for 4 hours and recharged at a very slow rate. The well was purged on one day and sampled the next.

2.3.2 Surface Water Sampling

Surface water samples were collected from intermittent streams, drainage ditches, and surface runoff locations throughout SWMU 16. All samples were collected at previously sampled locations which had been marked with a labeled, wooden survey stake. Fluorescent flagging had been tied to the stake and to

a nearby tree (if available) to facilitate relocation of the sample location for future sampling. Surface water samples were collected in accordance with Addendum No. 2 to the approved QAPP (TtNUS, 2004). All pertinent field data, including water quality parameters, sampling methods, and locations were recorded on a surface water sample log sheet (see Appendix A.2). See Figure 2-2 for all surface water sampling locations.

All 4 proposed surface water samples were collected at SWMU 16 during Round 8 (See Table 2-2). A mistake was found in the nomenclature for the four surface water samples on the sample log sheets and corresponding COCs. The last numerical digit of the sample ID indicating the sequential location sample was found to be incorrect and has been changed in the database to reflect the correct nomenclature as shown in the below table:

INCORRECT SAMPLE ID	CORRECTED SAMPLE ID
16SW1006	16SW1005
16SW1207	16SW1206
16SW1307	16SW1306
16SW3006	16SW3005

2.4 FIELD SAMPLE DOCUMENTATION

Sample documentation consisted of the completion of 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 166-03. 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 A of this document. Chain-of-custody records (see Appendix A.3) were used to track each sample from collection to receipt and analysis at the laboratory. Equipment calibration log sheets are discussed in Section 2.7.1 and can be found in Appendix A.5 of this document.

2.5 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. Samples were cooled in the field immediately after collection with ice placed over the sample containers. Glass sampling containers were wrapped in plastic bubble wrap and placed in Ziploc® plastic bags 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 then packed with ice. 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 will be removed from each sample bottle by laboratory personnel and forwarded to the NSWC EPD.

2.6 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 addendum. QA/QC samples included field duplicates, matrix spike/matrix spike duplicate (MS/MSD), equipment rinsate blanks, trip blanks, source water blanks, and temperature blanks. 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 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.

- MS/MSD - MSs are environmental samples to which known quantities of analytes are added prior to sample preparation (digestion or extraction). These samples provide information about the effect of the sample matrix on the sample preparation and measurement methodology. MSDs are duplicates of MSs and are used for estimating the precision of organic target analyte analyses.

- 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 the 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-based laboratory. One temperature blank was submitted to the laboratory in each cooler, and the temperature was checked upon receipt at the laboratory.

2.7 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:

- Multi-parameter water-quality meter
- LaMotte 2020 turbidity meter
- M-scope water level indicator

2.7.1 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 A.5.

2.7.2 Field Investigation Preventive Maintenance Procedures/Schedule

Field instruments for this project included a multi-parameter 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 and a DO probe membrane kit (membranes and a bottle of solution). 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.

2.8 DECONTAMINATION

Any non-dedicated, non-disposable equipment involved in field sampling activities was decontaminated before beginning work, during sampling activities, and at the completion of the field activities in accordance with SOP CTO166-16.

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.

2.9 WATER LEVEL MEASUREMENTS

2.9.1 Groundwater Level Measurements

A complete synoptic round of water levels for all SMWU 16 groundwater wells was taken prior to sampling activities in Round 8. The synoptic water level measurements were obtained within a 24 to 48 hour time period. Measurements were taken with an electrical water level indicator (M-scope), using the top of the riser pipe as the reference point to determine water depth for monitoring wells and using a surveyed mark for staff gauge measurements. All measurements were taken in accordance with the specific SOP contained in the QAPP addendum. A mark was placed at the top of the riser pipe to ensure that measurements were taken from a consistent reference point. Water level measurements and staff gauge measurements were recorded to the nearest 0.01 foot on groundwater level measurement forms, which are provided in Appendix A.5 of this document. Table 2-1 contains water level/elevation data.

2.10 INVESTIGATION-DERIVED WASTE HANDLING

The field investigation generated limited potentially contaminated wastes including personal protective equipment (PPE), purge water, and sampling equipment decontamination fluids.

All wastes were handled in accordance with the requirements for investigation-derived waste (IDW) found in the specific IDW SOP contained in Appendix C of the approved QAPP Addendum No.2 (TtNUS, 2004).

2.11 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 were familiar with the Addendum No. 2 to 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.

2.12 RECORDKEEPING

All field activities were recorded electronically on daily activity logs in accordance with SOP CTO166-03. The Daily Activity Record served as the overall record of field activities. Information recorded in the Daily Activity Record included daily field activities, weather conditions, identity and arrival and departure times of personnel, management issues, etc. A copy of the Daily Activities Record is included in Appendix B.

All field forms and records were maintained electronically and eventually were docketed and incorporated in the central project file for CTO 0377.

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

Well Number	Northing (NAD83)	Easting (NAD83)	Ground Elevation	Total Depth[1]	Screened Interval				Water-Bearing Zone	May 5, 2003		May 30, 2003		January 24, 2004		February 4, 2005		May 6, 2005		August 10, 2005		January 5, 2006		May 3, 2006	
					Top	Bottom	Top	Bottom		Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation
	(feet)	(feet)	(feet amsl)	(feet bgs)	(feet bgs)	(feet bgs)	(feet amsl)	(feet amsl)		(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)
16MWT01	1321193.49	3032881.29	762.02	24.00	14.00	24.00	748.02	738.02	Puz	25.19	739.31	22.70	741.80	19.12	745.38	15.88	748.62	15.55	748.95	14.49	750.01	15.83	748.67	15.59	748.91
16MWT02	1321146.42	3032559.16	757.60	18.00	8.00	18.00	749.60	739.60	Puz	6.55	753.81	12.18	748.18	10.94	749.42	12.61	747.75	11.68	748.68	13.1	747.26	8.15	752.21	6.83	753.53
16MWT03	1320946.97	3032644.29	761.95	35.00	25.00	35.00	736.95	726.95	Pmz	27.20	737.21	28.07	736.34	28.34	736.07	28.88	735.53	27.85	736.56	30.08	734.33	29.03	735.38	27.66	736.75
16MWT04	1321003.28	3032946.47	763.88	25.00	15.00	25.00	748.88	738.88	Puz	8.05	758.09	13.14	753.00	13.11	753.03	14.29	751.85	13.13	753.01	14.49	751.65	10.58	755.56	10.67	755.47
16MWT05	1320741.79	3032812.77	764.50	40.00	29.00	39.00	735.50	725.50	Pmz	29.77	737.11	30.39	736.49	31.44	735.44	32.11	734.77	31.10	735.78	33.06	733.82	32.63	734.25	30.98	735.90
16MWT06	1321199.52	3032883.37	761.77	25.00	15.00	25.00	746.77	736.77	Puz	22.33	742.11	15.92	748.52	17.41	747.03	17.79	746.65	16.69	747.75	17.93	746.51	19.40	745.04	17.58	746.86
16MWT07	1321176.93	3033001.57	760.54	25.50	15.00	25.00	745.54	735.54	Puz	NA	NA	NA	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA
16MWT08	1321179.45	3033009.24	759.57	99.00	85.00	95.00	674.57	664.57	Plz	NA	NA	NA	NA	97.03	664.53	96.60	664.96	96.16	665.40	95.81	665.75	95.33	666.23	95.05	666.51
16MWT09	1321068.49	3033041.44	762.43	25.00	15.00	25.00	747.43	737.43	Puz	NA	NA	NA	NA	13.88	750.40	15.25	749.03	13.82	750.46	15.49	748.79	13.52	750.76	13.21	751.07
16MWT10	1320936.05	3033074.74	761.93	25.00	14.00	24.00	747.93	737.93	Puz	NA	NA	NA	NA	22.05	742.38	22.30	742.13	21.07	743.36	23.4	741.03	21.49	742.94	21.12	743.31
16MWT11	1320934.64	3033062.79	763.23	98.00	86.00	96.00	677.23	667.23	Plz	NA	NA	NA	NA	96.30	668.94	96.41	668.83	96.10	669.14	95.92	669.32	Water level below pump	NA	95.95	669.29
16MWT12	1320729.14	3033074.92	753.23	26.50	16.00	26.00	737.23	727.23	Pmz	NA	NA	NA	NA	20.13	735.32	20.94	734.51	19.85	735.60	21.86	733.59	13.52	741.93	19.82	735.63
16MWT13	1321125.78	3032562.41	757.62	19.00	8.00	18.00	749.62	739.62	Puz	NA	NA	NA	NA	10.25	749.32	11.36	748.21	10.42	749.15	12.08	747.49	21.49	738.08	8.26	751.31
16MWT14	abd.	abd.	764.98	25.00	15.00	25.00	749.98	739.98	Puz	NA	NA	NA	NA	Dry, abd.	NA	abd.	NA	abd.	NA	abd.	NA	abd.	NA	abd.	NA
16MWT15	1321120.81	3032563.53	757.73	92.00	81.00	91.00	676.73	666.73	Plz	NA	NA	NA	NA	53.23	706.46	54.99	704.70	56.57	703.12	58.95	700.74	59.43	700.26	59.34	700.35
16MWT16	1321059.41	3032814.52	764.98	40.00	26.00	36.00	738.98	728.98	Pmz	NA	NA	NA	NA	32.93	731.81	34.40	730.34	33.47	731.27	33.33	731.41	33.32	731.42	33.42	731.32
16MWT17	1321235.88	3032675.07	764.79	24.00	14.00	24.00	750.79	740.79	Puz	NA	NA	NA	NA	15.35	751.18	15.78	750.75	15.38	751.15	15.79	750.74	15.52	751.01	14.65	751.88
16MWT18	1321068.96	3032807.84	764.99	105.00	94.00	104.00	670.99	660.99	Plz	NA	NA	NA	NA	96.65	667.79	95.75	668.69	95.68	668.76	95.48	668.96	95.39	669.05	95.24	669.20
16MWT19	1320172.28	3033846.62	606.73	16.00	5.00	15.00	601.73	591.73	Valley deposits	NA	NA	NA	NA	NA	NA	3.25	606.06	3.36	605.95	8.18	601.13	3.11	606.20	3.11	606.20
16MWT20	1320532.68	3034030.68	607.43	16.00	5.00	15.00	602.43	592.43	Valley deposits	NA	NA	NA	NA	NA	NA	3.66	606.27	3.81	606.12	7.76	602.17	3.58	606.35	3.41	606.52
16MWT21	1320581.35	3032960.08	760.78	96.00	80.00	95.00	680.78	665.78	Plz	NA	NA	NA	NA	NA	NA	65.46	697.59	64.90	698.15	65.92	697.13	66.07	696.98	64.93	698.12
WES-14-01-83	1320638.35	3032713.38	763.87	50.70	35.80	45.30	728.07	718.57	Pmz	31.00	735.67	31.00	735.67	31.94	734.73	32.33	734.34	31.62	735.05	33.07	733.60	3.52	763.15	31.65	735.02
WES-14-02-83	1321319.90	3032647.27	763.69	25.80	11.35	20.39	752.34	743.30	Puz	14.23	752.31	14.56	751.98	15.36	751.18	15.94	750.60	15.40	751.14	15.76	750.78	15.50	751.04	14.72	751.82
WES-14-03-83	1320816.00	3033018.50	761.51	35.40	20.88	29.99	740.63	731.52	Puz	18.80	745.13	19.83	744.10	20.00	743.93	20.45	743.48	19.44	744.49	20.69	743.24	19.22	744.71	19.14	744.79
WES-14-04-83	1320572.35	3032960.96	760.42	46.00	31.38	40.47	729.04	719.95	Pmz	26.80	736.19	27.27	735.72	28.39	734.60	28.70	734.29	27.67	735.32	29.61	733.38	29.27	733.72	25.64	737.35
WES-14-05-83	1320584.05	3032850.32	766.60	50.70	35.80	45.25	730.80	721.35	Pmz	32.59	736.81	33.05	736.35	34.18	735.22	34.88	734.52	33.80	735.60	35.72	733.68	35.41	733.99	33.78	735.62

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

Well Number	Northing (NAD83)	Easting (NAD83)	Ground Elevation	Total Depth[1]	Screened Interval				Water-Bearing Zone	May 5, 2003		May 30, 2003		January 24, 2004		February 4, 2005		May 6, 2005		August 10, 2005		January 5, 2006		May 3, 2006	
					Top	Bottom	Top	Bottom		Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation
	(feet)	(feet)	(feet amsl)	(feet bgs)	(feet bgs)	(feet bgs)	(feet amsl)	(feet amsl)		(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)
STAFF GAUGES																									
16SG01	1321342.91	3032498.83	750.58	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	Dry	NA	Dry	NA	Dry	NA	Dry	NA	NM	NM
16SG02	1321121.91	3032465.01	734.32	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	5.29	729.03	Dry	NA	Dry	NA	4.90	729.42	NM	NM
16SG03	1320712.52	3032705.12	761.79	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	5.03	756.76	Dry	NA	Dry	NA	4.96	756.83	NM	NM
16SG04	1320748.57	3033005.16	762.44	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	2.15	760.29	Dry	NA	Dry	NA	2.11	760.33	NM	NM
16SG05	1320889.16	3032979.28	763.21	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	Dry	NA	Dry	NA	Dry	NA	1.45	761.76	NM	NM
16SG06	1320930.80	3034364.52	603.53	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	3.51	600.02	3.67	599.86	Dry	NA	3.21	600.32	NM	NM
16SG07	1320765.76	3034582.61	601.53	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	5.99	595.54	Staff washed away	NA	Staff washed away	NA	6.39	595.14	NM	NM
16SG08	1318992.38	3033277.47	590.00	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	4.16	585.84	4.22	585.78	Dry	NA	4.11	585.89	NM	NM
16SG09	1318679.54	3033368.61	583.26	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	6.34	576.92	Dry	NA	Dry	NA	5.93	577.33	NM	NM

Notes:

1 = Total depth of boring; total depth of well may be less.

amsl = Above mean sea level (NAVD88).
abd. = well was grouted shut and abandoned
bgs = Below ground surface.
NA = not applicable
NM = not measured
NAD83 = North American Datum of 1983
Puz = Upper Pennsylvanian water-bearing zone
Pmz = Middle Pennsylvanian water-bearing zone
Plz = Lower Pennsylvanian water-bearing zone

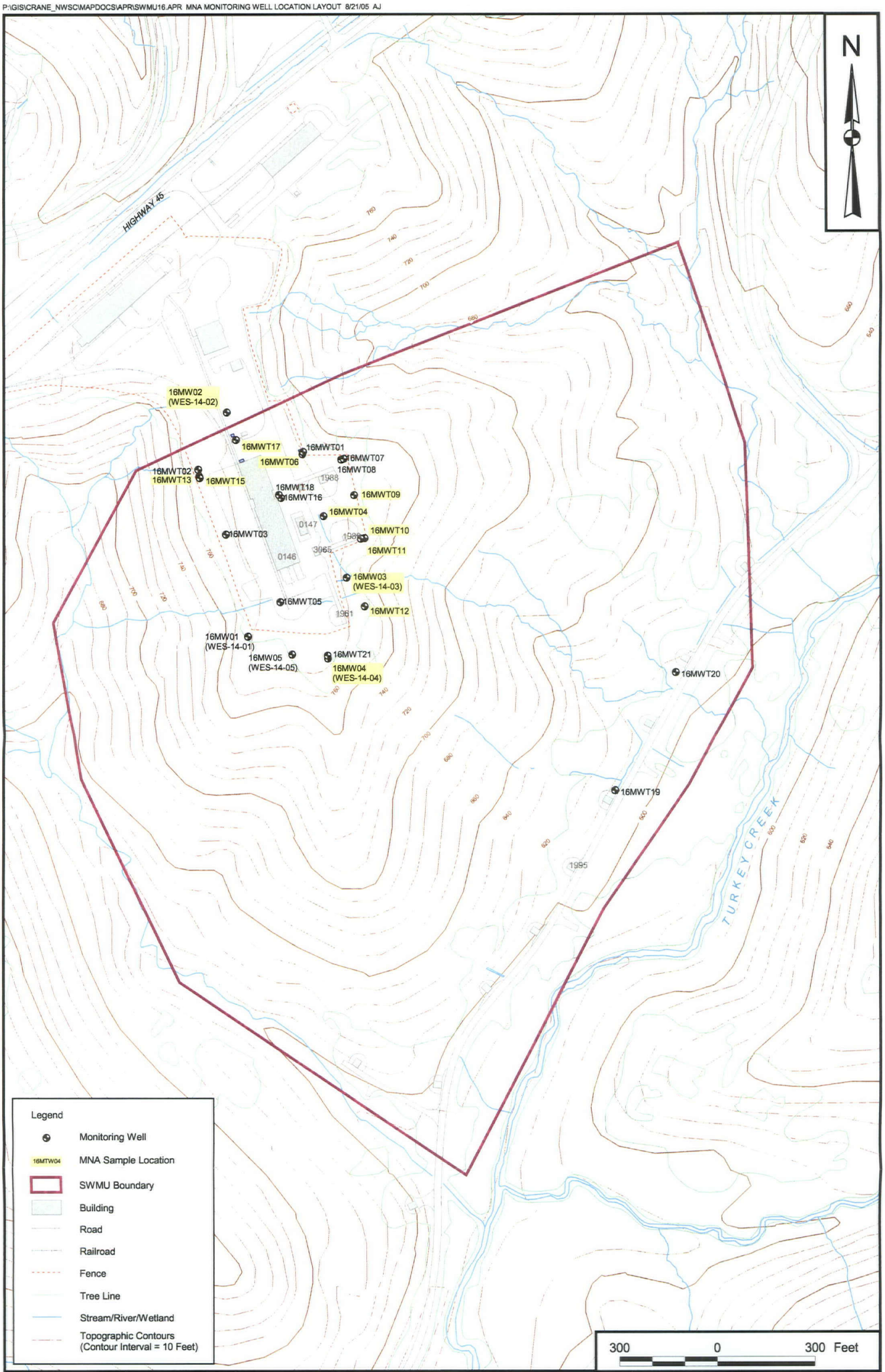
TABLE 2-2

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
ROUND 8
NSWC CRANE
CRANE, INDIANA

Sample Number	Analytical Fraction		Reasoning Why Sample Was Not Collected
	Volatiles	Explosives	
	SW-846 8260B	Nitroaromatics and Nitramines SW-846 8330	
Groundwater (Round 8)			
16GW0209	X	X	
16GW0308	X	X	
16GW0408	X	X	
16GWT0408	X	X	
16GWT0609	X	X	
16GWT0907	X	X	
16GWT1007	X	X	
16GWT1107	X	X	
16GWT1207	X	X	
16GWT1307	X	X	
16GWT1507	X	X	
16GWT1707	X	X	
GW TOTALS	**12**	**12**	
Surface Water (Round 8)			
16SW1006	X	X	
16SW1207	X	X	
16SW1307	X	X	
16SW3006	X	X	
SW TOTALS	**4**	**4**	

X - indicates the sample was collected as proposed.
O - indicates a sample was not collected as proposed.

P:\GIS\CRANE_NWSC\MAPDOCS\APR\SWMU16.APR MNA MONITORING WELL LOCATION LAYOUT 8/21/05 AJ



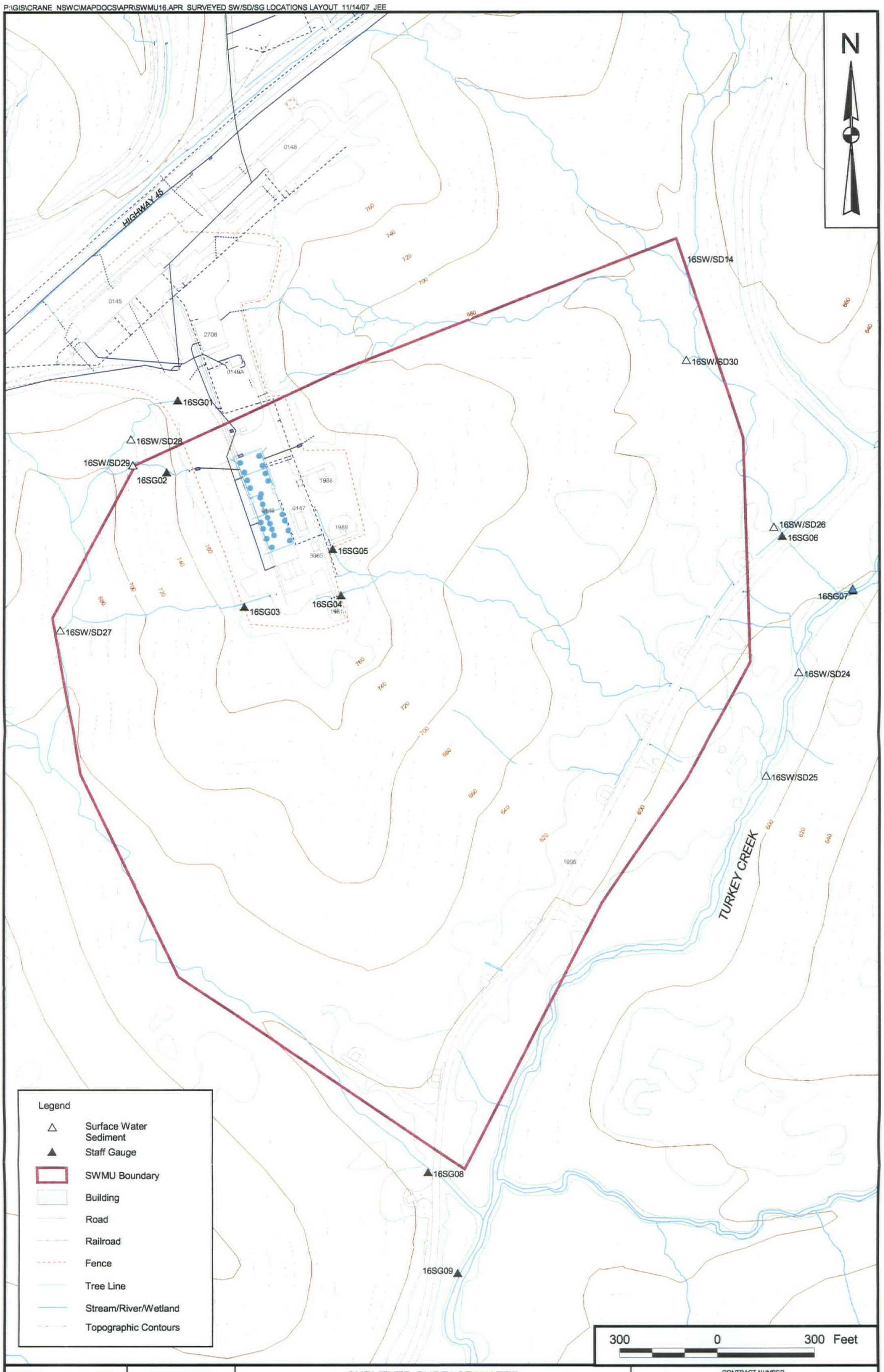
DRAWN BY	DATE
A. JANOCHA	8/21/05
CHECKED BY	DATE
J. LUCAS	8/22/05
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

MONITORING WELL LOCATIONS
SWMU 16 CAST HIGH EXPLOSIVES FILL/
BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
7448	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
DRAWING NO.	REV
FIGURE 2 - 1	0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU16.APR SURVEYED SW/SD/SG LOCATIONS LAYOUT 11/14/07 JEE



DRAWN BY C. FOSTER	DATE 12/29/04	SURVEYED SURFACE WATER, SEDIMENT, AND STAFF GAUGE LOCATIONS SWMU 16 CAST HIGH EXPLOSIVES FILL/ BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER 7448
CHECKED BY J. LUCAS	DATE 11/14/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 2 - 2 REV 0

3.0 DATA PRESENTATION

This section presents the analytical results for groundwater and surface water sampling conducted in Round 8 at SMWU 16 (see Tables 3-1 through 3-8). In addition, analytical results for Rounds 1 through 7 are also provided in this section to support data interpretation, which is discussed in Section 4.0 of this report.

The SWMU 16 RFI identified RDX and trichloroethene (TCE) to be the primary explosive and VOC contaminants, respectively, in soil and groundwater. Over time, natural attenuation will reduce the mass or concentration of these contaminants in soil and groundwater and the parent compounds will decompose in stages to other well-defined intermediate products. In the case of RDX, it will degrade to give nitroso derivatives hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX), hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine (DNX) and hexahydro-1,3,5-trinitroso-1,3,5-triazine (TNX). In the case of TCE, the degradation route is expected to produce cis-1,2-dichloroethene, vinyl chloride, ethene, and ethane. As a result, the presentation and interpretation of analytical results in Sections 3 and 4 for SWMU 16 monitoring will focus on these primary contaminants and degradation products for RDX and TCE and miscellaneous field parameters.

3.1 GROUNDWATER DATA

Groundwater analytical results for Rounds 1 through 8 at SWMU 16 are presented in Tables 3-1, 3-3, and 3-5 for select monitoring well locations in the Upper, Middle, and Lower Pennsylvanian Water Bearing Zones, respectively. These tables show summary listings of groundwater concentrations for select explosives, explosive degradation products, VOCs, VOC degradation products, field, and miscellaneous parameters for each water bearing zone. Concentrations are presented in micrograms per liter (µg/L), unless otherwise noted, along with data validation qualifiers, as applicable. Due to the staggered nature of the groundwater sampling, not all wells were sampled in each of the eight rounds of sampling. RDX degradation products were not target analytes in Round 8. Descriptive statistics for each water bearing zone in Round 8 is shown in Tables 3-2, 3-4, and 3-6.

3.1.1 Explosives

3.1.1.1 Pennsylvanian Upper Water Bearing Zone (Puz)

Monitoring results for Round 8 are presented in Table 3-1. Tables 3-2 presents descriptive statistics for all wells sampled in Round 8. There were no detections of explosives at the upgradient well (16MWT02)

and source area well 16MWT13. However, explosives were detected in all other Puz wells. The most frequently detected explosive was RDX with concentrations ranging from 5.8 µg/L at 16MWT17 to 150 µg/L at 16MWT04. HMX was the second most frequently detected explosive in 5 out of 8 Puz MNA wells with concentrations ranging from 2.5 µg/L at 16MWT06 to 9.9 µg/L at 16MWT09. Other explosives were also detected in Round 8 but only at 16MWT06 and 16MWT09. These other explosives included 1,3,5-trinitrobenzene, 2,4,6-trinitrotoluene, 2,4-dinitrotoluene, 2-amino-4,6-dinitrotolunene, 4-amino-2,6-dinitrotoluene, 2-6-dinitrotoluene, and 3-nitrotoluene.

3.1.1.2 Pennsylvanian Middle Water Bearing Zone (Pmz)

Analytical results for Round 8 sampling at Pmz monitoring locations 16MW04 and 16MWT12 are presented in Table 3-3. The descriptive statistics for Round 8 results are presented in Table 3-4. There were no explosives detected at these wells in Round 8.

3.1.1.3 Pennsylvanian Lower Water Bearing Zone (Plz)

Table 3-5 presents the analytical results for Round 8 sampling at Plz MNA wells 16MW11 and 16MWT15. The descriptive statistics for Round 8 results are presented in Table 3-6. In Round 8, there were no detections of explosives in Plz monitoring wells.

3.1.2 Volatile Organic Compounds

3.1.2.1 Pennsylvanian Upper Water Bearing Zone

VOC monitoring results for Round 8 sampling in the Puz wells are presented in Table 3-1. Table 3-2 presents descriptive statistics for upgradient and downgradient Puz wells, respectively. In Round 8, ethane (0.074 µg/L) and ethene (0.039 µg/L) were the only VOCs detected in the upgradient well (16MW02). VOCs were detected in all downgradient wells in Round 8. With the exception of ethane and ethene, TCE was the most frequently detected VOC. TCE downgradient concentrations ranged from 1.4 µg/L at well 16MWT04 to 150,000 µg/L at 16MWT06. The compound cis-1,2-dichloroethene was only detected at wells 16MWT06 (3,100 µg/L), 16MWT13 (1.5 µg/L), and 16MWT17(260 µg/L). Vinyl chloride was only detected at well 16MWT06 (360 µg/L). Ethene and ethane were detected at all eight Puz wells. Ethane concentrations ranged from 0.0004J µg/L at16MWT04 to 1 µg/L at 16MWT06. Ethene concentrations ranged from 0.015J µg/L at 16MWT04 to 22 µg/L at 16MWT06.

3.1.2.2 Pennsylvanian Middle Water Bearing Zone

VOC monitoring results for Round 8 at the Pmz wells are presented in Table 3-3. Summary descriptive statistics for these locations are shown in Table 3-4. In Round 8, TCE was only detected at well 16MW04. However, ethane and ethene were both detected at wells 16MW04 and 16MWT12.detections of TCE.

3.1.2.3 Pennsylvanian Lower Water Bearing Zone

Analytical results for VOC detections in Round 8 at the Plz wells are presented in Table 3-5. Summary descriptive statistics for Round 8 are given in Table 3-6. In Round 8, TCE was only detected in well 16MWT15 (1.4 µg/L). Ethane and ethene were both detected at wells 16MWT11 and 16MWT15. Ethene concentrations ranged between 1.2 µg/L and 1.8 µg/L. Ethene concentrations ranged between 0.06 µg/L and 0.14 µg/L.

3.2 SURFACE WATER

Surface water sampling was conducted at 4 locations in Round 8. The analytical results for Round 8 are presented in Table 3-7. Summary descriptive statistics for Round 8 are presented in Table 3-8.

3.2.1 Explosives

In Round 8, three explosives were detected only at locations 16SW30. These explosives included HMX (4.9 µg/L), 4-amino-2,6-dichlorotoluene (0.94 µg/L), and tetryl (18.0 µg/L). Only RDX (0.77 µg/L) was detected at 16SW10.

3.2.2 Volatile Organic Compounds

In Round 8, TCE was only detected at location 16SW12 (8.7 µg/L). In addition, cis-1,2-Dichloroethene (0.6 µg/L) was the only degradation by-product detected in Round 8 at location 16SW12.

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND
MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		16MW02								16MW03							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		04/24/03	10/26/03	08/25/04	02/04/05	05/06/05	08/14/05	01/08/06	05/04/06	05/11/03	11/08/03	08/24/04	02/05/05	05/06/05	08/13/05	01/07/06	05/06/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
1,3-DINITROBENZENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 U	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.48 U								0.5 U						
2,4,6-TRINITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.24 U		0.278 U		0.26 U				0.25 U		0.258 U		0.25 U		
2,4-DINITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.24 U		0.278 U		0.26 U				0.25 U		0.258 U		0.25 U		
2,6-DINITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.48 J	0.62 J	0.89	0.52 J	0.45 J	0.41 J	0.52 J	0.25 U
2-NITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
3,5-DINITROANILINE			0.24 U		0.278 U		0.26 U				0.25 U		0.258 U		0.25 U		
3-NITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
4,4'-TN-AZOXY					0.555 U		0.52 U						0.515 U		0.5 U		
4-AMINO-2,6-DINITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.86 J	1.1	1 J	0.91	0.76	0.72	0.94	0.84
4-NITROTOLUENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
RDX		0.195 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	52	71	50	55	51	51	57	51
DNX			0.24 U		0.278 U		0.26 U				0.25 U		0.258 U		0.25 U		
HMX		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	5.7	7.5	6.1	5.7	5	5.4	6.2 J	5.9
MNX			0.24 U		0.278 U		0.26 U				0.82		0.36 J		0.32 J		
TNX			0.24 U		0.278 U		0.26 U				0.25 U		0.258 U		0.25 U		
NITROBENZENE		0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 U	0.242 U	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
PICRAMIC ACID		0.39 U								0.39 U							
PICRIC ACID		0.39 U								0.39 U							
TETRYL		0.21 U	0.24 U	0.27 UJ	0.278 U	0.26 U	0.26 U	0.27 U	0.25 U	0.45 U	0.25 U	0.242 UJ	0.258 U	0.271 U	0.25 U	0.27 U	0.25 U
VOLATILES																	
TRICHLOROETHENE		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		1 U	0.3 U	5.6	5	4.3	5	4.5	4.8	5.2	5.7
CIS-1,2-DICHLOROETHENE		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		1 U	0.3 U	0.4 J	0.5 J	0.6 J	0.3 U	0.3 U	0.3 U	1 U	0.3 U
ETHANE			0.062		0.078		0.093		0.074				0.005 U		0.016 J		0.017 J
ETHENE			0.018		0.005 U		0.007 J		0.039				0.026		0.052		0.051
VINYL CHLORIDE		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		1 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U
FIELD PARAMETERS																	
TEMPERATURE	C	11.8	15.27	17.24	13.04	15.84	16.63	11.53		14.17	13.62	18.66	14.69	14.85	17.14	9.76	
ALKALINITY	MG/L		300								10 U						
CARBON DIOXIDE			105								130						
DISSOLVED OXYGEN			0.2	0.12	4.68			1.47			1	0.1	13.83			1.21	
DISSOLVED OXYGEN - METER		0.64	6.3			1.53	0.95			1.63	0.74			0.81	1.5		
HYDROGEN SULFIDE (H2S)			0								0						
IRON(+2)			3.3 >								0.54						
MANGANESE(+2)			1.5								2.1						
NITRITE-N			0.003								0.007						
SULFIDE			0								0.01						
SPECIFIC CONDUCTANCE	MS/CM	0.568	1.75	0.502	0.479	0.446	402	0.707		0.483	0.355	0.43	0.323	0.359	339	0.472	
OXIDATION REDUCTION POTENTIAL	MV	7.1	-0.8	124	28.2	641	527.4	3		154.2	350	438.1	266	335.8	566.9	322	
TURBIDITY	NTU	2.2	0.8	0	1.1	0.2	0	8		2.8	1.06	15.5	7.9	8.7	8.4	4.1	
PH	S.U.	6.65	6.54	5.75	6.59	5.2	5.91	6.82		5.84	4.82	5.28	5	5.13	5	5	
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L	0.04								0.02							
CHLORIDE			14		25 J		22		18		5		5 J		4		3.8
NITRITE/NITRATE-N		0.02 U	0.05 U		0.45		0.025 U		0.025 U	0.54	0.7		0.75		0.36		0.59
SULFATE			270		8700		59		55		170		150		200		250
TOTAL ORGANIC CARBON			1.7				1.1								1.2		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND
MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		16MWT04								16MWT06							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		04/22/03	11/08/03	08/15/04	02/05/05	05/07/05	08/13/05	01/21/06	05/08/06	04/28/03	11/08/03	08/24/04	02/05/05	05/07/05	08/12/05	01/08/06	05/08/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L	0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 UJ	1.8	2	3.4	1.9	2.3	7.4
1,3-DINITROBENZENE		0.55 U	0.255 U	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 U	0.25 U	0.24 U	0.264 UJ	0.28 U	0.25 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.51 U								0.5 U						
2,4,6-TRINITROTOLUENE		0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 UJ	4.8	6.2	12	4.1	6.1	21
2,4-DIAMINO-6-NITROTOLUENE			0.255 U		0.25 U		0.28 U				0.27 J		0.31 J		1.3		
2,4-DINITROTOLUENE		0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 UJ	0.8	1.2	1 J	0.68	1.1	3.3
2,6-DIAMINO-4-NITROTOLUENE			0.255 U		0.25 U		0.28 U				0.25 U		0.24 U		0.28 U		
2,6-DINITROTOLUENE		0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 UJ	0.25 U	0.92 J	1.3 J	0.52 J	0.25 U	2.3 J
2-AMINO-4,6-DINITROTOLUENE		0.55 U	0.47 J	0.27 U	0.3 J	0.269 U	0.34 J	0.26 U	0.25 U	0.34 U	4.2 J	29 J	34	60 J	28 J	38	130 J
2-NITROTOLUENE		0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 UJ	0.25 U	0.24 U	0.264 UJ	0.28 U	0.25 U	0.25 U
3,5-DINITROANILINE			0.255 U		0.25 U		0.28 U				0.25 U		0.24 U		0.28 U		
3-NITROTOLUENE		0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 UJ	0.25 U	0.24 U	0.264 UJ	0.28 U	0.47 J	1.25 U
4,4'-TN-AZOXY					0.5 U		0.55 U						0.48 U		0.56 U		
4-AMINO-2,6-DINITROTOLUENE		0.55 U	1 J	0.56	0.75	0.44 J	0.75	0.38 J	0.25 U	0.34 U	1.5	14	18	31	13	15	43
4-NITROTOLUENE		0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 UJ	0.25 U	0.24 U	0.264 UJ	0.28 U	0.25 U	0.25 U
RDX		77	200	70	68	59	130	120	130	4	1.8	8.8	7.3	11	13	4.6	18
DNX			0.63 J		0.25 U		0.28 U				0.25 U		0.24 U		0.28 U		
HMX		7.8	21	8.6	8.2	6.4	8.8	7.1	8	0.34 U	0.27 J	0.93 J	0.72 J	0.64 J	1.6	1 J	2.5
MNX			4.1		1.2		2.5				0.25 U		0.24 U		0.33 J		
TNX			0.255 U		0.25 U		0.28 U				0.25 U		0.24 U		0.28 U		
NITROBENZENE		0.55 U	0.255 U	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 U	0.25 U	0.24 U	0.264 UJ	0.28 U	0.25 U	0.25 U
PICRAMIC ACID		0.39 U								0.39 U							
PICRIC ACID		0.39 U								0.39 U							
TETRYL		0.55 U	0.255 U	0.27 U	0.25 U	0.269 U	0.28 U	0.26 U	0.25 U	0.34 U	0.25 U	0.25 UJ	0.24 U	0.264 UJ	0.28 U	0.25 U	0.25 U
VOLATILES																	
TRICHLOROETHENE		2.2	3.9	2.1	5	2.4	3.7	1.8	1.4	35000	250000	330000	440000	510000	480000	370000	150000
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	0.3 U	600	4200	4100	5200	5600	4600	4800	3100
ETHANE			0.013		0.0088 J		0.004 J		0.005 J		7.7		2.3		1.5		1
ETHENE			0.027		0.014 J		0.016 J		0.015 J		65		29		22		22
VINYL CHLORIDE		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	65 J	340 J	390 J	660	610	350 J	450	360
FIELD PARAMETERS																	
TEMPERATURE	C	12.41	15.73	19.45	15.09	15.93	19.6	13.34		15	14.55	18.77	15.57	17.46	20.27	14.26	
ALKALINITY	MG/L		75								200						
CARBON DIOXIDE			19								40						
DISSOLVED OXYGEN			2	1.81	7.25			4.32			1.5	0.39	2.64			1.33	
DISSOLVED OXYGEN - METER		5.41	0.89			0.39	2.02			0.48	1.67			2.69	3.06		
HYDROGEN SULFIDE (H2S)			0								0						
IRON(+2)			5.19								0.03						
MANGANESE(+2)			1								3.8						
NITRITE-N			0.004								0.016						
SULFIDE			0								0.07						
SPECIFIC CONDUCTANCE	MS/CM	0.225	0.582	0.232	0.18	0.16	0.168	0.209		0.516	1.216	1.219	0.889	0.762	862	1.6	
OXIDATION REDUCTION POTENTIAL	MV	79.7	152	54	231	286.3	168	175		-106	188.6	402	14.5	497	729	151	
TURBIDITY	NTU	9.2	2.2	5.13	2.3	7.8	0.7	2.9		8.8	1.99	29	17.9	15	5.2	29	
PH	S.U.	6.28	5.84	5.6	5.5	6.32	6.1	6.57		7.7	6.49	4.69	5.96	6	6	6.26	
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L	0.03								0.57							
CHLORIDE			10		11 J		7		4.1		47		54 J		58		
NITRITE/NITRATE-N		0.6	0.49		0.88		0.025 U		0.34	0.5	0.025 U		0.025 U		0.025 U		
SULFATE			70		32		24		23		520		480		490		
TOTAL ORGANIC CARBON			1.4				2.6								4.1		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND
MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		16MWT09								16MWT10							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		No Sample	11/22/03	08/17/04	02/06/05	05/07/05	08/14/05	01/07/06	05/04/06	No Sample	11/21/03	08/17/04	02/06/05	05/07/05	08/13/05	01/09/06	05/05/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
1,3-DINITROBENZENE			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.543 U								0.575 U						
2,4,6-TRINITROTOLUENE			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.272 U		0.24 U		0.26 U				0.287 U		0.255 U		0.27 U		
2,4-DINITROTOLUENE			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.272 U		0.24 U		0.26 U				0.287 U		0.255 U		0.27 U		
2,6-DINITROTOLUENE			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.31 J	0.27 U	0.26 J	0.269 U	0.27 J	0.25 J	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
2-NITROTOLUENE			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
3,5-DINITROANILINE			0.272 UJ		0.24 U		0.26 U				0.287 U		0.255 U		0.27 U		
3-NITROTOLUENE			0.272 U	1.5 J	1.8 J	0.269 U	1.1 J	1.5 J	1.2 J		0.287 U	2.1 J	1.8 J	0.248 U	0.34 J	0.24 U	0.25 U
4,4'-TN-AZOXY					0.48 U		0.52 U						0.51 U		0.54 U		
4-AMINO-2,6-DINITROTOLUENE			0.69 J	0.27 U	0.61 J	0.269 U	0.68	0.63	1.1		0.287 U	0.27 U	0.42 J	0.248 U	0.47 J	0.5 J	0.25 U
4-NITROTOLUENE			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
RDX			110	79	92	98	100	110	100		55	55	50	51	58	52	47
DNX			0.272 U		0.24 U		0.26 U				0.287 U		0.255 U		0.27 U		
HMX			11	8.1	9.3	9.3	11	12 J	9.9		6.7	5.2	5.1	4.8	5.8	5.3 J	4.5
MNX			1.1		0.43 J		0.46 J				0.5 J		0.3 J		0.27 U		
TNX			0.272 U		0.24 U		0.26 U				0.287 U		0.255 U		0.27 U		
NITROBENZENE			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
PICRAMIC ACID																	
PICRIC ACID																	
TETRYL			0.272 U	0.27 U	0.24 U	0.269 U	0.26 U	0.25 U	0.25 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U	0.24 U	0.25 U
VOLATILES																	
TRICHLOROETHENE			7.6	7.1	10	6.9	9.1	8.7	6.3		1.9	1.9	2.4	1.6	1.4	2	1.5
CIS-1,2-DICHLOROETHENE			0.2 J	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U		0.2 J	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U
ETHANE					0.074		0.044		0.038		0.33		0.082		0.054		0.058
ETHENE					0.081		0.079		0.06		0.16		0.03		0.036		0.11
VINYL CHLORIDE			0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U
FIELD PARAMETERS																	
TEMPERATURE	C		16.56	19.68	12.18	14.1	17.77	12.4			14.77	16.75	14.1	15.88	17.85	12.8	
ALKALINITY	MG/L										10 U						
CARBON DIOXIDE											280						
DISSOLVED OXYGEN				0.37	1.41			1.31			0.35	0.14	7.14			1.83	
DISSOLVED OXYGEN - METER			2.33			1.51	1.09				1.28			1.1	220		
HYDROGEN SULFIDE (H2S)											0						
IRON(+2)											3.3 >						
MANGANESE(+2)											22 >						
NITRITE-N											0.002						
SULFIDE											0.02						
SPECIFIC CONDUCTANCE	MS/CM		0.502	0.937	0.456	0.432	522	0.655			1.178	1.284	1.168	0.867	854	1.63	
OXIDATION REDUCTION POTENTIAL	MV		329.8	199.7	169.4	525	664.8	232			328.9	501.2	315.2	337	890.5	315	
TURBIDITY	NTU		4.82	2.32	0	1	0	0.95			5.56	6.31	4.3	7.4	6.9	6.5	
PH	S.U.		4.1	4.7	4.82	5	4.11	4.61			3.72	3.21	3.31	3.59	3	3.57	
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L																
CHLORIDE			14 U		13 J		12		8.8		8 J		9 J		7		6.9
NITRITE/NITRATE-N			0.05 U		0.56		0.025 U		0.51		0.27 J		0.72		0.27		0.43
SULFATE			210 U		290		240		190		980 J		1100		880		690
TOTAL ORGANIC CARBON							1								1.7		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND
MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		16MWT13								16MWT17							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		No Sample	11/22/03	08/18/04	02/05/05	05/08/05	08/14/05	01/22/06	05/05/06	No Sample	12/05/03	08/25/04	02/05/05	05/07/05	08/14/05	01/22/06	05/08/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L		0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
1,3-DINITROBENZENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.549 U								0.538 U						
2,4,6-TRINITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
2,4-DIAMINO-6-NITROTOLUENE			0.275 U		0.264 U		0.29 U				0.269 U		0.24 U		0.27 U		
2,4-DINITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
2,6-DIAMINO-4-NITROTOLUENE			0.275 U		0.264 U		0.29 U				0.269 U		0.24 U		0.27 U		
2,6-DINITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
2-AMINO-4,6-DINITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
2-NITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
3,5-DINITROANILINE			0.275 U		0.264 U		0.29 U				0.269 U		0.24 U		0.27 U		
3-NITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
4,4'-TN-AZOXY					0.528 U		0.59 U						0.48 U		0.53 U		
4-AMINO-2,6-DINITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
4-NITROTOLUENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
RDX			6.7	1.1	0.264 U	0.298 U	0.29 U	0.42 J	0.25 U		4.3	5.2	4.9	4.9	4.5	4.5	5.8
DNX			0.275 U		0.264 U		0.29 U				0.269 U		0.24 U		0.27 U		
HMX			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.43 J	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
MNX			0.275 U		0.264 U		0.29 U				0.269 U		0.24 U		0.27 U		
TNX			0.275 U		0.264 U		0.29 U				0.269 U		0.24 U		0.27 U		
NITROBENZENE			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 U	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
PICRAMIC ACID																	
PICRIC ACID																	
TETRYL			0.275 U	0.271 U	0.264 U	0.298 U	0.29 U	0.25 U	0.25 U		0.269 U	0.27 UJ	0.24 U	0.281 U	0.27 U	0.26 U	0.28 U
VOLATILES																	
TRICHLOROETHENE			62000	28000	1900	2200	130	5100	160		11000	19000	18000	19000	19000	22000	25000
CIS-1,2-DICHLOROETHENE			280	140	8.2	12	1.5	20	1.5		210	290	310	260	290	340	260
ETHANE			0.45		0.065		0.03		0.07				0.6		0.74		0.45
ETHENE			0.67		0.035		0.1		0.11				0.17		0.2		0.1
VINYL CHLORIDE			30 U	0.8 J	0.3 U	0.3 U	0.3 U	0.6 U	0.3 U		2.1	60 U	3.8	6 U	3 U	3 U	30 U
FIELD PARAMETERS																	
TEMPERATURE	C		21.88	18.44	13.12	16.23	21.63	12.04			11.63	18.56	13.97	13.78	18.29	11.48	
ALKALINITY	MG/L		10 U														
CARBON DIOXIDE			140														
DISSOLVED OXYGEN			6	0.08	3.22			0.52				0.18	0.89			0.66	
DISSOLVED OXYGEN - METER			7.27			0	0.41				0.63			-17.04	20.43		
HYDROGEN SULFIDE (H2S)			0														
IRON(+2)			3.3 >														
MANGANESE(+2)			4.1														
NITRITE-N			0.008														
SULFIDE			0.02														
SPECIFIC CONDUCTANCE	MS/CM		0.433	0.42	0.299	0.232	0.234	0.326			0.649	0.786	0.595	0.474	0.658	1.24	
OXIDATION REDUCTION POTENTIAL	MV		264.8	541	12	100.1	108.3	110			111.5	274.3	100.9	173.2	92.3	108	
TURBIDITY	NTU		8.67	105	380	30	5.8	0			5.92	9.1	3.27	4.6	2.5	7.4	
PH	S.U.		4.72	5.42	5.99	5.18	6.82	5.82			5.58	4.59	5.17	5.4	6.31	5.24	
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L																
CHLORIDE			17 U		21 J		23		21		120		110 J		120		110
NITRITE/NITRATE-N			0.19 J		0.025 U		0.025 U		0.025 U		0.05 UJ		0.025 U		0.025 U		0.025 U
SULFATE			180 U		50		37		44		150		190		260		120
TOTAL ORGANIC CARBON							1.3								1.7		

A blank cell indicates that no sample was collected or analysis was conducted for the parameter.
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
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
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 time
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 t
BU - Indicates that the associated organic chemical was detected in this 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 adjusted for uncertainties (i
> - 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.

UG/L - micrograms per liter
C - degrees centigrade
MG/L - milligrams per liter
MS/CM - millisiemens per centimeter
MV - millivolts
NTU - nephelometric turbidity units
S.U. - standard units

TABLE 3-2

DESCRIPTIVE STATISTICS FOR
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146) ROUND 8 GROUNDWATER IN THE PENNSYLVANIAN UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Explosives (ug/L)							
1,3,5-Trinitrobenzene	1/8	7.4	7.4	0.25 - 0.28	1.04	7.40	16GWT0609
2,4,6-Trinitrotoluene	1/8	21	21	0.25 - 0.28	2.74	21.0	16GWT0609
2,4-Dinitrotoluene	1/8	3.3	3.3	0.25 - 0.28	0.524	3.30	16GWT0609
2,6-Dinitrotoluene	1/8	2.3 J	2.3 J	0.25 - 0.28	0.399	2.30	16GWT0609
2-Amino-4,6-Dinitrotoluene	1/8	130 J	130 J	0.25 - 0.28	16.4	130	16GWT0609
3-Nitrotoluene	1/8	1.2 J	1.2 J	0.25 - 1.25	0.324	1.20	16GWT0907
4-Amino-2,6-Dinitrotoluene	3/8	0.84	43	0.25 - 0.28	5.70	15.0	16GWT0609
HMX	5/8	2.5	9.9	0.25 - 0.28	3.97	6.27	16GWT0907
RDX	6/8	5.8	150	0.25 - 0.25	45.3	60.3	16GWT0408-D
Volatile Organic Compounds (ug/L)							
1,1,2-Trichloroethane	1/8	120	120	0.3 - 30	17.0	120	16GWT0609
1,1-Dichloroethene	1/8	94	94	0.3 - 30	13.7	94.0	16GWT0609
Carbon Tetrachloride	1/8	16	16	0.3 - 30	4.91	16.0	16GW0308
Chloroform	3/8	0.6 J	4.6	0.3 - 30	3.74	2.33	16GW0308
Chloromethane	1/8	0.4 J	0.4 J	0.3 - 30	2.96	0.400	16GWT1307
cis-1,2-Dichloroethene	3/8	1.5	3100	0.3 - 0.3	420	1121	16GWT0609
Ethane	8/8	0.004 J	1	- - -	0.214	0.214	16GWT0609
Ethene	8/8	0.015 J	22	- - -	2.81	2.81	16GWT0609
Methane	8/8	1.9 J	190	- - -	73.0	73.0	16GWT0609, 16GWT1307
Tetrachloroethene	1/8	100	100	0.3 - 30	14.5	100	16GWT0609
Toluene	1/8	200	200	0.3 - 30	27.0	200	16GWT0609
Trichloroethene	7/8	1.4	150000	0.3 - 0.3	21897	25025	16GWT0609
Vinyl Chloride	1/8	360	360	0.3 - 30	47.0	360	16GWT0609
Miscellaneous Parameters (mg/L)							
Chloride	7/7	3.8	110	- - -	24.6	24.6	16GWT1707
Nitrite/Nitrate-N	4/7	0.34	0.59	0.025 - 0.025	0.273	0.469	16GW0308
Sulfate	7/7	23	690	- - -	196	196	16GWT1007

Associated Samples
16GW0209
16GW0308
16GWT0408
16GWT0408-D
16GWT0609
16GWT0907
16GWT1007
16GWT1307
16GWT1707

TABLE 3-3

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIAN MIDDLE WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		16MW04								16MWT12							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		04/23/03	10/26/03	08/25/04	02/06/05	05/06/05	08/13/05	01/07/06	05/06/06	No Sample	11/21/03	08/24/04	02/06/05	05/07/05	08/13/05	01/07/06	05/06/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
1,3-DINITROBENZENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.5 U								0.538 U						
2,4,6-TRINITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.25 U		0.264 U		0.25 U				0.269 U		0.26 U		0.26 U		
2,4-DINITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.25 U		0.264 U		0.25 U				0.269 U		0.26 U		0.26 U		
2,6-DINITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
2-NITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
3,5-DINITROANILINE			0.25 U		0.264 U		0.25 U				0.269 U		0.26 U		0.26 U		
3-NITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
4,4'-TN-AZOXY					0.528 U		0.5 U						0.52 U		0.51 U		
4-AMINO-2,6-DINITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
4-NITROTOLUENE		0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
RDX		1.7	1.9	0.66	0.58	0.59	0.64	0.85	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
DNX			0.25 U		0.264 U		0.25 U				0.269 U		0.26 U		0.26 U		
HMX		0.39	0.45 J	0.264 U	0.264 U	0.269 U	0.25 U	0.24 U	0.25 U		1.3 J	0.264 U	0.26 U	0.266 U	0.26 U	0.25 U	0.25 U
MNX			0.25 U		0.264 U		0.25 U				0.269 U		0.26 U		0.26 U		
TNX			0.25 U		0.264 U		0.25 U				0.269 U		0.26 U		0.26 U		
VOLATILES																	
TRICHLOROETHENE		0.5 J	0.3 U	0.7 J	1.4	0.7 J	0.9 J	1 U	1 J		0.3 U	0.3 U	0.5 J	0.3 U	0.3 U	1 U	0.3 U
CIS-1,2-DICHLOROETHENE		0.3 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U
ETHANE					0.005 U		0.01 J		0.015 J		0.37 J		0.17		0.13		0.15
ETHENE					0.005 U		0.018 J		0.048		0.031 J		0.12		0.028		0.066
VINYL CHLORIDE		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	0.3 U
FIELD PARAMETERS																	
TEMPERATURE	C	13.31	13.21	15.03	12.87	14.13	15.79	11.82			16.04	17.81	12.28	16.46	16.75	12.41	
ALKALINITY	MG/L										10 U						
CARBON DIOXIDE											260						
DISSOLVED OXYGEN					5.79			0.55			0.1	3.66	4.22			0.59	
DISSOLVED OXYGEN - METER		0.29	0.54			1.57	2.01				0.64			-1.57	0.36		
HYDROGEN SULFIDE (H2S)											0						
IRON(+2)											3.3 >						
MANGANESE(+2)											9.4						
NITRITE-N											0						
SULFIDE											0.01						
SPECIFIC CONDUCTANCE	MS/CM	0.72	0.735	0.838	0.672	0.738	0.703	1.29			0.795	2.785	1.898	2.014	1.165	1.81	
OXIDATION REDUCTION POTENTIAL	MV	207.4	328.7	124	319	274.3	340	277			306.8	220.7	134.6	230.2	155.9	191	
TURBIDITY	NTU	0.5	0.13	8.9	0.05	0.49	0.5	0.4			4.11	7.63	1.7	1.7	0	2.2	
PH	S.U.	3.68	3.65	4.1	4.5	4.06	3.33	3.92			4.27	4.64	4.89	4.65	6.68	4.88	
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L	0.08															
CHLORIDE			12		15 J		14		13		15 U		15 J		13		12
NITRITE/NITRATE-N		0.02 U	0.05 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U
SULFATE			430		660		650		560		260 J		1300		980		1100
TOTAL ORGANIC CARBON							1								1		

A blank cell indicates that no sample was collected or analysis was conducted for the parameter.
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
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 t
UG/L - micrograms per liter
C - degrees centigrade
MG/L - milligrams per liter
MS/CM - millisiemens per centimeter
MV - millivolts
NTU - nephelometric turbidity units
S.U. - standard units

TABLE 3-4

DESCRIPTIVE STATISTICS FOR
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146) ROUND 8 GROUNDWATER IN THE PENNSYLVANIAN MIDDLE WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organic Compounds (ug/L)							
Ethane	2/2	0.015 J	0.15	- - -	0.083	0.083	16GWT1207
Ethene	2/2	0.048	0.066	- - -	0.057	0.057	16GWT1207
Methane	2/2	2.3	2.9	- - -	2.60	2.60	16GWT1207
Trichloroethene	1/2	1 J	1 J	0.3 - 0.3	0.575	1.00	16GW0408
Miscellaneous Parameters (mg/L)							
Chloride	2/2	12	13	- - -	12.5	12.5	16GW0408
Sulfate	2/2	560	1100	- - -	830	830	16GWT1207

Associated Samples
16GW0408
16GWT1207

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIAN LOWER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		16MWT11								16MWT15							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		No Sample	12/06/03	08/25/04	02/04/05	05/06/05	08/12/05	01/22/06	05/21/06	No Sample	12/06/03	08/17/04	02/05/05	05/07/05	08/14/05	01/21/06	05/08/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
1,3-DINITROBENZENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.495 UJ								0.495 U						
2,4,6-TRINITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.248 UJ		0.316 U		0.29 U				0.248 U		0.266 U		0.26 U		
2,4-DINITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.248 UJ		0.316 U		0.29 U				0.248 U		0.266 U		0.26 U		
2,6-DINITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
2-NITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
3,5-DINITROANILINE			0.248 UJ		0.316 U		0.29 U				0.248 U		0.266 U		0.26 U		
3-NITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
4,4'-TN-AZOXY					0.632 U		0.59 U						0.532 U		0.52 U		
4-AMINO-2,6-DINITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
4-NITROTOLUENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
RDX			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
DNX			0.248 UJ		0.316 U		0.29 U				0.248 U		0.266 U		0.26 U		
HMX			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
MNX			0.248 UJ		0.316 U		0.29 U				0.248 U		0.266 U		0.26 U		
NITROBENZENE			0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
TETRYL			0.248 UJ	0.242 UJ	0.316 U	0.266 U	0.29 U	0.26 U	0.25 UJ		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U	0.25 U	0.25 U
TNX			0.248 UJ		0.316 U		0.29 U				0.248 U		0.266 U		0.26 U		
VOLATILES																	
TRICHLOROETHENE			0.3 U	0.3 U	0.3 U	52 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.6 J	0.3 U	0.3 U	0.3 U	1.4
CIS-1,2-DICHLOROETHENE			0.3 U	0.3 U	0.3 U	30 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
VINYL CHLORIDE			0.3 U	0.3 U	0.3 U	30 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
ETHANE					0.34		0.44		1.2		1		2.5		0.99		1.8
ETHENE					0.075		0.074		0.06		0.22		0.26		0.41		0.14
FIELD PARAMETERS																	
TEMPERATURE	C		7.29	24.93	11.82						12.78	15.85	13.89	16.87	19.23	13.73	
ALKALINITY	MG/L										250						
CARBON DIOXIDE											10 U						
DISSOLVED OXYGEN				0.87	9.72						3.5	1.77	1.36			0.6	
DISSOLVED OXYGEN - METER			4.51								2.57			-0.04	1.09		
HYDROGEN SULFIDE (H2S)											0						
IRON(+2)											0						
MANGANESE(+2)											0.3						
NITRITE-N											0.007						
SULFIDE											0.01						
SPECIFIC CONDUCTANCE	MS/CM		0.256	1.004	0.756						0.392	0.411	0.354	0.301	0.326	0.439	
OXIDATION REDUCTION POTENTIAL	MV		188	95	-43.9						174.1	143.1	-21.7	238.4	61	103	
TURBIDITY	NTU		650	4.7	2.8						22.5	2	0.6	0	0.65	4.6	
PH	S.U.		7.35	5.47	6.98						7.99	6.15	7.43	7.06	6.95	7.52	
MISCELLANEOUS PARAMETERS																	
CHLORIDE	MG/L				5		5		4.3		4		3 J		2		2.1
NITRITE/NITRATE-N					0.025 U		0.025 U		0.15		0.05 UJ		0.025 U		0.025 U		0.025 U
SULFATE					4		4		2.6		8		0.5 U		0.5 U		0.5 U
TOTAL ORGANIC CARBON							1 U				2.6				1 U		

A blank cell indicates that no sample was collected or analysis was conducted for the parameter.
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
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
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
UG/L - micrograms per liter
C - degrees centigrade
MG/L - milligrams per liter
MS/CM - millisiemens per centimeter
MV - millivolts
NTU - nephelometric turbidity units
S.U. - standard units

TABLE 3-6

DESCRIPTIVE STATISTICS FOR
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146) ROUND 8 GROUNDWATER IN THE PENNSYLVANIAN LOWER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organic Compounds (ug/L)							
Ethane	1/1	1.8	1.8	- - -	1.80	1.80	16GWT1507
Ethene	1/1	0.14	0.14	- - -	0.140	0.140	16GWT1507
Methane	1/1	9200	9200	- - -	9200	9200	16GWT1507
Trichloroethene	1/2	1.4	1.4	0.3 - 0.3	0.775	1.40	16GWT1507
Miscellaneous Parameters (mg/L)							
Chloride	2/2	2.1	4.3	- - -	3.20	3.20	16GWT1107
Nitrite/Nitrate-N	1/2	0.15	0.15	0.025 - 0.025	0.081	0.150	16GWT1107
Sulfate	1/2	2.6	2.6	0.5 - 0.5	1.43	2.60	16GWT1107

Associated Samples
16GWT1107
16GWT1507

TABLE 3-7

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 SURFACE WATER
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 1 AND 2

Location		16SW/SD10								16SW/SD12							
Round		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Date		No Sample	No Sample	No Sample	02/03/2005	05/08/2005	No Sample	01/05/2006	05/03/2006	No Sample	10/25/2003	11/02/2004	02/03/2005	05/08/2005	No Sample	01/05/2006	05/04/2006
Explosives	**Units**																
RDX					0.242 U	0.25 U		0.77	0.25 U		0.25 U	0.255 U	0.24 U	0.25 U		0.248 U	0.25 U
DNX											0.25 U						
MNX											0.25 U						
TNX											0.25 U						
Volatiles																	
TRICHLOROETHENE					0.3 U	0.3 U		0.3 U	0.3 U		15	5.6	20	6.7		11	8.7
CIS-1,2-DICHLOROETHENE					0.3 U	0.3 U		0.3 U	0.3 U		1.4	0.3 U	1.3	0.3 U		0.3 U	0.6 J
VINYL CHLORIDE					0.3 U	0.3 U		0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U
Field Parameters																	
TEMPERATURE	C			10.74	5.44	13.71		5.93	22.4		13.24	16.24	5.95	13.92		6.05	19.3
DISSOLVED OXYGEN	MG/L			6.02	8.95			8.78	9.14			9.38	10.07			9.65	9.53
DISSOLVED OXYGEN - METER						10.04					6			10.49			
SPECIFIC CONDUCTANCE	MS/CM			0.066	0.126	0.135		0.182	0.25		0.204	0.1	0.164	0.164		0.239	0.217
OXIDATION REDUCTION POTENTIAL	MV			120	218	213		180	-9999		195.4	51.4	218	211		182	-9999
TURBIDITY	NTU			46.7	6.9	1.5		11	0		4.06	38.4	3	3.5		2.2	11
PH	S.U.			7.26	3.65	6.96		7.28	5.28		7.21	7.16	3.75	6.76		7.29	6.62
Miscellaneous Parameters																	
NITRITE/NITRATE-N	MG/L										0.11	0.43					

TABLE 3-7

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 SURFACE WATER
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 2 AND 2

Location		16SW/SD13								16SW/SD30							
Round		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Date		No Sample	10/25/2003	11/02/2004	02/03/2005	05/08/2005	No Sample	01/05/2006	05/04/2006	No Sample	No Sample	10/26/2004	02/03/2005	05/08/2005	No Sample	01/05/2006	05/04/2006
Explosives	**Units**																
RDX			0.25 U	0.25 U	0.24 U	0.245 U		0.242 U	0.25 U			24	14	13		19	18
DNX			0.25 U														
MNX			0.25 U														
TNX			0.25 U														
Volatiles																	
TRICHLOROETHENE			0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U			0.3 U	0.3 U	0.3 U		0.3 U	0.3 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	0.3 U	0.3 U		0.3 U	0.3 U
VINYL CHLORIDE			0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U			0.3 U	0.3 U	0.3 U		0.3 U	0.3 U
Field Parameters																	
TEMPERATURE	C		13.68	16.03	5.25	12.66		5.46	18.7			13.28	3.12	14.56		5.45	
DISSOLVED OXYGEN	MG/L			9.18	10.93			9.67	10.27			8.9	11.15			9.92	
DISSOLVED OXYGEN - METER			2.94			8.45								10.44			
SPECIFIC CONDUCTANCE	MS/CM		0.168	0.84	0.175	0.166		0.247	0.254			0.159	0.14	0.133		0.22	
OXIDATION REDUCTION POTENTIAL	MV		68.3	49.4	203	203		175	-9999			53.6	188	207		162	
TURBIDITY	NTU		15.9	22.8	2.2	3.3		4.8	15			9.49	3.1	9		8.4	
PH	S.U.		6.4	7.64	3.83	6.48		7.45	6.57			7.37	4.16	7.07		7.44	
Miscellaneous Parameters																	
NITRITE/NITRATE-N	MG/L		0.27	0.55													

A blank cell indicates that no sample was collected or analysis was conducted for the parameter.
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
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
UG/L - micrograms per liter
C - degrees centigrade
MG/L - milligrams per liter
MS/CM - millisiemens per centimeter
MV - millivolts
NTU - nephelometric turbidity units
S.U. - standard units

TABLE 3-8

DESCRIPTIVE STATISTICS FOR
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146) ROUND 8 SURFACE WATER
NSWC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Explosives (ug/L)							
4-Amino-2,6-Dinitrotoluene	1/4	0.93	0.94	0.25 - 0.25	0.329	0.940	16SW3006
HMX	1/4	4.8	4.9	0.25 - 0.25	1.32	4.90	16SW3006
RDX	1/4	17	18	0.25 - 0.25	4.59	18.0	16SW3006
Volatile Organic Compounds (ug/L)							
cis-1,2-Dichloroethene	1/4	0.6 J	0.6 J	0.3 - 0.3	0.263	0.600	16SW1207
Trichloroethene	1/4	8.7	8.7	0.3 - 0.3	2.29	8.70	16SW1207
Miscellaneous Parameters							
Dissolved Oxygen - Meter (mg/L)	3/3	9.14	10.27	- - -	9.65	9.65	16SW1307
pH	3/3	5.28	6.62	- - -	6.16	6.16	16SW1207
Specific Conductance (MS/CM)	3/3	0.217	0.254	- - -	0.240	0.240	16SW1307
Temperature (C)	3/3	18.7	22.4	- - -	20.1	20.1	16SW1006
Turbidity (NTU)	2/2	11	15	- - -	13.0	13.0	16SW1307

Associated Samples
16SW1006
16SW1207
16SW1307
16SW3006
16SW3006-D

4.0 DATA EVALUATION

Section 4 presents groundwater and surface monitoring data for Rounds 1 through 8. The information presented includes potentiometric surface contours and temporal plots for each groundwater and surface water sampling location included in the SWMU 16 long term monitoring program. The objective of the long term monitoring program at SWMU 16 is to collect enough monitoring data (up to nine rounds) to determine whether residual explosives are naturally degrading and to provide data for making remedy decisions for residual explosives and VOC contamination to complete the CMS.

The information being provided in this monitoring program fulfills the requirements established by the U.S. EPA Region 5 as described in the document entitled "Region 5 Framework for Monitored Natural Attenuation Decisions for Groundwater" (U.S. EPA 2000). The framework summarizes the current state-of-the-science and U.S. EPA policy on the use of MNA. The framework also provides technical direction for the collection of specific primary and secondary monitoring information to demonstrate a net loss of contaminants and processes responsible for the loss.

The primary MNA monitoring information requirements are identified below in bold type along with supporting information being provided by the SWMU 16 long term monitoring program:

- **Monitoring data should include analytical results for the contaminants of concern and their degradation products from nine or more rounds of samples collected under non-pumping conditions over a period of three to five years.** The SWMU 16 long term monitoring program is providing analytical results for select explosives and VOCs. RDX is considered to be the principal explosive chemical of concern because it is a site-related contaminant and it has been detected more frequently and at higher concentrations that any other explosive at SWMU 16.. Degradation products of RDX are DNX, MNX, and TNX. For reasons similar to RDX, TCE is considered to be the primary VOC of concern and has the degradation products cis-1,2-dichloroethene, vinyl chloride, ethene, ethane, and methane. The long-term monitoring program is scheduled to include nine rounds of sampling, under non-pumping conditions, to provide information on trends in groundwater concentrations of explosives and explosives degradation productions. To date, 8 rounds of groundwater sampling has been conducted: Round 1 (February through May 2003); Round 2 (October 2003 through January 2004); Round 3 (July through November 2004), Round 4 (February 2005), Round 5 (May 2005), Round 6 (August 2005), Round 7 (January 2006), and Round 8 (May 2006). The remaining round of sampling will be completed in 2007 and will reflect a MNA monitoring period of approximately three years at SWMU 16.

- **There should be at least two years of quarterly sampling to evaluate seasonal effects on the contaminant concentrations.** At the completion of the ninth round of sampling in 2007, monitoring will have been conducted for approximately 3 years.

- **The data should be collected from appropriately located sampling points, including within the source area, within the center of the plume, and at the leading edges of the plume.** The SWMU 16 long term monitoring program includes 12 wells. The location of each well relative to the source area and the contamination plume is discussed in Section 4.1 below.

- **Samples should be collected from points located vertically (above and below) and horizontally (upgradient and downgradient) outside the area of groundwater contamination.** The long term monitoring program includes monitoring wells located in three (Puz, Pmz, and Plz) water bearing zones to evaluate if contamination is migrating from the upper aquifer to the lower aquifer. In addition, monitoring wells are positioned upgradient and downgradient of the source area, within the source plume and along the outside area of the groundwater contamination. Explosives contamination has been detected in the Puz and Pmz water bearing zones, but not in the Plz water bearing zone. VOCs have been detected in the all three water bearing zones.

- **The most recent analytical data on groundwater should be no more than two years old at the time of evaluation.** The ninth round of sampling will be completed in 2007. A final report evaluating the MNA program through nine rounds of sampling is expected to be issued in 2007. As a result, the most recent analytical data will be no more than two years old.

- **Demonstration of a trend of decreasing contamination concentration must be clear and meaningful and be based on statistical tests which indicate a high degree of confidence in the apparent trend line.** The SWMU 16 MNA report for nine rounds of sampling will include temporal plots of RDX and TCE, and their associated degradation by-product concentrations. In addition, a statistical analysis and summary of analytical data will be included to provide information on trends in groundwater concentrations.

- **Additional rounds of samples, beyond nine rounds, may be required to demonstrate the decreasing trend.** SWMU 16 MNA monitoring data will be evaluated after nine rounds and a decision will be made if additional data is needed.

The secondary MNA monitoring information requirements are identified below in bold type along with supporting information being provided by the SWMU 16 long term monitoring program:

- **The monitoring data should be collected from appropriate locations that are distributed both vertically and horizontally throughout the plume.** The long term monitoring program includes monitoring wells located in the Puz, Pmz, and Plz water bearing zones to evaluate if contamination is migrating downward to lower aquifers. In addition, the monitoring program includes monitoring wells positioned upgradient and downgradient of the source area, within the source plume, and along the outside area of the groundwater contamination. As stated previously, explosives contamination has been detected in the Puz and Pmz zones, but not in the Plz aquifer. VOCs have been detected in all 3 water bearing zones.

- **Sample locations should consider heterogeneities in geologic structures and in the spatial distribution of contaminants. Groundwater flow paths and rates should be fully and accurately defined.** Groundwater elevations are being measured during each sampling round to develop potentiometric analyses of groundwater direction and flow rates and the results will be presented in the final MNA report.

- **Locations should be sampled under non-pumping conditions and should include the following information:**

  - **Contaminants of concern and potential degradation by-products.** The SWMU 16 monitoring program is providing analytical results for RDX and TCE, which are the primary chemicals of concern, and their associated degradation products which are identified in Section 3.

  - **Routine and Other Indicator Parameters.** The monitoring data includes the routine indicator parameters dissolved oxygen (DO), oxidation reduction potential (ORP), pH, specific conductance, temperature, turbidity, and nitrite/nitrate concentrations. Other parameters measured in the MNA monitoring that can be used to support decision making include alkalinity, chloride, nitrite, nitrate, dissolved methane, iron (II) and iron (III), sulfate, sulfide, and total organic carbon (TOC).

  - **Vertical and horizontal characterization of the distribution of hydraulic conductivity and its affect on contaminant concentrations.** Information collected in nine rounds of sampling will be evaluated and used to characterize vertical and horizontal hydraulic conductivity.

- **Water levels should be measured to determine groundwater flow direction.** Groundwater elevations are being measured at each well during each of the nine sampling rounds and the results will be presented in the final MNA report in the form of potentiometric surface figures.

- **Seasonal variations and trends should be evaluated by obtaining data from different times of the year to determine if changes in contaminant concentrations, indicator parameters or water types are caused by natural attenuation or may be attributed to seasonal variability.** The SWMU 16 monitoring program includes quarterly monitoring which will measure RDX, TCE, degradation by-product concentrations, and routine indicator parameters. The final MNA report will include the presentation of temporal plots to discern potential seasonal trends of RDX, TCE and degradation by-product concentrations, as well as routine indicator parameters.

4.1 GROUNDWATER MONITORING PROGRAM

The MNA groundwater monitoring program is being conducted at 12 select well locations across SWMU 16 (see Figure 2-1). These wells have been established in accordance with U.S. EPA Region 5 MNA guidance (U.S. EPA 2000). The monitoring wells have a specific role in the monitoring program and represent locations within the plume and source area, leading edges of the plume, and from points located vertically (above and below) and horizontally (upgradient and downgradient) outside the area of groundwater contamination. In Rounds 4 through 9, these locations are being analyzed for explosives and VOCs. The selected wells are distributed as follows in the Puz, Pmz, and Plz Water Bearing Zones:

- One clean, laterally upgradient well (16MW02) in the Puz
- Three source area wells (16MWT06, 16MWT13, 16MWT17) in the Puz
- Four wells within the RDX and TCE plumes (16MW03, 16MWT04, 16MWT09, and 16MWT10) in the Puz.
- One well at the leading edge of the plume (16MW04) in the Puz
- One laterally downgradient well that is clean (16MWT12) in the Pmz
- Two clean, deep wells below the plumes (16MWT11, 16MWT15) in the Plz

4.2 SURFACE WATER MONITORING PROGRAM

In support of the MNA demonstration, surface water samples are also being collected at four select locations (see Figure 2-2). These locations include 16SW10, 16SW12, 16SW13, and 16SW30. In Rounds 4 through 9, these locations are being analyzed for explosives and VOCs.

4.3 ROUND 8 POTENTIOMETRIC SURFACES

The potentiometric surface elevation maps for the Puz, Pmz, and Plz water bearing zones at SWMU 16 in Round 8 are shown in Figures 4-1 through 4-3, respectively. The groundwater elevations for Round 8 in all three zones were compared to groundwater elevations and flow directions reported in the Round 7 MNA report (TtNUS, 2006b). The groundwater elevations for Round 7 are presented in Appendix E. Further discussion of the potentiometric surface elevations for Round 8 is presented below.

In Round 8, groundwater elevations in the Puz zone ranged from 743.31 feet above mean sea level (amsl) at well 16MWT10 to 755.47 feet amsl at well 16MWT04. Most wells in the Puz experienced a slight increase (less than 2 feet) in water elevation from Round 7 to Round 8 with the exception of 16MWT13 which was higher in Round 8 by approximately +13 feet. The groundwater elevation for well 16MWT04 was the only slightly lower in Round 8 versus Round 7. Groundwater flow directions in the Puz remained essentially the same in Round 8 in comparison to Round 7. As reported previously, groundwater to the west of the SWMU 16 centerline flows to the west and southwest, ultimately discharging into gullies that drain surface water and groundwater westward towards a tributary of Turkey Creek. Shallow groundwater east of the SWMU 16 centerline flows to the east towards gullies on the eastern side of the site. Shallow groundwater is also present in the east-central portion of the site and flows in a southeasterly direction towards gullies on the southeastern side of the site that convey water eastward and southeastward towards Turkey Creek.

In Round 8, Pmz groundwater elevations ranged from 731.32 feet amsl at well 16MT16 to 737.35 feet amsl at well 16MWT05 (WES-14-01-83). As compared to Round 7, the most significant change in Pmz groundwater elevation occurred in wells 16MTMW05 (WES-14-01-83) and 16MWT12, where water levels dropped by 28.13 feet and 6.30 feet, respectively. All other Pmz wells reported slight increases in groundwater elevation between 1.63 to 3.63 feet. Groundwater in the Pmz is continuing to flow toward the southwestern, southern, and southeastern hillsides.

All wells in the Plz water bearing zone had only small increases in groundwater elevations in Round 8. The elevations ranged from 666.51 feet asml at well 16MWT08 to 700.35 feet amsl at well 16MWT15. Monitoring well 16MWT15 was not used in developing the potentiometric surface map for the Plz because the potentiometric elevation for 16MWT15 was approximately 33 feet higher than the average water level measured in the other two wells screened in the Plz. This may indicate that the well is in an area of increased vertical fracturing and enhanced leakage from the overlying intermediate flow zone. The groundwater flow direction on the eastern side of the site in the Plz is towards the northeast.

4.4 GROUNDWATER TEMPORAL TREND PLOTS AND DATA EVALUATION

4.4.1 Pennsylvanian Upper Water Bearing Zone (Puz)

Figures 4-4 and 4-5, respectively, show temporal plots of RDX and TCE, and their associated degradation by-product concentrations for Rounds 1 through 8. The temporal plots on each page are arranged in columns by monitoring well location showing concentration trends for RDX and TCE followed by the trend for each degradation by-product. The analytical results for each round are shown as a data point on each plot with the data validation qualifier as applicable and correspond to data presented in Table 3-1 for the Puz.

Through Round 8, RDX has been detected at all Puz monitoring locations with the exception of 16MW02, which is the upgradient well (see Figure 4-4). This pattern of concentrations, among other evidence, links RDX to SWMU 16 as a site-related contaminant in groundwater. DNX and more notably MNX have been detected in 6 wells (16MWT03, 16MWT04, 16MWT06, 16MWT09, and 16MWT10). This alone, is an indication that degradation of RDX is occurring because the only source of these degradation compounds is RDX.

TCE has been detected at all Puz well locations with the exception of the upgradient well (16MW02). TCE degradation-by-products have been detected at all Puz wells, including 16MW02. Similar to RDX, this links TCE to SWMU 16 as a site-related contaminant. Also, detections of TCE degradation-by-products at all Puz wells provide evidence that TCE is degrading in the environment. A summary evaluation of monitoring results through Round 7 for each Puz well location is presented below.

- Upgradient well:
  - 16MW02 - There have been no detections of RDX or degradation-by-products through Round 8. Also, there have been no detections of TCE; however ethene and ethane have been detected in most rounds. Results through Round 8 show no clear trends regarding ethane or ethene concentrations.
- Three source area wells:
  - 16MWT06 - RDX has been detected in all 8 rounds of sampling and concentrations are showing a general upward trend. Only one degradation product (MNX) has been detected, which occurred in Round 6. TCE and associated degradation-by-products have been detected in all

rounds of sampling. TCE demonstrated a steady increase in concentrations through Round 5; but is now showing a downward trend in Rounds 6, 7, and 8. Cis-1,2-dichloroethene concentrations demonstrated an upward trend in Rounds 1 through 5; however, concentrations now appear to be trending downward in Rounds 6 through 8. Concentrations of ethene and ethane have trended downward since Round 2. Vinyl chloride concentrations generally trended upward through Round 4; however are showing signs of a decreasing trend in Rounds 5 through 8.

- 16MWT13 - RDX has only been detected in Rounds 2, 3, and 7. There have been no detections of RDX degradation products. TCE and cis-1,2-dichloroethene have been detected in all rounds; however, concentrations have decreased significantly since Round 2 and are presently showing no trend since Round 4. Concentrations of ethane and ethene have also decreased since Round 2 and are showing no discernable trend after Round 2.

- 16MWT17 - RDX has been detected in all rounds and appears to be showing a potential upward trend. There have been no detections of RDX degradation by-products. TCE and cis-1,2-dichloroethene have been detected in Rounds 2 through 8 with concentrations of both contaminants generally trending upward. Ethane and ethene have been detected in Rounds 4, 6, and 8; however show no apparent trend in concentrations.

- Four wells within the RDX and TCE plumes:

  - 16MW03 - RDX has been detected in all rounds with concentrations showing no distinct trend. MNX has been the only detected degradation by-product with concentrations appearing to trend lower based on 3 samples. TCE has also been detected in all rounds; however there is no distinct trend in TCE concentrations. Cis-1,2-dichloroethene has been detected in Rounds 1 through 3, but not in subsequent rounds. There have been no detections of vinyl chloride. Ethane and ethene have been detected in Rounds 4, 6, and 8, but show no clear trend in concentrations.

  - 16MWT04 - RDX has been detected in all rounds with concentrations showing no clear trend. DNX and MNX have been the only detected RDX degradation by-products. DNX was only detected in Round 2. MNX has been detected in Rounds 2, 4, and 6, but shows no trend in concentrations. TCE has been detected in all rounds with concentrations showing a downward trend since Round 4. Ethane and ethene are the only TCE degradation products detected in well

16MWT04 through Round 8. Concentrations of both by-products have trended downward since Round 2. Cis-1,2-dichloroethene and vinyl chloride have not been detected through Round 8.

- 16MWT09 - RDX has been detected in all rounds and but generally shows no trend in concentrations. MNX has been the only detected degradation-by-product and concentrations show no trend based on 3 samples. TCE has been detected in all rounds of sampling with no trend in concentrations. Cis-1,2-dichloroethene has only been detected in Round 1. Ethane and ethene have been detected in Rounds 4, 6, and 8, and are showing a potential downward trend.

- 16MWT10 - RDX has been positively detected in all rounds with concentrations showing a potential downward trend in Rounds 6, 7, and 8. MNX has been the only detected degradation-by-product in Rounds 2 and 4 and was not detected in Round 6, indicating a potential downward trend. TCE has been detected in all rounds and there are indications of a potential downward trend since Round 4. Ethene and ethane were detected in Rounds 2, 4, 6, and 8 and concentrations have generally decreased since Round 2.

4.4.2 Pennsylvanian Middle Water Bearing Zone (Pmz)

The Figures 4-6 and 4-7, respectively, show temporal plots of RDX, TCE, and their associated degradation-by-product concentrations for Rounds 1 through 8 for wells 16MW04 and 16MWT12. The data points and validation qualifiers posted on each trend plot correspond to data presented in Table 3-3. RDX has been detected only in well 16MW04. DNX, MNX, and TNX have not been detected in either well. TCE has been detected most frequently at well 16MW04. A summary evaluation of monitoring results for each Pmz well location is presented below:

- Well at the leading edge of the plume:

  - 16MW04 - RDX has been positively detected in all rounds except Round 8. As a result, it appears that RDX concentrations are showing a potential downward trend since Round 2. RDX degradation-by-products have not been detected at 16MW04. TCE has been detected in all Rounds except 2 and 7, and shows no clear indications of a trend in concentrations. There has only been one detection for cis-1,2-dichloroethene in Round 1. More recently, ethane and ethene have been detected in Rounds 6 and 8, with concentrations of both by-products increasing in Round 8. There have been no detections of cis-1,2-dichloroethene or vinyl chloride.

- Downgradient well:

  - 16MWT12 - There have been no detections of RDX or degradation-by-products through Round 8. TCE has only been detected once in Round 4. Ethene and ethane have been the only detected degradation products. Since Round 2, ethane concentrations have decreased and leveled off to show generally steady concentrations in Rounds 4, 6, and 8. However, ethene concentrations have fluctuated over four rounds of sampling and show no clear trend.

4.4.3 Pennsylvanian Lower Water Bearing Zone (Plz)

Figures 4-8 and 4-9, respectively show temporal plots of RDX and TCE and associated degradation by-product concentrations for the Plz. All positive hits are shown as a data point on each plot and correspond to data presented in Table 3-9. A summary evaluation of monitoring results for each Plz well location is presented below:

- Deep wells below the plumes:

  - 16MWT11 - There have been no detections of RDX, TCE, or RDX degradation-by-products. Ethane and ethene were detected in Rounds 4, 6, and 8. Ethane concentrations have trended upward, whereas, ethene concentrations have decreased slightly since Round 4.

  - 16MWT15 - There have been no detections of RDX or degradation-by-products through Round 8. TCE has only been detected in Rounds 4 and 8. Ethene and ethane have been detected in Rounds 2, 4, 6, and 8, but are not showing a clear trend in concentrations.

4.4 SURFACE WATER TEMPORAL TREND PLOTS AND DATA EVALUATION

Figures 4-10 and 4-11, respectively, show temporal plots of RDX and TCE and associated degradation by-product concentrations in surface water through Round 8. Due to very dry conditions, surface water samples were not collected in Round 6. All analytical results are shown as a data point on each plot and correspond to data presented in Table 3-7. Through Round 8, RDX has only been detected at locations 16SW/SD10 and 16SW/SD30, with detections occurring for all sampling events at 16SW/SD30. RDX degradation by-products analysis has been limited to Round 2 when there we no detections reported. Only TCE and cis-1,2-dichloroethene have been detected at 16SW/SD12. A summary evaluation of monitoring results for each surface water location is presented below:

- 16SW/SD10 - No detections of RDX, TCE, or their associated degradation products through Round 8.

- 16SW/SD12 - No detections of RDX or degradation products. TCE has been detected in all rounds of sampling with no trend in concentrations. Cis-1,2-dichloroethene has only been detected sporadically in Rounds 2, 4, and 8.

- 16SW/SD13 - No detections of RDX, TCE, or their associated degradation products through Round 8.

- 16SW/SD30 - RDX has been detected in Rounds 3, 4, 5, 7, and 8. Over this period, RDX concentrations have generally trended downward since Round 3. No analyses have been conducted for RDX degradation products at this location. There have been no detections of TCE or degradation products through Round 8.

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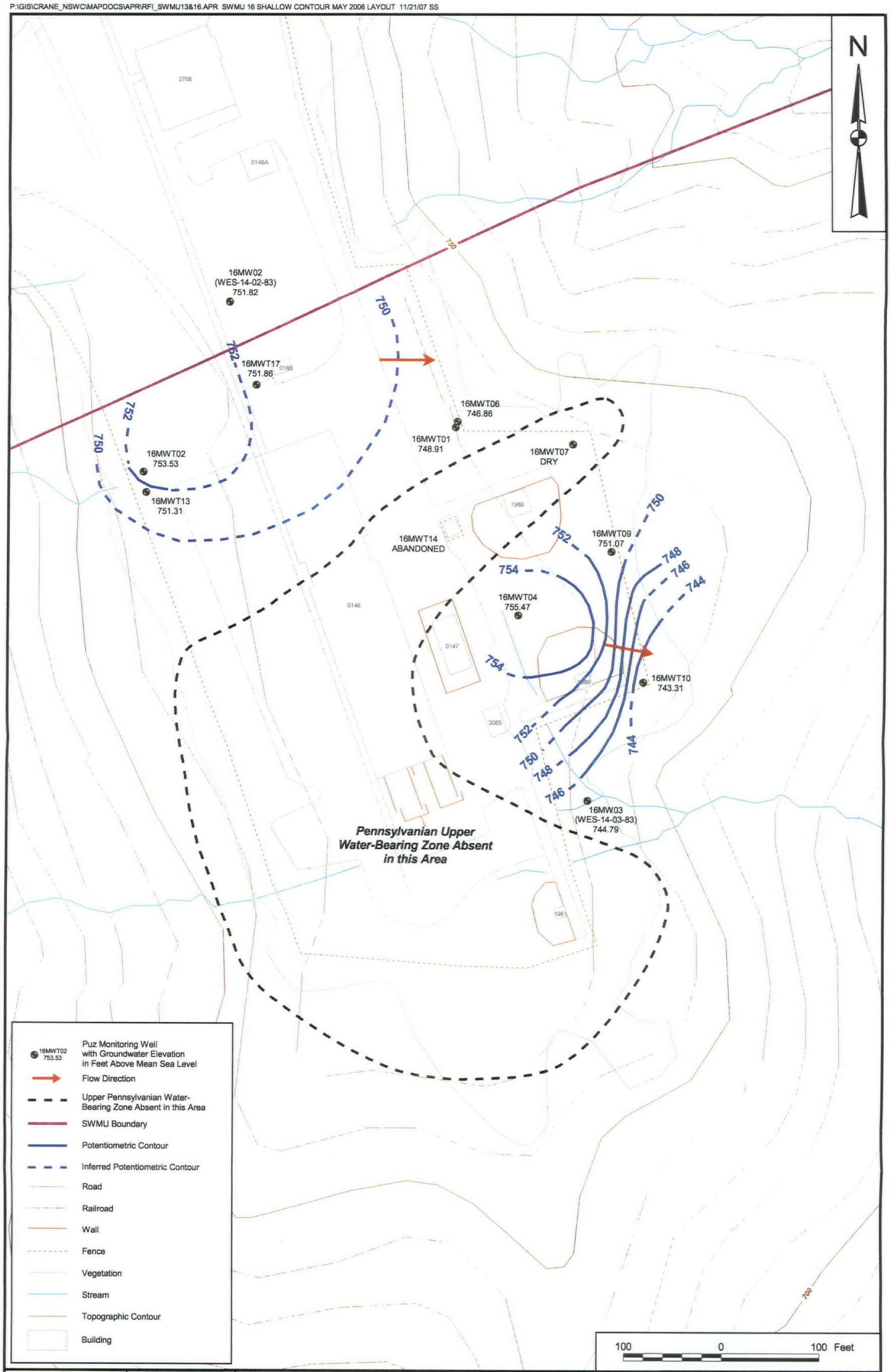
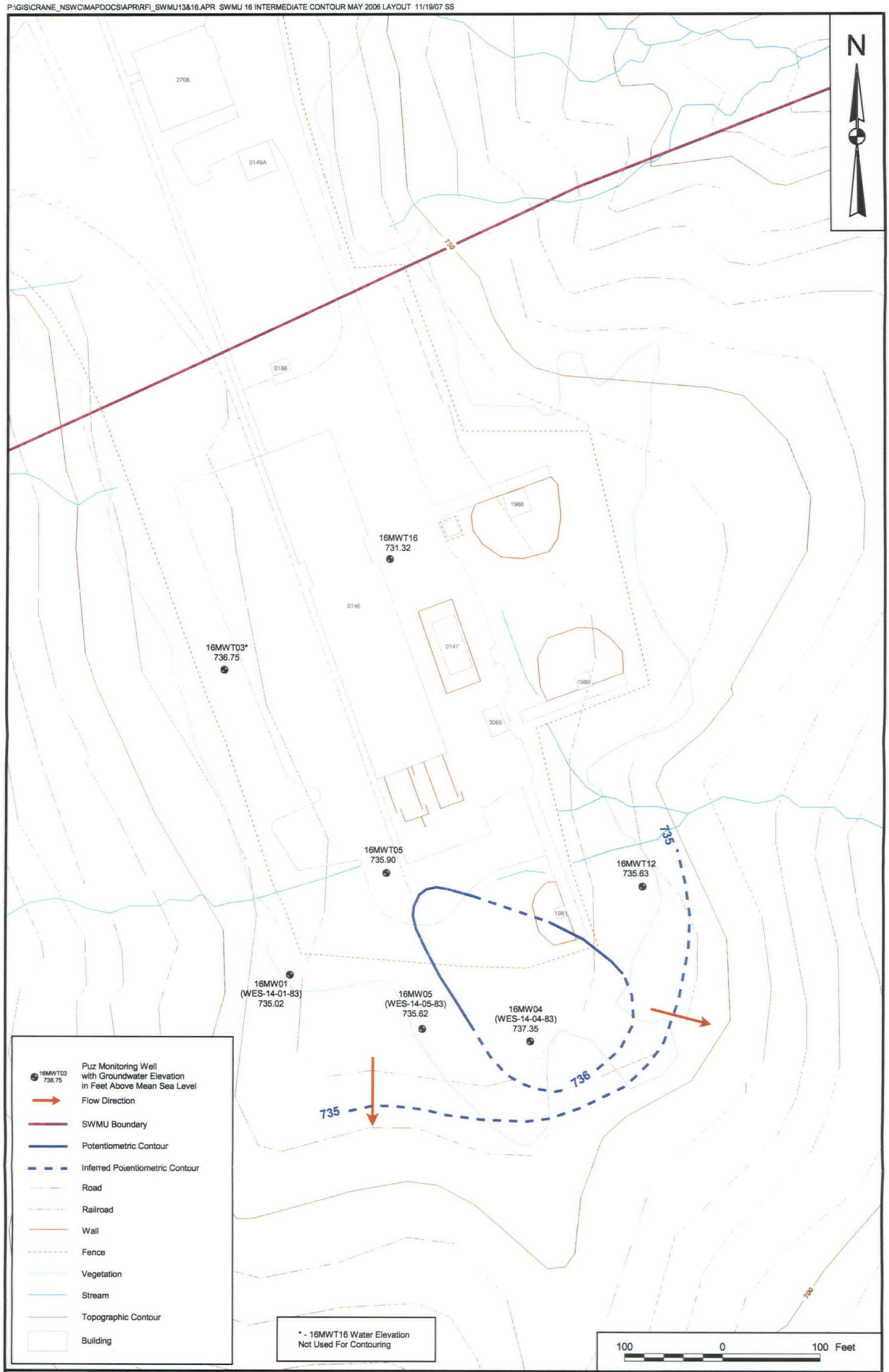


DRAWN BY S. STROZ	DATE 11/19/07	POTENTIOMETRIC SURFACE MAP FOR	CONTRACT NUMBER 00041
CHECKED BY J. LUCAS	DATE 11/21/07	PENNSYLVANIAN UPPER WATER-BEARING ZONE - MAY 3, 2006	APPROVED BY — DATE —
COST/SCHEDULE-AREA		ROUND 8	APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC	SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	DRAWING NO. FIGURE 4 - 1 REV 0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16.APR SWMU 16 INTERMEDIATE CONTOUR MAY 2006 LAYOUT 11/19/07 SS



DRAWN BY S. STROZ	DATE 11/19/07	POTENTIOMETRIC SURFACE MAP FOR PENNSYLVANIAN MIDDLE WATER-BEARING ZONE - MAY 3, 2006 ROUND 8 SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER 00041
CHECKED BY J. LUCAS	DATE 11/19/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 4 - 2 REV 0

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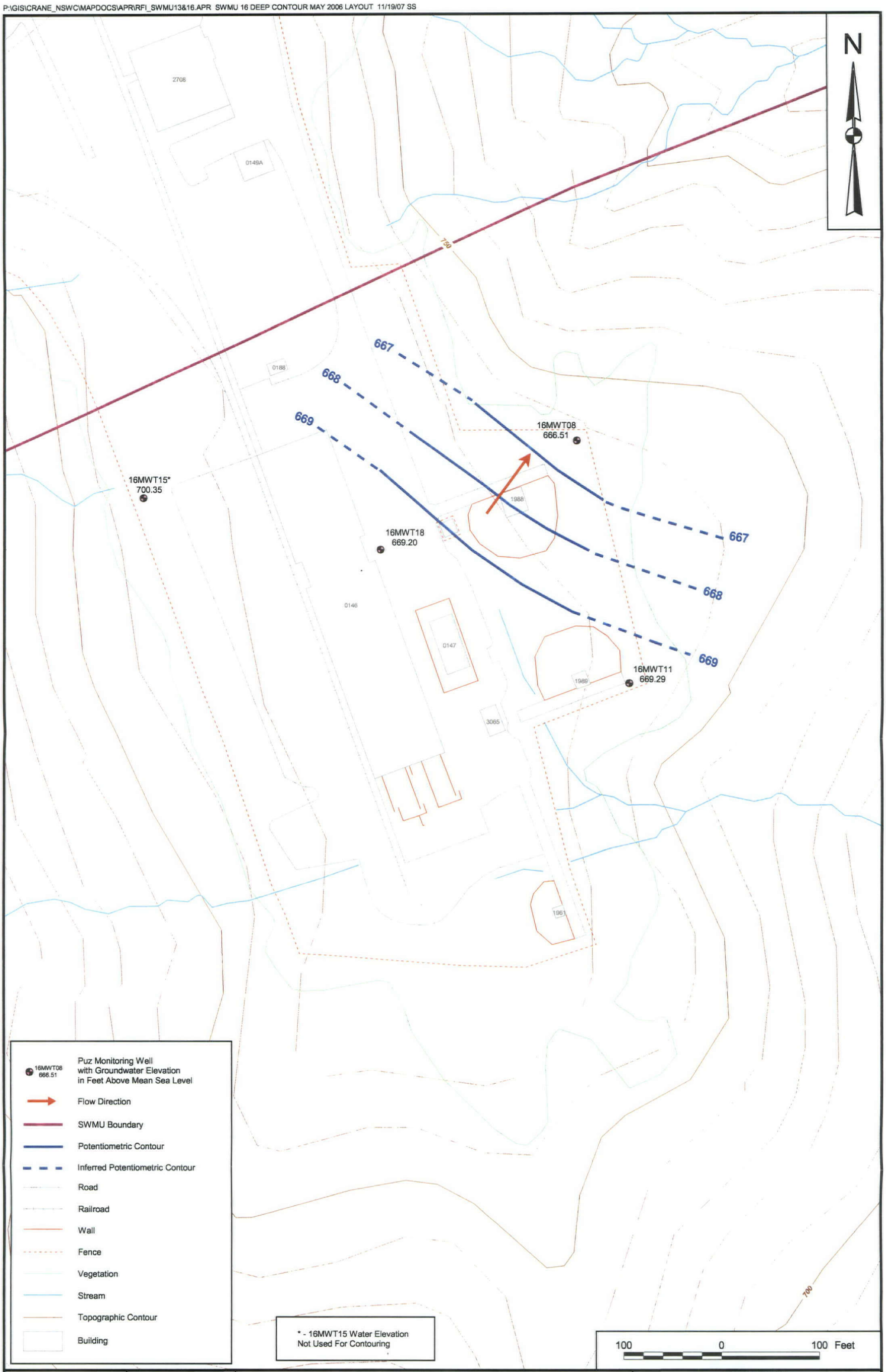


DRAWN BY S. STROZ	DATE 11/19/07	POTENTIOMETRIC SURFACE MAP FOR PENNSYLVANIAN LOWER WATER-BEARING UNIT - MAY 3, 2006 ROUND 8 SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER 00041
CHECKED BY J. LUCAS	DATE 11/19/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 4 - 3 REV 0

FIGURE 4-4

TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 16
FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 1 OF 2

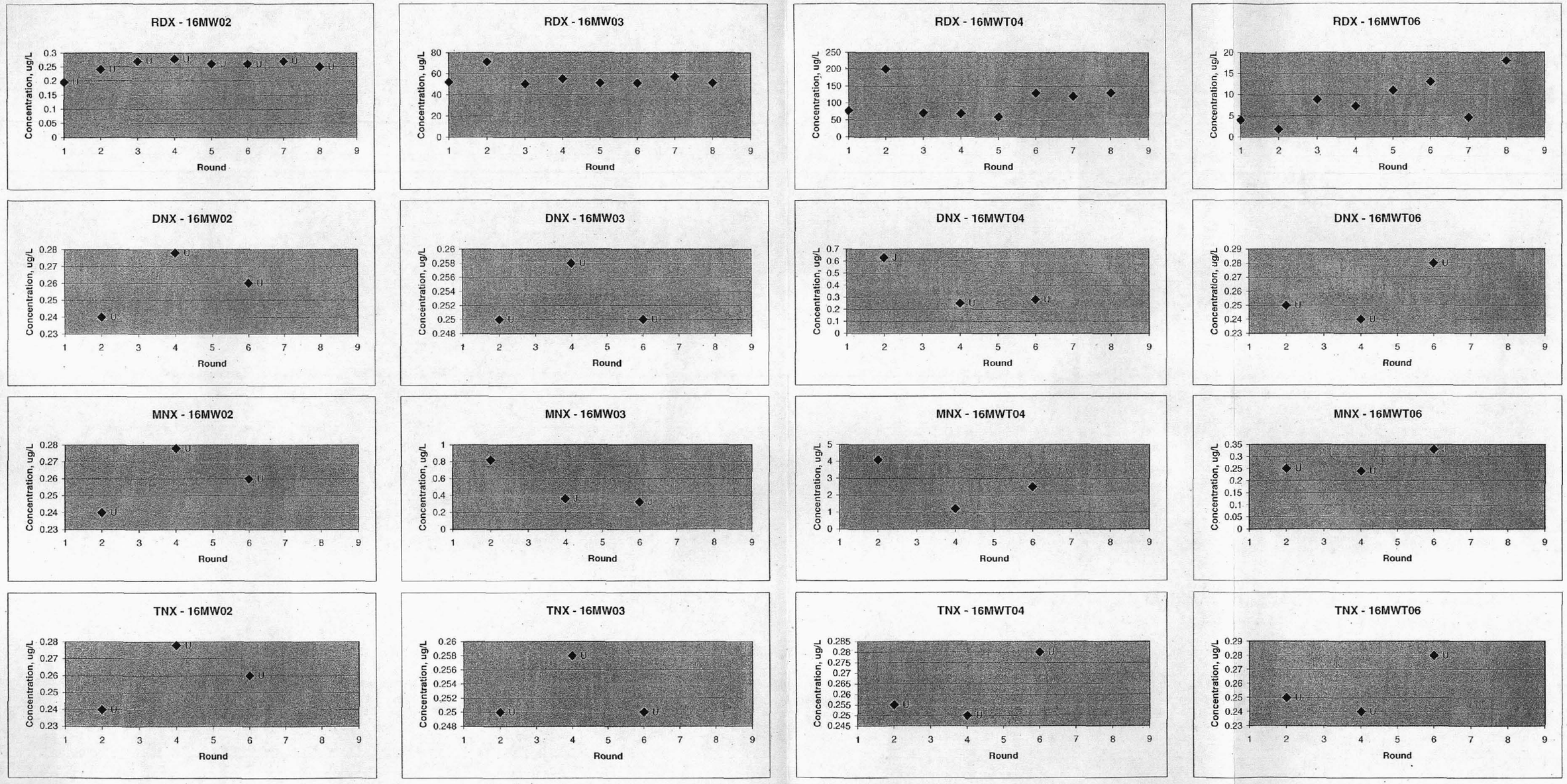


FIGURE 4-4

TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 16
FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

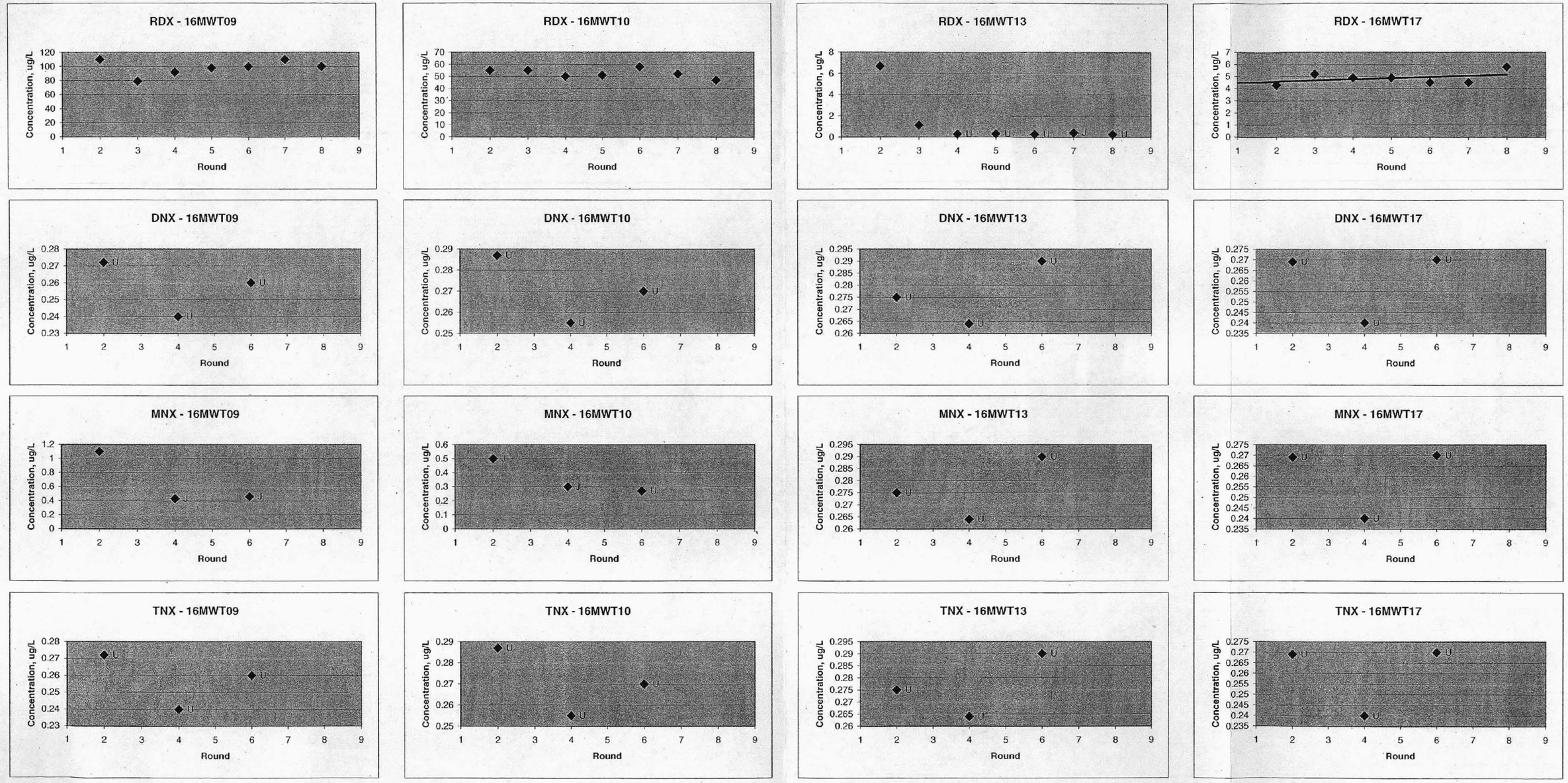


FIGURE 4-5

TEMPORAL PLOTS OF TRICHLOROETHENE AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 16
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 1 OF 2

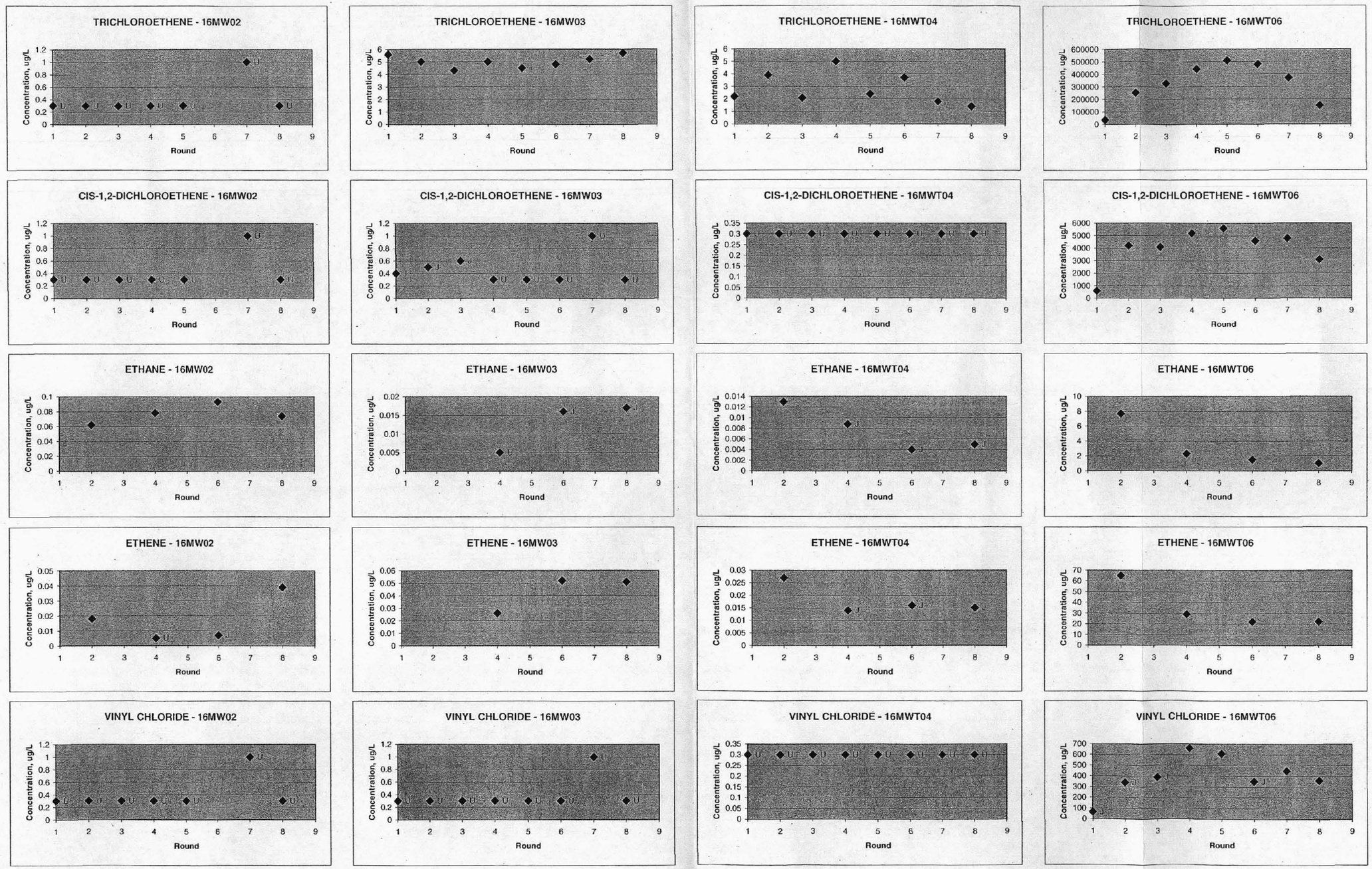


FIGURE 4-5

TEMPORAL PLOTS OF TRICHLOROETHENE AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 16
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 2 OF 2

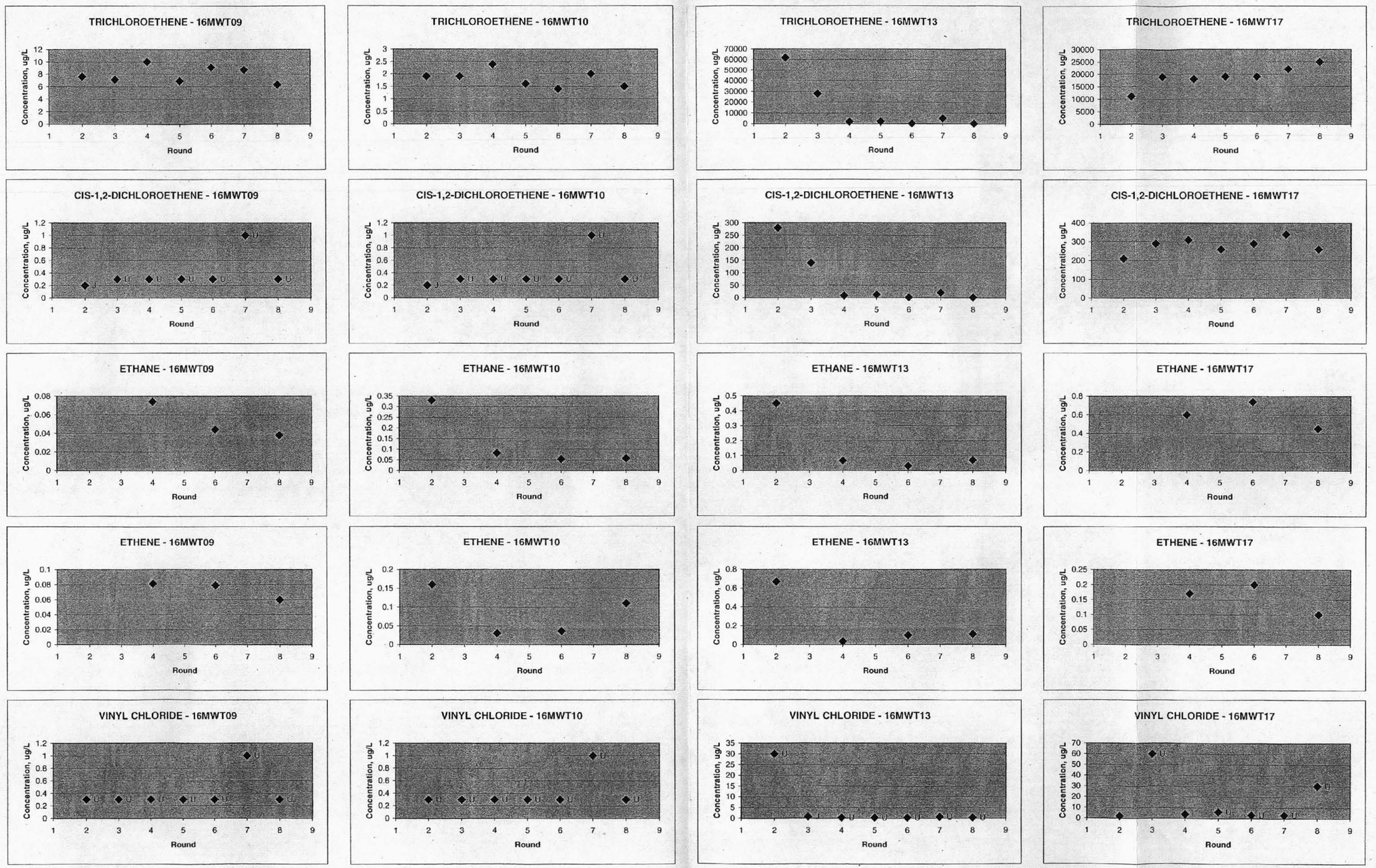


FIGURE 4-6

TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA MIDDLE WATER BEARING ZONE AT SWMU 16
FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

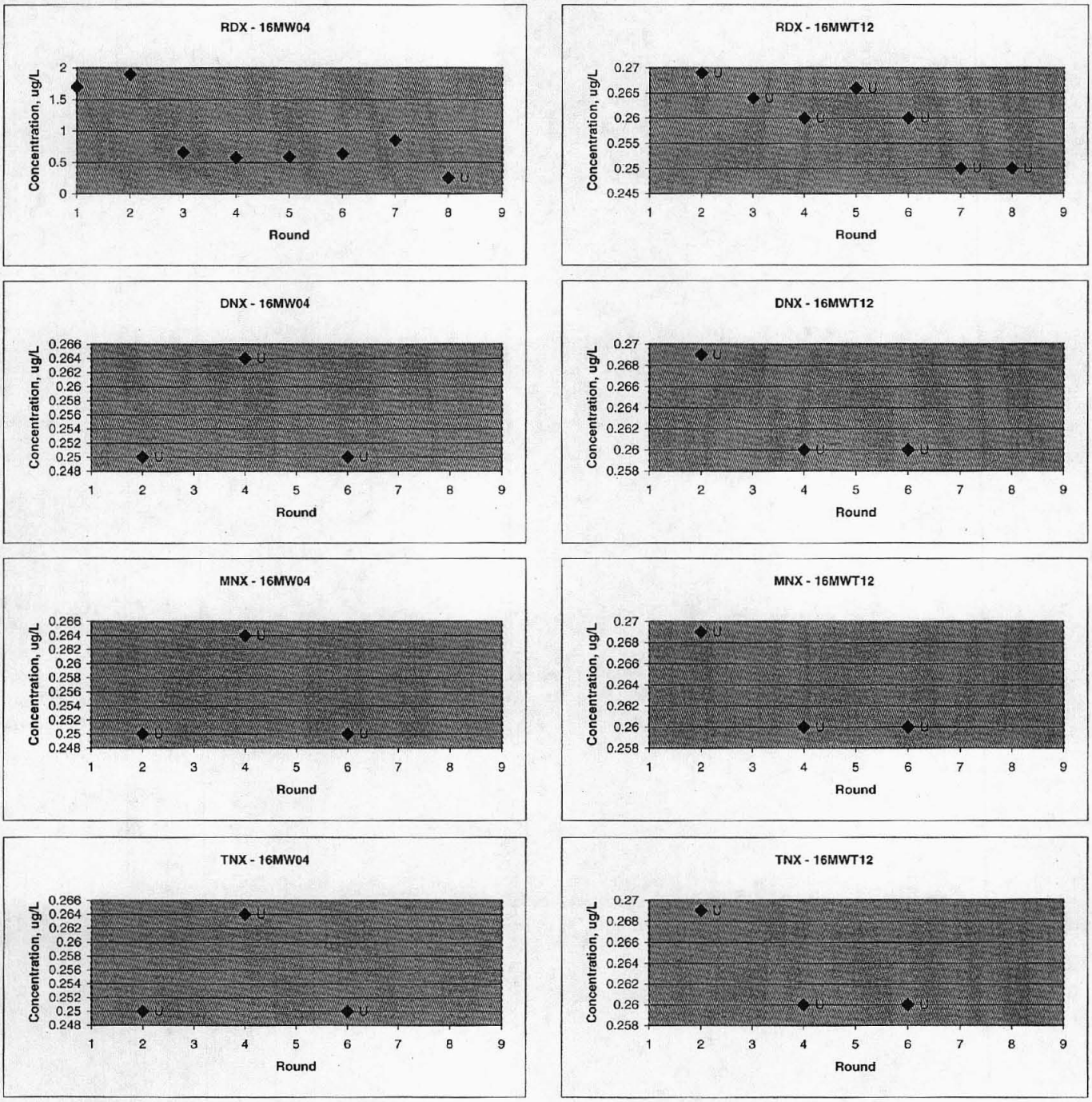
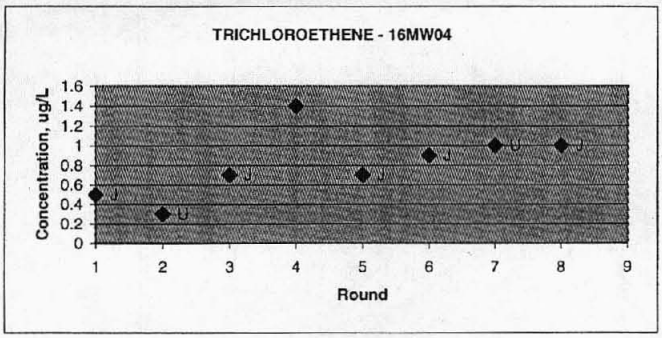
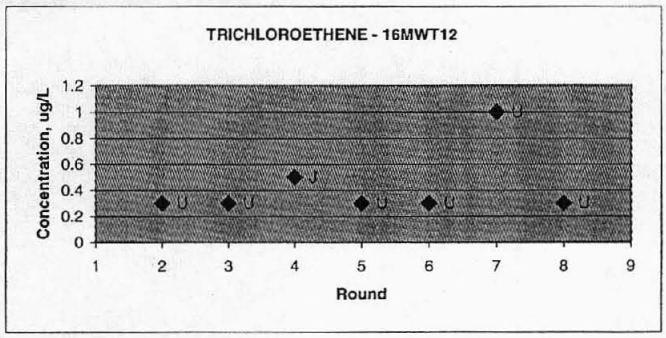
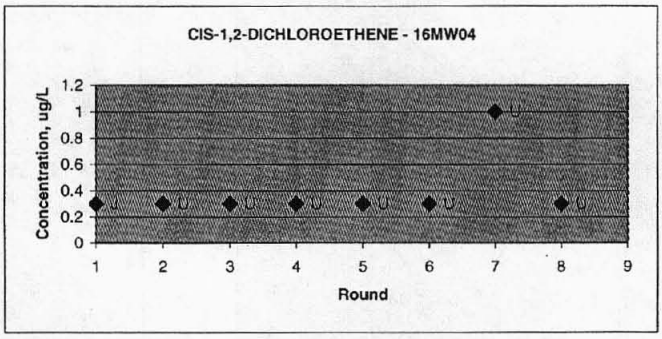


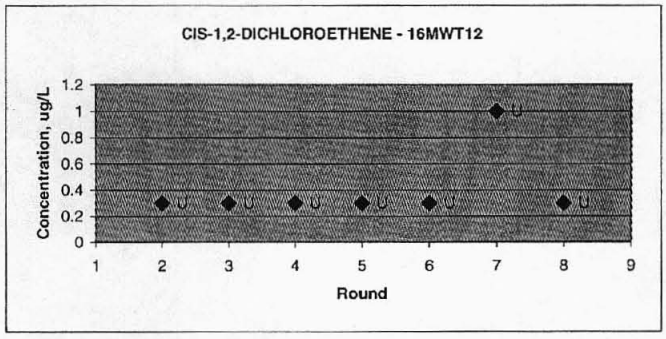
FIGURE 4-7

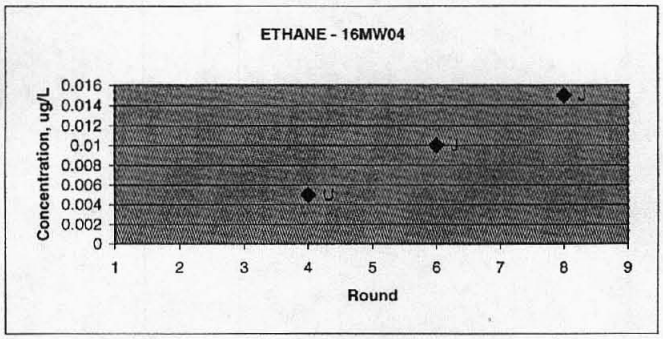
TEMPORAL PLOTS OF TRICHLOROETHENE AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA MIDDLE WATER BEARING ZONE AT SWMU 16
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

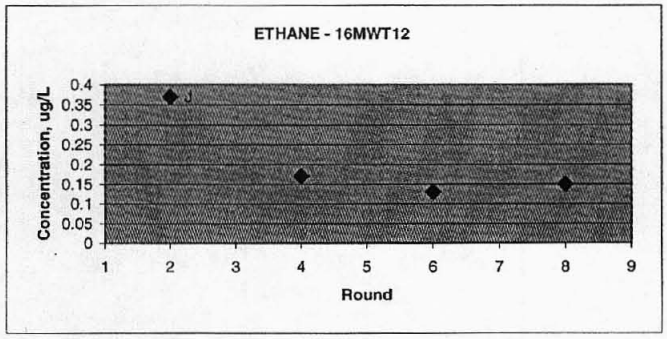


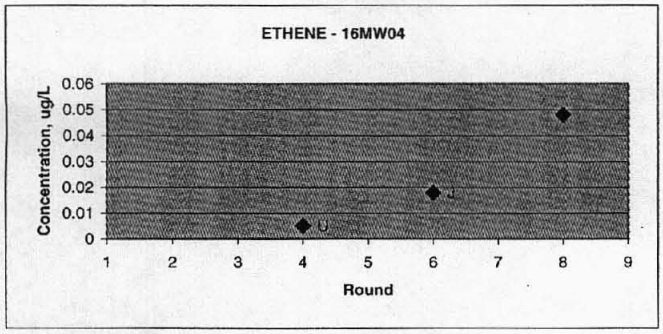


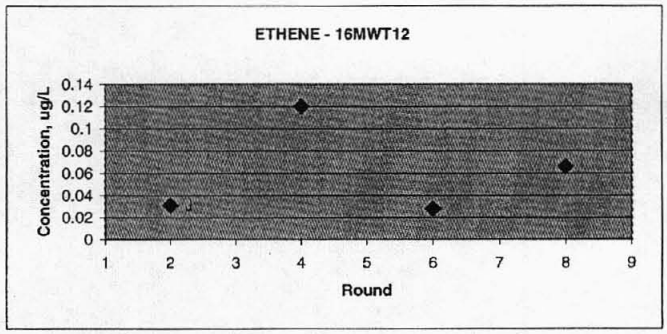


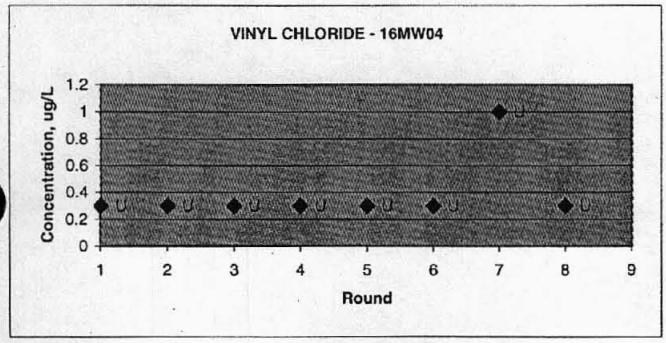












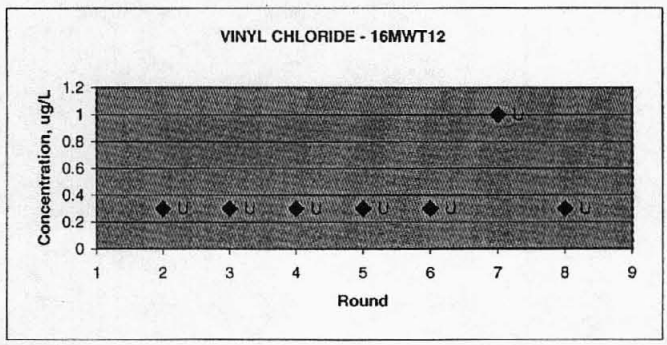


FIGURE 4-8

TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIAN LOWER WATER BEARING ZONE AT SWMU 16
FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

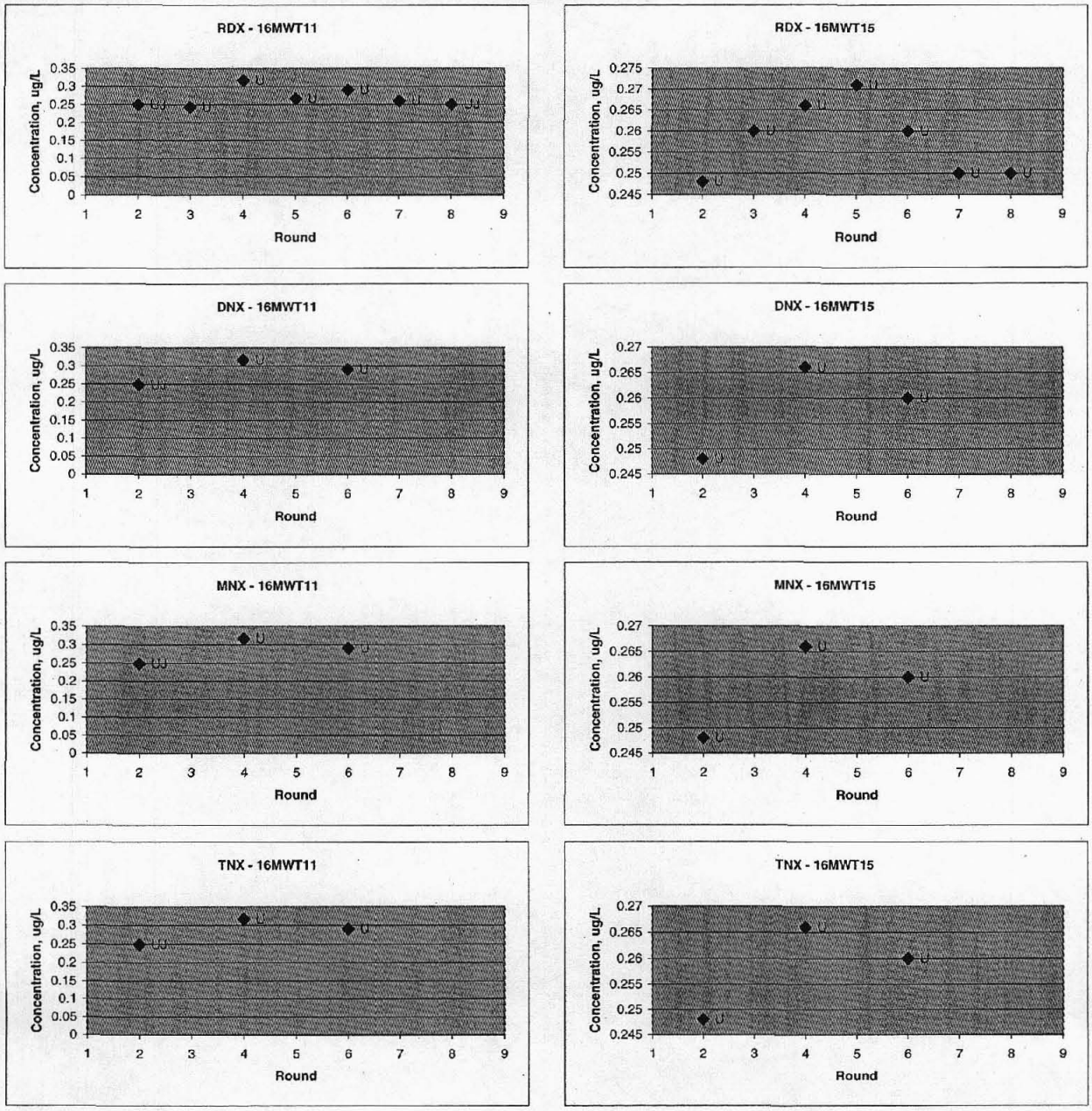


FIGURE 4-9

TEMPORAL PLOTS OF TRICHLOROETHENE AND DEGRADATION BY-PRODUCT CONCENTRATIONS
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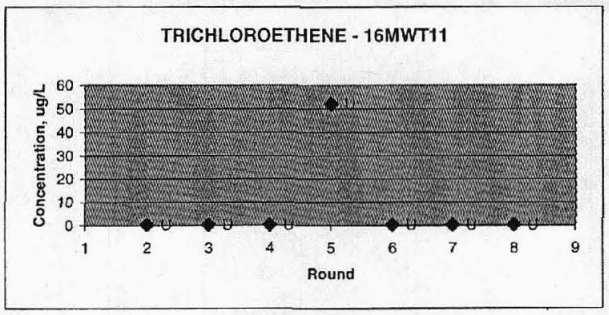
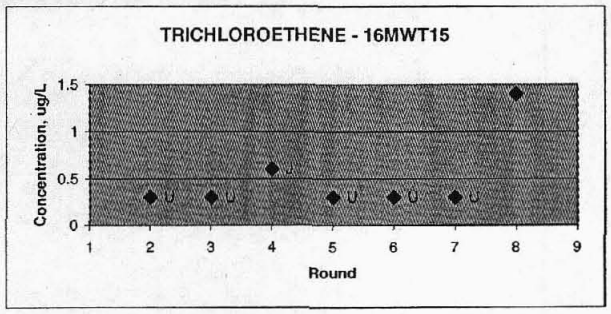
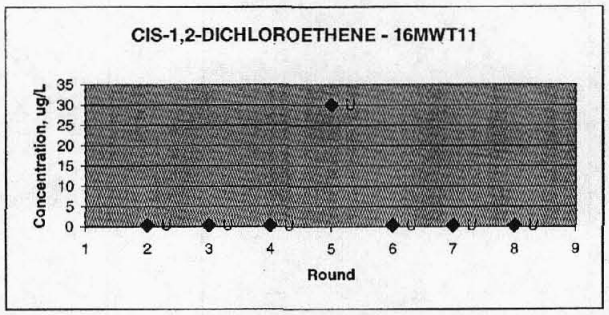
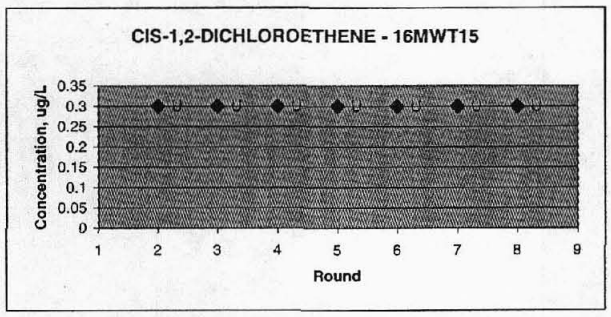
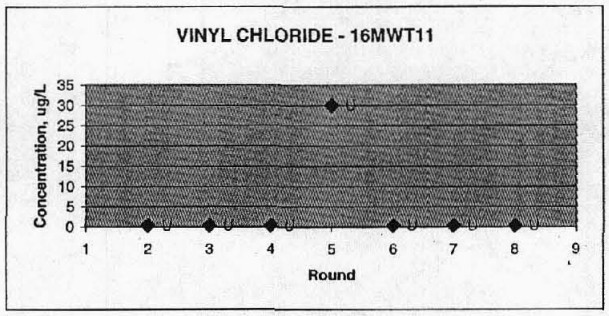
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

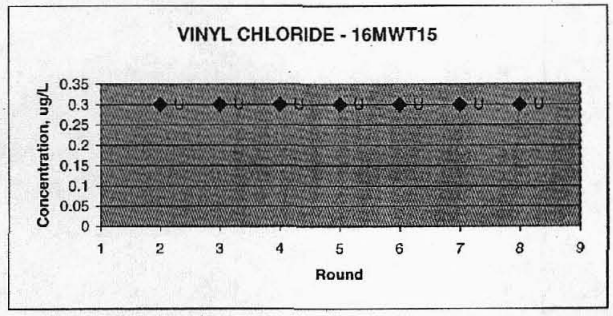


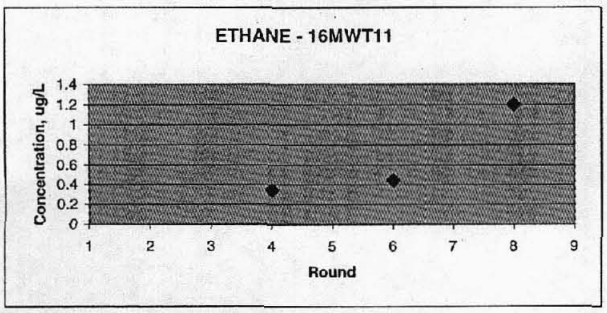


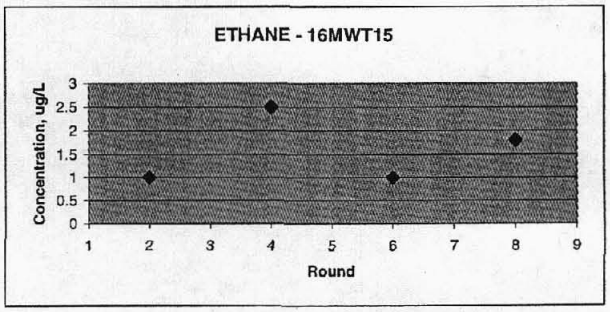


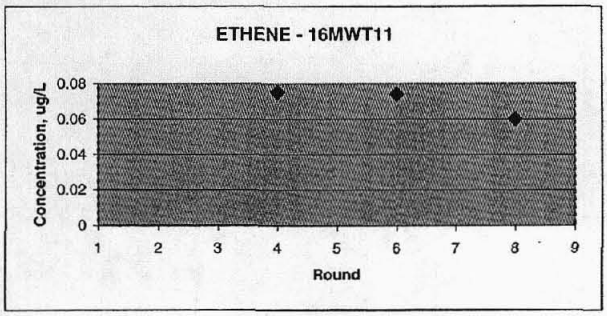












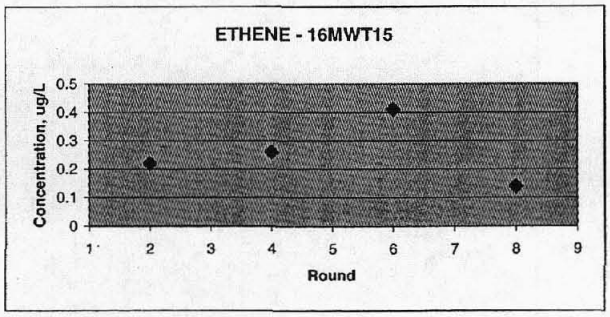


FIGURE 4-10

TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 16 FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDANA

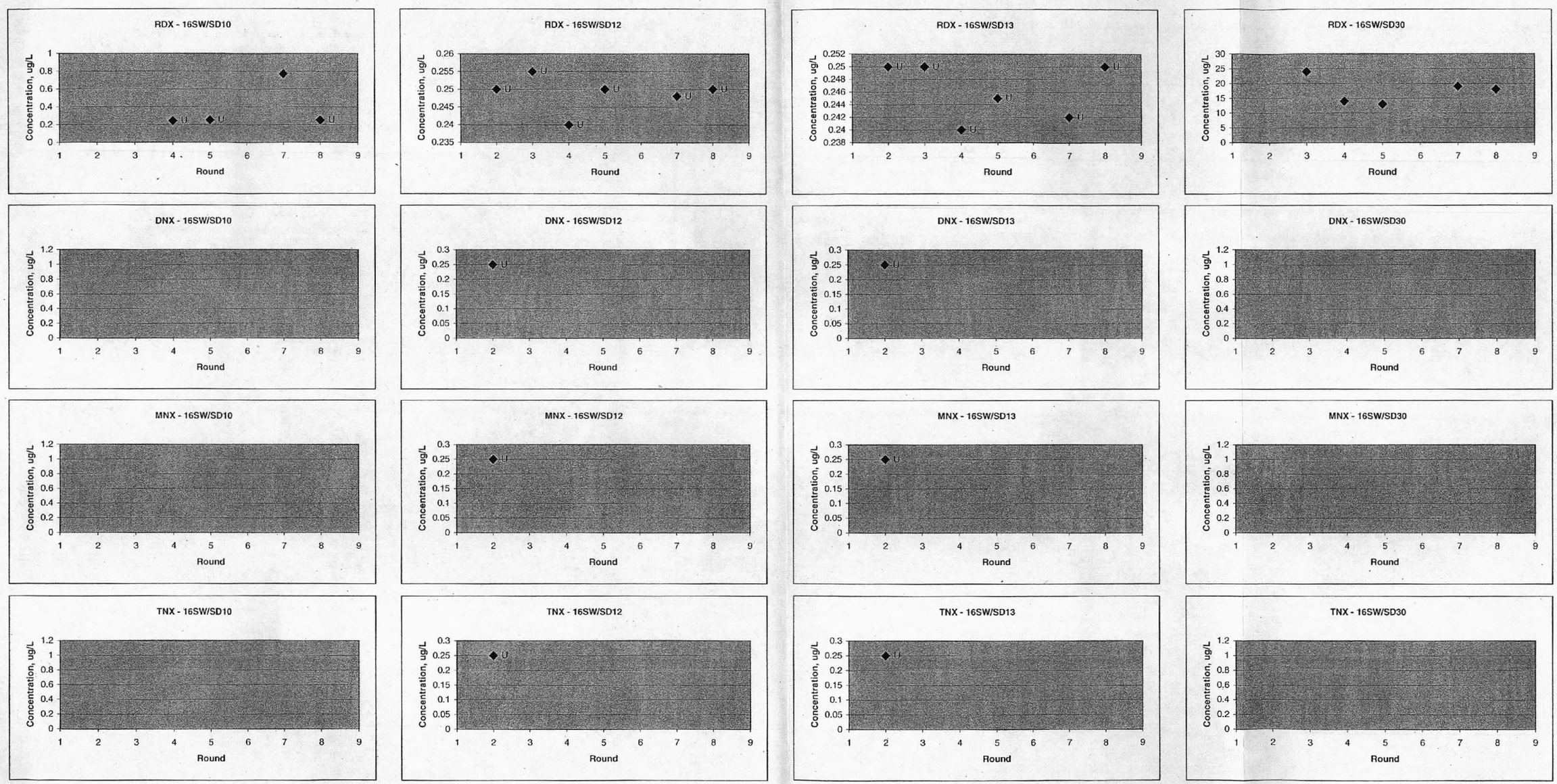
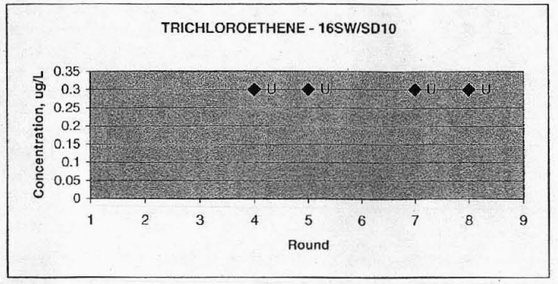
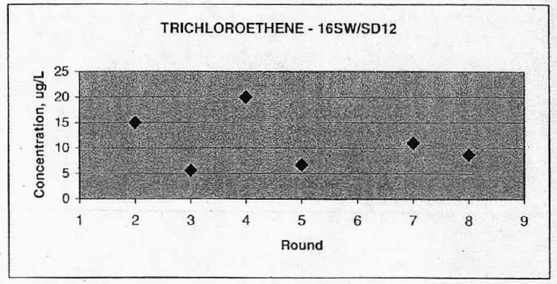
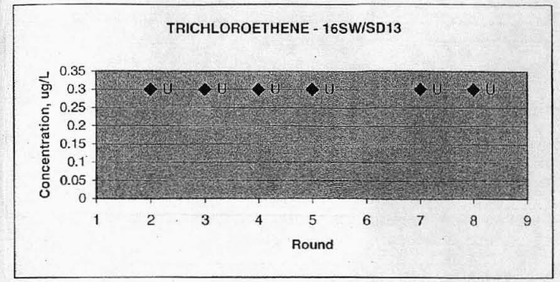


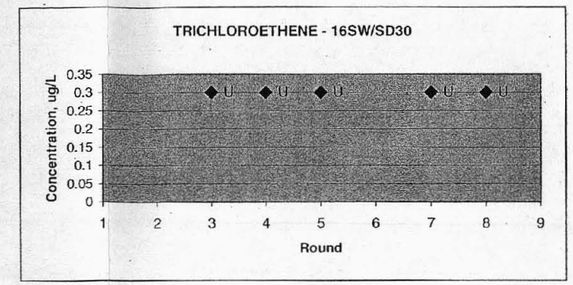
FIGURE 4-11

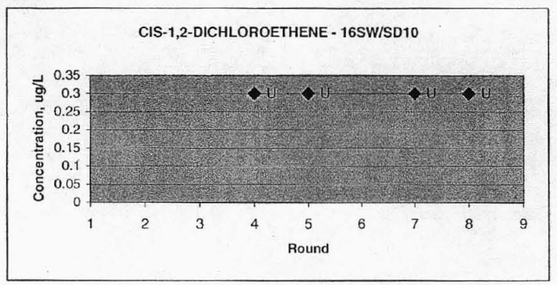
TEMPORAL PLOTS OF TRICHLOROETHENE AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 16
NSWC CRANE
CRANE, INDIANA

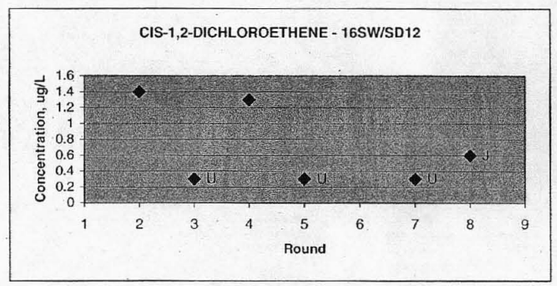


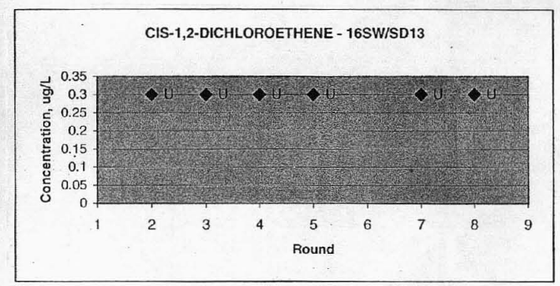


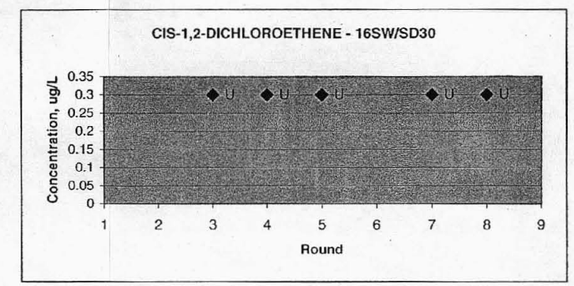


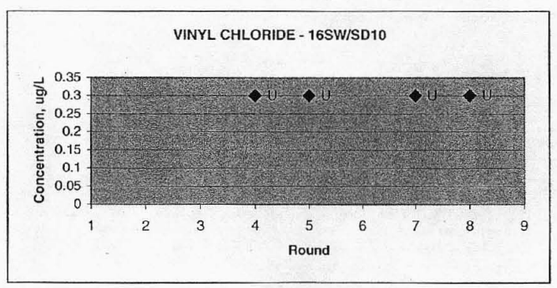


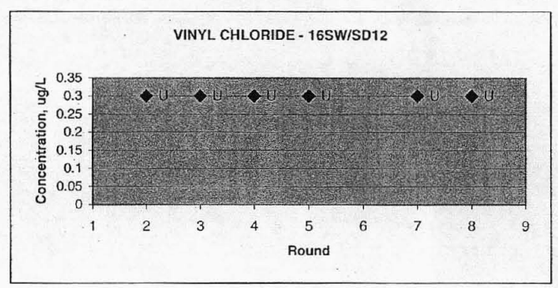


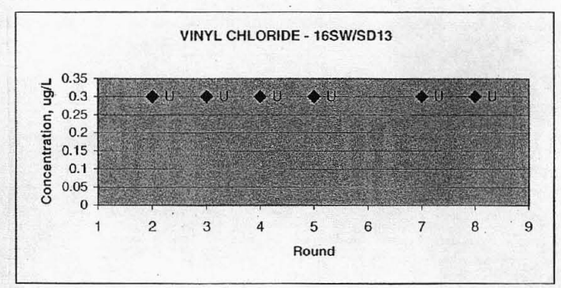


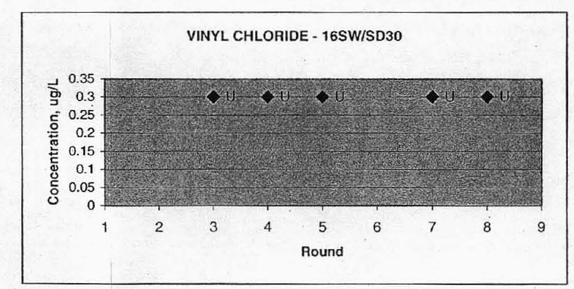












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APPENDIX A

SWMU 16

SAMPLE LOG SHEETS AND OTHER FIELD FORMS

ROUND 8

A.1

SWMU 16

GROUNDWATER SAMPLE LOG SHEETS

ROUND 8

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/4/06	**Modified Date**	5/5/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GW020~~8~~9
TtNUS Project #	112G00041	**Well ID**	16MW02
Task/Contract #	CTO 377	**Well Type**	Monitoring Well
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/4/06	**Static Water Level (ft.)**	14.63	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1335
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3327-2402
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)
5/4/06	16:08	14.63	175	Clear	6.97	0.719	3.84	4.2	14.7	37			0
5/4/06	16:18	14.92	175	Clear	6.89	0.648	1.01	0.75	13.7	15			1750

5/4/06	16:28	14.98	175	Clear	6.81	0.614	0.86	0.30	13.7	15			1750
5/4/06	16:39	15.02	175	Clear	6.69	0.590	0.37	0.25	13.6	20			1925
5/4/06	16:48	15.o5	175	Clear	6.63	0.578	0.17	0.15	13.4	25			1575
5/4/06	16:58	15.05	175	Clear	6.60	0.571	1.38	0.20	13.4	29			1750
5/4/06	17:08	15.05	175	Clear	6.60	0.567	1.09	0.00	13.4	30			1750
5/4/06	17:18	15.06	175	Clear	6.60	0.564	1.30	0.05	13.6	30			1750

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/4/06	17:29	15.06	175	Clear	6.59	0.558	0.00	0.00	13.6	29			1925
5/4/06	17:39	15.08	175	Clear	6.58	0.557	0.00	0.00	13.6	29			1750

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.00
Total Vo. Purge (L)	15.925	**Waterlevel (ft.)**	15.08	**Turbidity (NTUs)**	0.00
Start Purge (hrs.)	4:08:00 PM	**Flowrate (mL/min)**	175	**Temp (C)**	13.6
End Purge (hrs.)	5:39:00 PM	**Color**	Clear	**ORP (mV)**	29
Total Purge Time (min.)	91	**pH (S.U.)**	6.58	**Salinity**	
		Conductivity (mS/cm)	0.557	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/4/06	17:45	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-552006-1
✓	5/4/06	17:45	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-552006-1
✓	5/4/06	17:45	SW-846-8330	Nitroaromatics and Nitramines	4°C	1	Glass	1L Amber		112G00041-552006-1
✓	5/4/06	17:45	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-552006-1
✓	5/4/06	17:45	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-552006-1
✓	5/4/06	17:45	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-552006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	5/6/06	**Modified Date**	5/7/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GW0308
TtNUS Project #	112G00041	**Well ID**	16MW03
Task/Contract #	CTO 377	**Well Type**	Monitoring Well
WBS Code #	TP00050125	**Sampled By**	James Goerdt
		Concentration	Low concentration

Well and Sample Data

Date	5/6/06	**Static Water Level (ft.)**	19.01	**Water Quality Meter**	4143005
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3254-1902
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)
5/6/06	15:45	19.01	100	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
5/6/06	15:55	20.89	100	Clear	4.24	0.558	0.59	21	14.40	387	NA	NA	1000

5/6/06	16:05		100	Clear	4.22	0.563	0.3	12	14.67	399	NA		1000
5/6/06	16:25	21.62	100	Clear	4.14	0.577	0	4.38	14.73	420	NA		2000
5/6/06	16:35		100	Clear	4.11	0.573	0	6.21	14.20	416	NA		1000
5/6/06	16:45	21.95	100	Clear	4.09	0.569	0	10.09	14.09	419	NA		1000
5/6/06	16:55		100	Clear	4.10	0.568	0	8.92	14.02	418	NA		1000
5/6/06	17:05	22.36	100	Clear	4.04	0.570	0	5.09	13.85	417	NA		1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/6/06	17:15		100	Clear	4.03	0.571	0	5.21	13.86	419	NA		1000
5/6/06	17:25	22.52	100	Clear	4.00	0.571	0	4.81	13.75	419	NA		1000
5/6/06	17:35	22.75	100	Clear	3.96	0.571	0	3.89	13.66	420	NA		1000
5/6/06	17:45	22.80	100	Clear	3.87	0.570	0	3.12	13.75	420	NA		1000
5/6/06	18:15	22.83	100	Clear	3.89	0.565	0	2.12	13.79	414	NA		3000
5/6/06	18:25	22.87	100	Clear	3.88	0.568	0	3.20	13.78	418	NA		1000
5/6/06	18:35	22.89	90	Clear	3.82	0.563	0	3.68	13.61	415	NA		900
5/6/06	18:45	22.90	90	Clear	3.81	0.561	0	6.82	13.56	414	NA		900
5/6/06	18:55	22.88	90	Clear	3.85	0.560	0	3.12	13.48	410	NA		900

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0
Total Vo. Purge (L)	18.7	**Waterlevel (ft.)**	22.88	**Turbidity (NTUs)**	3.12
Start Purge (hrs.)	3:45:00 PM	**Flowrate (mL/min)**	90	**Temp (C)**	13.48
End Purge (hrs.)	6:55:00 PM	**Color**	Clear	**ORP (mV)**	410
Total Purge Time (min.)	190	**pH (S.U.)**	3.85	**Salinity**	NA
		Conductivity (mS/cm)	0.560	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/6/06 1:00:00 AM	19:00	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06 1:00:00 AM	19:00	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06 1:00:00 AM	19:00	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06 1:00:00 AM	19:00	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06 1:00:00 AM	19:00	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-582006-4
✓	5/6/06 1:00:00 AM	19:00	DGPM-01/AM20GAX	Methane Ethane and Ethene	4° C/NA3PO4	2	Glass	40ml vials		112G00041-582006-3

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	5/6/06	**Modified Date**	5/7/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GW0408
TtNUS Project #	112G00041	**Well ID**	16MW04
Task/Contract #	CTO 377	**Well Type**	Monitoring Well
WBS Code #	TP00050125	**Sampled By**	James Goerdt
		Concentration	Low concentration

Well and Sample Data

Date	5/6/06	**Static Water Level (ft.)**	27.66	**Water Quality Meter**	4143005
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3254-1902
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)
5/6/06	12:55	27.66	100	Clear	NA	NA	NA	NA	NA	NA	NA		0
5/6/06	13:05	27.71	100	Clear	3.65	1.09	9.16	0.2	14.41	375	NA		1000

5/6/06	13:15	27.67	100	Clear	3.94	1.09	5.49	0.4	14.41	379	NA		1000
5/6/06	13:25	27.67	100	Clear	3.99	1.09	7.22	0.4	14.52	370	NA		1000
5/6/06	13:35	27.66	100	Clear	4.07	1.09	7.52	0	14.48	365	NA		1000
5/6/06	13:45	27.69	100	Clear	4.11	1.09	7.67	0	14.46	357	NA		1000
5/6/06	13:55	27.70	100	Clear	4.12	1.09	7.81	0.3	14.45	350	NA		1000
5/6/06	14:05	27.66	100	Clear	4.04	1.09	6.95	0	14.53	343	NA		1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/6/06	14:15	27.74	140	Clear	3.86	1.09	6.06	0	14.62	328	NA		1400
5/6/06	14:25	27.69	140	Clear	3.84	1.09	6.08	0	14.67	328	NA		1400
5/6/06	14:35	27.67	140	Clear	3.80	1.09	5.81	0	14.63	324	NA		1400
5/6/06	14:45	27.67	140	Clear	3.80	1.10	5.74	0	14.62	321	NA		1400
5/6/06	14:55	27.66	140	Clear	3.79	1.09	5.71	0.2	14.58	322	NA		1400

Final Purge / Sample Data

One Casing Volume	0	**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	5.71
Total Vo. Purge (L)	14	**Waterlevel (ft.)**	27.66	**Turbidity (NTUs)**	0.2
Start Purge (hrs.)	12:55:00 PM	**Flowrate (mL/min)**	140	**Temp (C)**	14.58
End Purge (hrs.)	2:55:00 PM	**Color**	Clear	**ORP (mV)**	322
Total Purge Time (min.)	120	**pH (S.U.)**	3.79	**Salinity**	NA
		Conductivity (mS/cm)	1.09	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/6/06 1:00:00 AM	15:00	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06 1:00:00 AM	15:00	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06 1:00:00 AM	15:00	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06 1:00:00 AM	15:00	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-582006-4
✓	5/6/06 1:00:00 AM	15:00	DGPM-01/AM20GAX	Methane Ethane and Ethene	4° C/NA3PO4	2	Glass	40ml vials		112G00041-582006-3
✓	5/6/06 1:00:00 AM	15:00	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-582006-4

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/8/06	**Modified Date**	5/9/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT0408
TtNUS Project #	112G00041	**Well ID**	16MWT04
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/8/06	**Static Water Level (ft.)**	12.23	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1335
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3327-2402
MS/MSD Collected?		**Well Volumes Req.**	1		
Duplicate Sample Collected?	Y	**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)
5/8/06	10:10	12.23	125	Clear	6.00	0.291	4.72	10.11	14.2	256	NA	NA	0
5/8/06	10:20	12.65	125	Clear	5.96	0.280	3.28	12.0	14.2	253	NA	NA	1250

5/8/06	10:30	12.68	125	Clear	5.98	0.271	3.90	2.63	14.2	256	NA	NA	1250
5/8/06	10:40	12.70	125	Clear	6.08	0.258	2.41	1.28	14.3	241	NA	NA	1250
5/8/06	10:50	12.70	125	Clear	6.25	0.241	3.37	0.55	14.3	236	NA	NA	1250
5/8/06	11:00	12.70	125	Clear	6.33	0.237	3.49	0.00	14.3	229	NA	NA	1250
5/8/06	11:10	12.70	125	Clear	6.38	0.235	2.99	0.46	14.5	221	NA	NA	1250

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)	6.25	**Waterlevel (ft.)**		**Turbidity (NTUs)**	
Start Purge (hrs.)	10:10:00 AM	**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)	11:00:00 AM	**Color**		**ORP (mV)**	
Total Purge Time (min.)	50	**pH (S.U.)**		**Salinity**	
		Conductivity (mS/cm)		**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/8/06	11:15	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-592006-5
✓	5/8/06	11:15	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-592006-6
✓	5/8/06	11:15	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-592006-5
✓	5/8/06	11:15	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-592006-5
✓	5/8/06	11:15	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-592006-5
✓	5/8/06	11:15	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-592006-5

General Observations and Notes

Collected field duplicate 16FD05080601 at this location.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	5/8/06	**Modified Date**	5/16/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT0609
TtNUS Project #	112G00041	**Well ID**	16MWT06
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	James Goerdt
		Concentration	Low concentration

Well and Sample Data

Date	5/8/06	**Static Water Level (ft.)**	17.45	**Water Quality Meter**	4143005
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3254-1902
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)
5/8/06	13:20	17.45	90	Clear	NA	NA	NA	NA	NA	NA	NA		0
5/8/06	13:30	18.80	90	Clear	5.51	1.11	11.05	10.74	14.91	256	NA		900

5/8/06	13:40	18.96	90	Clear	5.44	1.09	9.62	13.6	14.70	278	NA		900
5/8/06	13:50	19.29	90	Clear	5.45	1.08	8.67	18.7	14.30	287	NA		900
5/8/06	14:00	19.73	90	Clear	5.43	1.07	7.60	19.2	14.38	295	NA		900
5/8/06	14:10	20.01	90	Clear	5.43	1.05	7.35	19.8	14.20	297	NA		900
5/8/06	14:20	20.52	90	Clear	5.42	1.06	6.70	20.9	14.32	301	NA		900
5/8/06	14:30	20.66	90	Clear	5.41	1.06	6.43	22.7	14.41	301	NA		900

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/8/06	14:40	20.82	90	Clear	5.41	1.06	6.31	26.8	14.53	302	NA		900
5/8/06	14:50	21.30	90	Clear	5.35	1.06	5.98	38.0	14.17	304	NA		900
5/8/06	15:00	21.47	90	Clear	5.41	1.07	5.93	39.2	14.22	301	NA		900
5/8/06	15:10	21.86	90	Clear	5.41	1.07	5.91	40.7	14.27	300	NA		900
5/8/06	15:20	22.47	90	Clear	5.42	1.07	5.91	41.9	14.38	297	NA		900
5/8/06	15:30	22.65	90	Clear	5.39	1.09	5.81	44.2	14.51	296	NA		900
5/8/06	15:40	22.83	90	Clear	5.42	1.09	5.85	46.9	14.58	293	NA		900
5/8/06	15:50	22.90	90	Clear	5.43	1.09	5.83	51.4	14.63	292	NA		900
5/8/06	16:00	23.09	90	Clear	5.42	1.10	4.00	58.7	14.58	287	NA		900
5/8/06	16:10	23.38	90	Clear	5.38	1.09	3.55	46.7	14.52	284	NA		900
5/8/06	16:20	23.51	90	Clear	5.43	1.10	3.14	46.7	14.72	276	NA		900
5/8/06	16:30	23.78	90	Clear	5.45	1.10	2.77	72.9	14.78	277	NA		900
5/8/06	16:40	23.99	90	Clear	5.43	1.10	2.60	97.8	14.89	276	NA		900
5/8/06	16:50	24.27	90	Clear	5.43	1.10	2.39	178	14.91	276	NA		900
5/8/06	17:00	24.52	90	Slightly Turbid	5.46	1.10	2.08	157	14.95	272	NA		900
5/8/06	17:10	24.62	90	Clear	5.47	1.11	1.99	163	15.15	270	NA		900
5/8/06	17:20	24.81	90	Clear	5.47	1.12	1.96	187	15.21	266	NA		900

Final Purge / Sample Data

One Casing Volume	
Total Vo. Purge (L)	21.6
Start Purge (hrs.)	1:20:00 PM
End Purge (hrs.)	5:20:00 PM
Total Purge Time (min.)	240

Method	Low flow - Bladder
Waterlevel (ft.)	24.81
Flowrate (mL/min)	90
Color	Clear
pH (S.U.)	5.47
Conductivity (mS/cm)	1.12

Dissolved Oxygen (mg/L)	1.96
Turbidity (NTUs)	187
Temp (C)	15.21
ORP (mV)	266
Salinity	NA
Other	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/8/06 1:00:00 AM	17:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	4° C/NA3PO4	2	Glass	40ml vials		112G00041-592006-6
✓	5/8/06 1:00:00 AM	17:30	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-592006-5
✗	5/8/06	17:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		
✓	5/8/06	17:30	SW-846-8330	Nitroaromatics and Nitramines	4°C	1	Glass	1L Amber		112G00041-592006-5
✗	5/8/06	17:30	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		
✓	5/8/06	17:30	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	1	Glass	1L Amber		112G00041-592006-5

General Observations and Notes

5/8 - Water level dropped below pump intake after collecting 2 liters for explosives

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	5/4/06	**Modified Date**	5/7/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT0907
TtNUS Project #	112G00041	**Well ID**	16MWT09
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	James Goerdt
		Concentration	Low concentration

Well and Sample Data

Date	5/4/06	**Static Water Level (ft.)**		**Water Quality Meter**	406032
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3254-1902
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)

5/4/06	15:00	13.21	200	Clear	NA	NA	NA	NA	NA	NA	NA		0
5/4/06	15:10	13.96	200	Clear	6.56	1.08	0.44	8.7	13.50	207	NA		2000
5/4/06	15:20	14.11	150	Clear	6.24	.844	0.69	7.3	13.62	254	NA		1500
5/4/06	15:30	13.98	150	Clear	6.22	.760	0.95	4.2	13.77	260	NA		1500
5/4/06	15:40	14.02	150	Clear	6.38	.733	0.69	2.8	13.69	263	NA		1500
5/4/06	15:50	14.08	150	Clear	6.41	.703	0.68	1.6	13.61	270	NA		1500
5/4/06	16:00	14.05	150	Clear	6.26	.683	0.55	0.1	13.74	272	NA		1500
5/4/06	16:10	14.04	150	Clear	6.14	.661	0.53	0	13.71	275	NA		1500

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/4/06	16:20	14.02	150	Clear	5.92	.640	0.50	0	13.68	279	NA		1500
5/4/06	16:30	14.03	150	Clear	5.71	.612	0.47	0	13.63	282	NA		1500
5/4/06	16:40	14.09	150	Clear	5.48	.606	0.41	0	13.59	284	NA		1500
5/4/06	16:50	14.11	150	Clear	4.62	.586	0.33	0	13.57	288	NA		1500
5/4/06	17:00	14.04	100	Clear	4.16	.572	0.30	0	13.63	289	NA		1000
5/4/06	17:10	13.98	100	Clear	4.03	.582	0.24	0	13.61	284	NA		1000
5/4/06	17:20	13.96	100	Clear	3.96	.584	0.25	0.2	13.57	285	NA		1000
5/4/06	17:25	13.97	100	Clear	3.94	.585	0.24	0	13.52	258	NA		500

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.24
Total Vo. Purge (L)	20.5	**Waterlevel (ft.)**	13.97	**Turbidity (NTUs)**	0
Start Purge (hrs.)	3:00:00 PM	**Flowrate (mL/min)**	100	**Temp (C)**	13.52
End Purge (hrs.)	5:25:00 PM	**Color**	Clear	**ORP (mV)**	258
Total Purge Time (min.)	145	**pH (S.U.)**	3.94	**Salinity**	NA
		Conductivity (mS/cm)	.585	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/4/06	17:30	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-552006-1
✓	5/4/06	17:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-552006-1
✓	5/4/06	17:30	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-552006-1
✓	5/4/06	17:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-552006-1
✓	5/4/06	17:30	SW-846-8330	Nitroaromatics and Nitramines	4°C	1	Glass	1L Amber		112G00041-552006-1
✓	5/4/06	17:30	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-552006-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/6/06	**Modified Date**	5/9/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1007
TtNUS Project #	112G00041	**Well ID**	16MWT10
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/6/06	**Static Water Level (ft.)**	21.10	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1335
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3327-2402
MS/MSD Collected?		**Well Volumes Req.**	1		
Duplicate Sample Collected?		**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)
5/6/06	09:15	21.1	75	Clear	3.28	1.88	2.8	27	13.7	429	NA	NA	0
5/6/06	09:17	21.19	75	Clear	3.54	1.99	2.8	11	13.8	388	NA	NA	150

5/6/06	09:25	21.15	50	Clear	3.41	1.87	1.37	6.3	14.8	368	NA	NA	400
5/6/06	09:36	21.13	50	Clear	3.41	1.85	1.42	5.9	15.2	370	NA	NA	550
5/6/06	09:50	21.11	50	Clear	3.43	1.83	1.49	4.6	15.9	369	NA	NA	700
5/6/06	10:01	21.16	50	Clear	3.42	1.81	3.05	5.0	14.2	372	NA	NA	550
5/6/06	10:12	21.19	50	Clear	3.43	1.74	1.69	5.5	14.1	368	NA	NA	550
5/6/06	10:22	21.18	50	Clear	3.45	1.68	1.81	3.7	14.0	357	NA	NA	500

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/6/06	10:31	21.17	50	Clear	3.47	1.65	3.23	2.8	14.1	354	NA	NA	450
5/6/06	10:45	21.17	50	Clear	3.5	1.61	3.23	3.5	14.5	350	NA	NA	700
5/6/06	10:56	21.17	50	Clear	3.70	1.59	3.66	2.0	15.2	352	NA	NA	550
5/6/06	11:05	21.17	50	Clear	3.52	1.59	3.61	1.9	15.2	353	NA	NA	450

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	3.61
Total Vo. Purge (L)	5.55	**Waterlevel (ft.)**	21.17	**Turbidity (NTUs)**	1.9
Start Purge (hrs.)	9:15:00 AM	**Flowrate (mL/min)**	50	**Temp (C)**	15.2
End Purge (hrs.)	11:05:00 AM	**Color**	Clear	**ORP (mV)**	353
Total Purge Time (min.)	110	**pH (S.U.)**	3.52	**Salinity**	NA
		Conductivity (mS/cm)	1.59	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/6/06	11:07	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06	11:07	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06	11:07	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-582006-3
✓	5/6/06	11:07	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-582006-4
✓	5/6/06	11:07	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06	11:07	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-582006-4

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	5/20/06	**Modified Date**	5/21/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1107
TtNUS Project #	112G00041	**Well ID**	16MWT11
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	5/20/06	**Static Water Level (ft.)**	96.12	**Water Quality Meter**	406032
Purge Method	Other	**Total Well Depth (ft.)**		**Pump Control Box**	No Data NA
Sampling Method	Bailer	**Well Riser Diameter (in.)**		**Turbidity Meter**	3327-2402
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)
5/20/06	13:15	96.12	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
5/21/06	17:20	96.72	0	Clear	6.75	1.10	*	20.2	15.88	54	NA	NA	0

Final Purge / Sample Data

One Casing Volume		**Method**	Other	**Dissolved Oxygen (mg/L)**	*
Total Vo. Purge (L)	0	**Waterlevel (ft.)**	96.72	**Turbidity (NTUs)**	20.2
Start Purge (hrs.)	1:15:00 PM	**Flowrate (mL/min)**	0	**Temp (C)**	15.88
End Purge (hrs.)	5:20:00 PM	**Color**	Clear	**ORP (mV)**	54
Total Purge Time (min.)	245	**pH (S.U.)**	6.75	**Salinity**	NA
		Conductivity (mS/cm)	1.10	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/21/06	17:20	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-5222006-10
✓	5/21/06	17:20	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-5222006-9
✓	5/21/06	17:20	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-5222006-10
✓	5/21/06	17:20	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-5222006-10
✓	5/21/06	17:20	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-5222006-10

General Observations and Notes

5/20/06:

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	5/6/06	**Modified Date**	5/7/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1207
TtNUS Project #	112G00041	**Well ID**	16MWT12
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	James Goerdt
		Concentration	Low concentration

Well and Sample Data

Date	5/6/06	**Static Water Level (ft.)**	19.86	**Water Quality Meter**	4143005
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3254-1902
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)
5/6/06	08:50	19.86	100	Clear	NA	NA	NA	NA	NA	NA	NA		0
5/6/06	09:00	20.20	100	Clear	3.91	3.29	3.45	0.3	12.25	320	NA		1000

5/6/06	09:10	20.20	100	Clear	4.15	3.29	3.32	0.3	12.27	321	NA		1000
5/6/06	09:20	20.41	100	Clear	4.23	3.21	2.65	0.4	12.29	318	NA		1000
5/6/06	09:30	20.50	100	Clear	4.36	3.15	2.02	0.7	12.32	317	NA		1000
5/6/06	09:40	20.78	100	Clear	4.38	2.96	1.05	0.5	12.38	318	NA		1000
5/6/06	09:50	20.81	100	Clear	4.36	2.87	0	0	12.41	319	NA		1000
5/6/06	10:00	20.84	100	Clear	4.38	2.68	0	0	12.43	319	NA		1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/6/06	10:10	20.87	100	Clear	4.37	2.54	0	0	12.51	319	NA		1000
5/6/06	10:20	20.91	100	Clear	4.36	2.48	0.43	0.4	12.54	317	NA		1000
5/6/06	10:30	20.93	100	Clear	4.32	2.44	0	0	12.55	320	NA		1000
5/6/06	10:40	20.95	100	Clear	4.29	2.09	0	0	12.82	315	NA		1000
5/6/06	10:50	20.96	100	Clear	4.34	2.03	0	0	12.85	312	NA		1000
5/6/06	11:00	20.95	100	Clear	4.36	1.98	0	0	12.75	309	NA		1000

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0
Total Vo. Purge (L)	13	**Waterlevel (ft.)**	20.95	**Turbidity (NTUs)**	0
Start Purge (hrs.)	8:50:00 AM	**Flowrate (mL/min)**	100	**Temp (C)**	12.75
End Purge (hrs.)	11:00:00 AM	**Color**	Clear	**ORP (mV)**	309
Total Purge Time (min.)	130	**pH (S.U.)**	4.36	**Salinity**	NA
		Conductivity (mS/cm)	1.98	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/6/06	11:10	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06	11:10	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06	11:10	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06	11:10	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-582006-4
✓	5/6/06	11:10	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-582006-3
✓	5/6/06	11:10	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-582006-4

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/6/06	**Modified Date**	5/9/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1307
TtNUS Project #	112G00041	**Well ID**	16MWT13
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/6/06	**Static Water Level (ft.)**	10.04	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1335
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3327-2402
MS/MSD Collected?		**Well Volumes Req.**	1		
Duplicate Sample Collected?		**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)
5/6/06	13:27	10.04	75	Clear	5.67	0.331	2.88	12.3	14.8	113	NA	NA	0
5/6/06	13:40	10.93	75	Clear	5.55	0.303	0.48	5.22	13.9	109	NA	NA	975

5/6/06	13:52	11.2	50	Clear	5.5	0.298	0.02	4.4	14.5	117	NA	NA	600
5/6/06	14:02	11.36	50	Clear	5.49	0.29	1.03	5.6	14.6	122	NA	NA	500
5/6/06	14:13	11.54	40	Clear	5.5	0.29	1.01	8.93	14.8	125	NA	NA	440
5/6/06	14:23	11.69	40	Clear	5.52	0.292	1.2	9.19	14.7	129	NA	NA	400
5/6/06	14:33	11.84	40	Clear	5.54	0.295	0.84	9.48	14.8	127	NA	NA	400
5/6/06	14:43	11.97	40	Clear	5.58	0.299	1.63	10.57	14.4	124	NA	NA	400

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/6/06	14:53	12.21	40	Clear	5.65	0.303	0.36	9.0	14.2	102	NA	NA	400
5/6/06	15:03	12.34	40	Clear	5.65	0.308	0.61	6.97	14.1	88	NA	NA	400
5/6/06	15:12	12.58	40	Clear	5.78	0.315	0.48	5.00	14.0	67	NA	NA	360
5/6/06	15:23	12.76	40	Clear	5.78	0.317	0.47	4.18	14.0	62	NA	NA	440
5/6/06	15:31	12.87	40	Clear	5.79	0.317	0.00	3.94	14.0	61	NA	NA	320

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.00
Total Vo. Purge (L)	5.635	**Waterlevel (ft.)**	12.87	**Turbidity (NTUs)**	3.94
Start Purge (hrs.)	1:27:00 PM	**Flowrate (mL/min)**	40	**Temp (C)**	14.0
End Purge (hrs.)	3:31:00 PM	**Color**	Clear	**ORP (mV)**	61
Total Purge Time (min.)	124	**pH (S.U.)**	5.79	**Salinity**	NA
		Conductivity (mS/cm)	0.317	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/6/06	15:34	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06	15:34	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06	15:34	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-582006-4
✓	5/6/06	15:34	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-582006-4
✓	5/6/06	15:34	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-582006-4
✓	5/6/06	15:34	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-582006-3

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/8/06	**Modified Date**	5/9/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1507
TtNUS Project #	112G00041	**Well ID**	16MWT15
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/8/06	**Static Water Level (ft.)**	59.87	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP10-1335
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3327-2402
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)
5/8/06	13:45	59.87	75	Clear	7.43	0.465	1.56	0.44	14.4	-115	NA	NA	0
5/8/06	13:50	61.23	100	Clear	7.41	0.460	1.05	1.30	14.4	-114	NA	NA	500

5/8/06	14:00	63.60	100	Clear	7.33	0.444	1.79	0.06	14.3	-94	NA	NA	1000
5/8/06	14:10	65.74	100	Clear	7.29	0.440	1.23	0.28	14.3	-74	NA	NA	1000
5/8/06	14:20	67.66	100	Clear	7.28	0.440	0.80	0.00	14.4	-75	NA	NA	1000
5/8/06	14:30	69.73	100	Clear	7.29	0.440	0.62	0.16	14.3	-76	NA	NA	1000
5/8/06	14:40	71.92	100	Clear	7.31	0.438	0.91	0.00	14.2	-83	NA	NA	1000
5/8/06	14:50	73.79	100	Clear	7.31	0.438	0.68	0.00	14.2	-83	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - 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 Volume (mL)
5/8/06	15:00	74.32	75	Clear	7.31	0.439	1.35	0.54	14.6	-90	NA	NA	750
5/8/06	15:10	74.98	75	Clear	7.35	0.439	0.44	0.00	14.7	-93	NA	NA	750
5/8/06	15:20	75.75	100	Clear	7.53	0.438	1.14	0.02	14.7	-89	NA	NA	1000
5/8/06	15:30	75.92	75	Clear	7.38	0.438	0.80	0.01	14.8	-88	NA	NA	750
5/8/06	15:40	76.12	75	Clear	7.40	0.437	0.43	0.00	14.9	-87	NA	NA	750
5/8/06	15:50	77.27	75	Clear	7.41	0.438	0.59	0.03	14.7	-84	NA	NA	750

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.59
Total Vo. Purge (L)	11.25	**Waterlevel (ft.)**	77.27	**Turbidity (NTUs)**	0.03
Start Purge (hrs.)	1:45:00 PM	**Flowrate (mL/min)**	75	**Temp (C)**	14.7
End Purge (hrs.)	3:50:00 PM	**Color**	Clear	**ORP (mV)**	-84
Total Purge Time (min.)	125	**pH (S.U.)**	7.41	**Salinity**	NA
		Conductivity (mS/cm)	0.438	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/8/06	15:55	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	3	Glass	40ml vials		112G00041-592006-5
✓	5/8/06	15:55	SW846 9056	Sulfate and Chloride	4°C	1	Plastic	1L HDPE		112G00041-592006-5
✓	5/8/06	15:55	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	2	Glass	1L Amber		112G00041-592006-5
✓	5/8/06	15:55	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-592006-5
✓	5/8/06	15:55	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	1L HDPE		112G00041-592006-5
✓	5/8/06	15:55	DGPM-01/AM20GAX	Methane Ethane and Ethene	4°C/NA3PO4	2	Glass	40ml vials		112G00041-592006-6

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	James Goerdt
Created Date	5/8/06	**Modified Date**	5/8/06	**Printed Date**	7/28/06

Project Information

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1707
TtNUS Project #	112G00041	**Well ID**	16MWT17
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	James Goerdt
		Concentration	Low concentration

Well and Sample Data

Date	5/8/06	**Static Water Level (ft.)**	14.79	**Water Quality Meter**	4143005
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	MP!)-1100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**		**Turbidity Meter**	3254-1902
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)
5/8/06	10:00	14.79	160	Clear	NA	NA	NA	NA	NA	NA	NA		0
5/8/06	10:10	15.31	120	Clear	4.24	.900	3.21	21.2	14.07	298	NA		1200

5/8/06	10:20	15.28	110	Clear	4.34	.951	0	5.14	14.09	274	NA		1100
5/8/06	10:30	15.26	110	Clear	4.38	.947	0	3.20	14.17	265	NA		1100
5/8/06	10:40	15.26	110	Clear	4.39	.939	0	1.53	14.10	262	NA		1100
5/8/06	10:50	15.24	110	Clear	4.40	.933	0	1.01	14.10	257	NA		1100
5/8/06	11:00	15.22	110	Clear	4.42	.928	0	0	14.20	256	NA		1100

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0
Total Vo. Purge (L)	6.7	**Waterlevel (ft.)**	15.22	**Turbidity (NTUs)**	0
Start Purge (hrs.)	10:00:00 AM	**Flowrate (mL/min)**	110	**Temp (C)**	14.20
End Purge (hrs.)	11:00:00 AM	**Color**	Clear	**ORP (mV)**	256
Total Purge Time (min.)	60	**pH (S.U.)**	4.42	**Salinity**	NA
		Conductivity (mS/cm)	.928	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/8/06 1:00:00 AM	11:15	Modified SW-846-8330	Explosives RDX Degradation Products	4°C	5	Glass	1L Amber		112G00041-592006-5
✓	5/8/06 1:00:00 AM	11:15	DGPM-01/AM20GAX	Methane Ethane and Ethene	4° C/NA3PO4	6	Glass	40ml vials		112G00041-592006-6
✓	5/8/06 1:00:00 AM	11:15	SW-846 8260B	Volatile Organic Compounds	4°C/HCL	9	Glass	40ml vials		112G00041-592006-5
✓	5/8/06 1:00:00 AM	11:15	SW846 9056	Sulfate and Chloride	4°C	3	Plastic	1L HDPE		112G00041-592006-5
✓	5/8/06 1:00:00 AM	11:15	SW-846-8330	Nitroaromatics and Nitramines	4°C	5	Glass	1L Amber		112G00041-592006-5
✓	5/8/06 1:00:00 AM	11:15	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	3	Plastic	1L HDPE		112G00041-592006-5

General Observations and Notes

Unsure if DO is measuring correctly.

- End of Report -

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SWMU 16

SURFACE WATER SAMPLE LOG SHEETS

ROUND 8

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	James Goerdt
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/4/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Sample ID Number	16SW1006			**Printed By**	James Goerdt
Sample Location ID	16SWSD10			**Printed Date**	8/4/06

Sample Collection Records

Date	5/3/06	**Color**	CLEAR	**Temp (C)**	22.40
Time	15:55	**pH (S.U.)**	5.28	**ORP (mV)**	318
Depth (ft.)	0	**S.C. (mS/cm)**	.250	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	9.14		
MS/MSD Collected	N	**Turbidity (NTUs)**	0.0		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/3/06	15:55	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-552006-1
✓	5/3/06 1:00:00 AM	15:55	Volatile Organic Compounds	SW-846 8260B	3	Glass	40ml vials	4° C		112G00041-552006-1

General Observations and Notes

Sample ID should be 16SW1005

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	James Goerdt
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/4/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Sample ID Number	16SW1207			**Printed By**	James Goerdt
Sample Location ID	16SWSD12			**Printed Date**	8/4/06

Sample Collection Records

Date	5/4/06	**Color**	clear	**Temp (C)**	19.3
Time	10:50	**pH (S.U.)**	6.62	**ORP (mV)**	172
Depth (ft.)	0	**S.C. (mS/cm)**	.217	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	9.53		
MS/MSD Collected	N	**Turbidity (NTUs)**	11		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/4/06	10:50	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4°C		112G00041-552006-1
✓	5/4/06 1:00:00 AM	10:50	Volatile Organic Compounds	SW-846 8260B	3	Glass	40ml vials	4° C/HCL		112G00041-552006-1

General Observations and Notes

Sample ID should be 16SW1206

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	James Goerdt
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/4/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Sample ID Number	16SW1307			**Printed By**	James Goerdt
Sample Location ID	16SWSD13			**Printed Date**	8/4/06

Sample Collection Records

Date	5/4/06	**Color**	clear	**Temp (C)**	18.7
Time	12:40	**pH (S.U.)**	6.57	**ORP (mV)**	187
Depth (ft.)	0	**S.C. (mS/cm)**	.254	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	10.27		
MS/MSD Collected	N	**Turbidity (NTUs)**	15		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/4/06	10:40	Volatile Organic Compounds	SW-846 8260B	3	Glass	40ml vials	4° C/HCL		112G00041-552006-1
✓	5/4/06	10:40	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4°C		112G00041-552006-1

General Observations and Notes

Sample ID should be 16SW1306

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	James Goerdt
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/4/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Sample ID Number	16SW3006			**Printed By**	James Goerdt
Sample Location ID	16SWSD30			**Printed Date**	8/4/06

Sample Collection Records

Date	5/4/06	**Color**	clear	**Temp (C)**	16.7
Time	09:00	**pH (S.U.)**	5.6	**ORP (mV)**	227
Depth (ft.)	0	**S.C. (mS/cm)**	.292	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	10.77		
MS/MSD Collected	Y	**Turbidity (NTUs)**	18		
Duplicate Collected	Y				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/4/06 1:00:00 AM	09:00	Volatile Organic Compounds	SW-846 8260B	9	Glass	40ml vials	4° C		112G00041-552006-1
✓	5/4/06	09:00	Nitroaromatics and Nitramines	SW-846-8330	4	Glass	1L Amber	4° C		112G00041-552006-1

General Observations and Notes

Sample ID should be 16SW3005

- End of Report -

A.3

SWMU 16

CHAIN OF CUSTODY RECORDS

ROUND 8

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	David Hickey
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/5/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-552006-2	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	849419217518	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-552006-2**	**Lab Name**	Microseeps, Inc.	**Relenquished By**	James Goerdt
Carrier	Federal Express	**Address**	220 William Pitt Way	**Date**	05/05/2006
Carrier/Waybill No.	849419217518	**City, State, Zip**	Pittsburgh, PA 15238	**Time**	12:00
		Lab Contact	Deb Hallo	**Received By:**	Federal Express
		Lab Telephone	412-826-5245	**Date**	5/5/06
				Time	12:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	David Hickey
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/5/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-552006-1	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	849419217529	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-552006-1**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	James Goerdt
Carrier	Federal Express	**Address**	940 South Harney Street	**Date**	05/05/2006
Carrier/Waybill No.	849419217529	**City, State, Zip**	Seattle, WA 98108	**Time**	12:00
		Lab Contact	Hugh Prentice/Elaine Walker	**Received By:**	Federal Express
		Lab Telephone	206-767-5060 x1028	**Date**	5/5/06
				Time	12:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/3/06	16SW1006	15:55	SW-846-8330	Nitroaromatics and Nitramines	16SWSD10	SW	4°C	2	Glass	1L Amber	
5/3/06 1:00:00 AM	16SW1006	15:55	SW-846 8260B	Volatile Organic Compounds	16SWSD10	SW	4°C	3	Glass	40ml vials	

5/4/06	16FD05040601	00:00	SW-846 8260B	Volatile Organic Compounds	QC	SW	4°C/HCL	3	Glass	40ml vials	
5/4/06	16GW0208	17:45	SW-846-8330	Nitroaromatics and Nitramines	16MW02	GW	4°C	1	Glass	1L Amber	
5/4/06	16GW0208	17:45	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MW02	GW	4° C/NA3PO4	2	Glass	40ml vials	
5/4/06	16GW0208	17:45	SW846 9056	Sulfate and Chloride	16MW02	GW	4°C	1	Plastic	1L HDPE	
5/4/06	16GW0208	17:45	Modified SW-846-8330	Explosives RDX Degradation Products	16MW02	GW	4°C	2	Glass	1L Amber	
5/4/06	16GW0208	17:45	EPA 353.2	Nitrate + Nitrite (as N)	16MW02	GW	4°C/H2SO4	1	Plastic	1L HDPE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/4/06	16GW0208	17:45	SW-846 8260B	Volatile Organic Compounds	16MW02	GW	4°C/HCL	3	Glass	40ml vials	
5/4/06	16GWT0907	17:30	SW846 9056	Sulfate and Chloride	16MWT09	GW	4°C	1	Plastic	1L HDPE	
5/4/06	16GWT0907	17:30	EPA 353.2	Nitrate + Nitrite (as N)	16MWT09	GW	4°C/H2SO4	1	Plastic	1L HDPE	
5/4/06	16GWT0907	17:30	SW-846-8330	Nitroaromatics and Nitramines	16MWT09	GW	4°C	1	Glass	1L Amber	
5/4/06	16GWT0907	17:30	SW-846 8260B	Volatile Organic Compounds	16MWT09	GW	4°C/HCL	3	Glass	40ml vials	
5/4/06	16GWT0907	17:30	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT09	GW	4°C	2	Glass	1L Amber	
5/4/06	16GWT0907	17:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT09	GW	4° C/NA3PO4	2	Glass	40ml vials	
5/4/06	16SW1207	10:50	SW-846-8330	Nitroaromatics and Nitramines	16SWSD12	SW	4°C	2	Glass	1L Amber	
5/4/06 1:00:00 AM	16SW1207	10:50	SW-846 8260B	Volatile Organic Compounds	16SWSD12	SW	4°C/HCL	3	Glass	40ml vials	
5/4/06	16SW1307	10:40	SW-846 8260B	Volatile Organic Compounds	16SWSD13	SW	4°C/HCL	3	Glass	40ml vials	
5/4/06	16SW1307	10:40	SW-846-8330	Nitroaromatics and Nitramines	16SWSD13	SW	4°C	2	Glass	1L Amber	
5/4/06 1:00:00 AM	16SW3006	09:00	SW-846 8260B	Volatile Organic Compounds	16SWSD30	SW	4°C	9	Glass	40ml vials	
5/4/06	16SW3006	09:00	SW-846-8330	Nitroaromatics and Nitramines	16SWSD30	SW	4°C	4	Glass	1L Amber	

5/5/06	16FD05040601	00:00	SW-846-8330	Nitroaromatics and Nitramines	QC	SW	4°C	2	Glass	1L Amber	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	James Goerdt
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/8/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-582006-3	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	849419217470	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-582006-3**	**Lab Name**	Microseeps, Inc.	**Relenquished By**	James Goerdt
Carrier	Federal Express	**Address**	220 William Pitt Way	**Date**	05/08/2006
Carrier/Waybill No.	849419217470	**City, State, Zip**	Pittsburgh, PA 15238	**Time**	12:00
		Lab Contact	Deb Hallo	**Received By:**	Federal Express
		Lab Telephone	412-826-5245	**Date**	5/8/06
				Time	12:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/6/06 1:00:00 AM	16GW0308	19:00	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MW03	GW	4°C/NA3PO4	2	Glass	40ml vials	
5/6/06 1:00:00 AM	16GW0408	15:00	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MW04	GW	4°C/NA3PO4	2	Glass	40ml vials	
5/6/06	16GWT1007	11:07	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT10	GW	4°C/NA3PO4	2	Glass	40ml vials	

5/6/06	16GWT1207	11:10	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT12	GW	4°C/NA3PO4	2	Glass	40ml vials	
5/6/06	16GWT1307	15:34	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT13	GW	4°C/NA3PO4	2	Glass	40ml vials	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	James Goerdt
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/8/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-582006-4	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	849419217481	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-582006-4**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	James Goerdt
Carrier	Federal Express			**Date**	05/08/2006
Carrier/Waybill No.	849419217481	**Address**	940 South Harney Street	**Time**	12:00
		City, State, Zip	Seattle, WA 98108	**Received By:**	Federal Express
		Lab Contact	Hugh Prentice/Elaine Walker	**Date**	5/8/06
		Lab Telephone	206-767-5060 x1028	**Time**	12:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/6/06 1:00:00 AM	16GW0308	19:00	Modified SW-846-8330	Explosives RDX Degradation Products	16MW03	GW	4°C	2	Glass	1L Amber	
5/6/06 1:00:00 AM	16GW0308	19:00	SW-846-8330	Nitroaromatics and Nitramines	16MW03	GW	4°C	2	Glass	1L Amber	

5/6/06 1:00:00 AM	16GW0308	19:00	SW846 9056	Sulfate and Chloride	16MW03	GW	4°C	1	Plastic	1L HDPE	
5/6/06 1:00:00 AM	16GW0308	19:00	EPA 353.2	Nitrate + Nitrite (as N)	16MW03	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/6/06 1:00:00 AM	16GW0308	19:00	SW-846 8260B	Volatile Organic Compounds	16MW03	GW	4°C/HCL	3	Glass	40ml vials	
5/6/06 1:00:00 AM	16GW0408	15:00	SW-846-8330	Nitroaromatics and Nitramines	16MW04	GW	4°C	2	Glass	1L Amber	
5/6/06 1:00:00 AM	16GW0408	15:00	Modified SW-846-8330	Explosives RDX Degradation Products	16MW04	GW	4°C	2	Glass	1L Amber	
5/6/06 1:00:00 AM	16GW0408	15:00	SW846 9056	Sulfate and Chloride	16MW04	GW	4°C	1	Plastic	1L HDPE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/6/06 1:00:00 AM	16GW0408	15:00	SW-846 8260B	Volatile Organic Compounds	16MW04	GW	4°C/HCL	3	Glass	40ml vials	
5/6/06 1:00:00 AM	16GW0408	15:00	EPA 353.2	Nitrate + Nitrite (as N)	16MW04	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/6/06	16GWT1007	11:07	EPA 353.2	Nitrate + Nitrite (as N)	16MWT10	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/6/06	16GWT1007	11:07	SW-846-8330	Nitroaromatics and Nitramines	16MWT10	GW	4°C	2	Glass	1L Amber	
5/6/06	16GWT1007	11:07	SW-846 8260B	Volatile Organic Compounds	16MWT10	GW	4°C/HCL	3	Glass	40ml vials	
5/6/06	16GWT1007	11:07	SW846 9056	Sulfate and Chloride	16MWT10	GW	4°C	1	Plastic	1L HDPE	
5/6/06	16GWT1007	11:07	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT10	GW	4°C	2	Glass	1L Amber	
5/6/06	16GWT1207	11:10	SW846 9056	Sulfate and Chloride	16MWT12	GW	4°C	1	Plastic	1L HDPE	
5/6/06	16GWT1207	11:10	SW-846-8330	Nitroaromatics and Nitramines	16MWT12	GW	4°C	2	Glass	1L Amber	
5/6/06	16GWT1207	11:10	EPA 353.2	Nitrate + Nitrite (as N)	16MWT12	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/6/06	16GWT1207	11:10	SW-846 8260B	Volatile Organic Compounds	16MWT12	GW	4°C/HCL	3	Glass	40ml vials	
5/6/06	16GWT1207	11:10	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT12	GW	4°C	2	Glass	1L Amber	
5/6/06	16GWT1307	15:34	EPA 353.2	Nitrate + Nitrite (as N)	16MWT13	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/6/06	16GWT1307	15:34	SW-846-8330	Nitroaromatics and Nitramines	16MWT13	GW	4°C	2	Glass	1L Amber	

5/6/06	16GWT1307	15:34	SW-846 8260B	Volatile Organic Compounds	16MWT13	GW	4°C/HCL	3	Glass	40ml vials	
5/6/06	16GWT1307	15:34	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT13	GW	4°C	2	Glass	1L Amber	
5/6/06	16GWT1307	15:34	SW846 9056	Sulfate and Chloride	16MWT13	GW	4°C	1	Plastic	1L HDPE	
5/7/06	12GWT1806	12:00	SW-846-8330	Nitroaromatics and Nitramines	12MWT18	GW	4°C	2	Glass	1L Amber	
5/7/06	12GWT1806	12:00	Modified SW-846-8330	Explosives RDX Degradation Products	12MWT18	GW	4°C	2	Glass	1L Amber	
5/7/06	12GWT1806	12:00	EPA 353.2	Nitrate + Nitrite (as N)	12MWT18	GW	4° C/H2SO4	1	Plastic	1L HDPE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/7/06 1:00:00 AM	12GWT2806	17:00	EPA 353.2	Nitrate + Nitrite (as N)	12MWT28	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/7/06 1:00:00 AM	12GWT2806	17:00	SW-846-8330	Nitroaromatics and Nitramines	12MWT28	GW	4°C	2	Glass	1L Amber	
5/7/06 1:00:00 AM	12GWT2806	17:00	Modified SW-846-8330	Explosives RDX Degradation Products	12MWT28	GW	4°C	2	Glass	1L Amber	
5/7/06	12GWT3206	17:45	Modified SW-846-8330	Explosives RDX Degradation Products	12MWT32	GW	4°C	2	Glass	1L Amber	
5/7/06	12GWT3206	17:45	SW-846-8330	Nitroaromatics and Nitramines	12MWT32	GW	4°C	2	Glass	1L Amber	
5/7/06	12GWT3206	17:45	EPA 353.2	Nitrate + Nitrite (as N)	12MWT32	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/7/06 1:00:00 AM	12GWT3606	11:10	EPA 353.2	Nitrate + Nitrite (as N)	12MWT36	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/7/06 1:00:00 AM	12GWT3606	11:10	SW-846-8330	Nitroaromatics and Nitramines	12MWT36	GW	4°C	2	Glass	1L Amber	
5/7/06 1:00:00 AM	12GWT3606	11:10	Modified SW-846-8330	Explosives RDX Degradation Products	12MWT36	GW	4°C	2	Glass	1L Amber	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	David Hickey
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/9/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-592006-6	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	849419217459	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-592006-6**	**Lab Name**	Microseeps, Inc.	**Relenquished By**	David Hickey
Carrier	Federal Express	**Address**	220 William Pitt Way	**Date**	05/09/2006
Carrier/Waybill No.	849419217459	**City, State, Zip**	Pittsburgh, PA 15238	**Time**	18:30
		Lab Contact	Deb Hallo	**Received By:**	Federal Express
		Lab Telephone	412-826-5245	**Date**	5/9/06
				Time	18:30

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/8/06	16FD05080601	00:00	DGPM-01/AM20GAX	Methane Ethane and Ethene	QC	GW	4°C/NA3PO4	2	Glass	40ml vials	
5/8/06	16GWT0408	11:15	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT04	GW	4°C/NA3PO4	2	Glass	40ml vials	
5/8/06 1:00:00 AM	16GWT0609	17:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT06	GW	4°C/NA3PO4	2	Glass	40ml vials	

5/8/06	16GWT1507	15:55	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT15	GW	4°C/NA3PO4	2	Glass	40ml vials	
5/8/06 1:00:00 AM	16GWT1707	11:15	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT17	GW	4°C/NA3PO4	6	Glass	40ml vials	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	David Hickey
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/9/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-592006-5	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	849419217460	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-592006-5**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	David Hickey
Carrier	Federal Express	**Address**	940 South Harney Street	**Date**	05/09/2006
Carrier/Waybill No.	849419217460	**City, State, Zip**	Seattle, WA 98108	**Time**	18:30
		Lab Contact	Hugh Prentice/Elaine Walker	**Received By:**	Federal Express
		Lab Telephone	206-767-5060 x1028	**Date**	5/9/06
				Time	18:30

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/8/06	16FD05080601	00:00	SW846 9056	Sulfate and Chloride	QC	GW	4°C	1	Plastic	1L HDPE	
5/8/06	16FD05080601	00:00	Modified SW-846-8330	Explosives RDX Degradation Products	QC	GW	4°C	2	Glass	1L Amber	
5/8/06	16FD05080601	00:00	SW-846-8330	Nitroaromatics and Nitramines	QC	GW	4°C	2	Glass	1L Amber	

5/8/06	16FD05080601	00:00	SW-846 8260B	Volatile Organic Compounds	QC	GW	4°C/HCL	3	Glass	40ml vials	
5/8/06	16FD05080601	00:00	EPA 353.2	Nitrate + Nitrite (as N)	QC	GW	4°C/H2SO4	1	Plastic	1L HDPE	
5/8/06	16GWT0408	11:15	SW-846 8260B	Volatile Organic Compounds	16MWT04	GW	4°C/HCL	3	Glass	40ml vials	
5/8/06	16GWT0408	11:15	SW-846-8330	Nitroaromatics and Nitramines	16MWT04	GW	4°C	2	Glass	1L Amber	
5/8/06	16GWT0408	11:15	EPA 353.2	Nitrate + Nitrite (as N)	16MWT04	GW	4°C/H2SO4	1	Plastic	1L HDPE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/8/06	16GWT0408	11:15	SW846 9056	Sulfate and Chloride	16MWT04	GW	4°C	1	Plastic	1L HDPE	
5/8/06	16GWT0408	11:15	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT04	GW	4°C	2	Glass	1L Amber	
5/8/06 1:00:00 AM	16GWT0609	17:30	SW-846 8260B	Volatile Organic Compounds	16MWT06	GW	4°C/HCL	3	Glass	40ml vials	
5/8/06	16GWT0609	17:30	SW-846-8330	Nitroaromatics and Nitramines	16MWT06	GW	4°C	1	Glass	1L Amber	Well drying out. Collecting min sample of 1 L.
5/8/06	16GWT0609	17:30	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT06	GW	4°C	1	Glass	1L Amber	Well drying out. Collecting min sample of 1 L.
5/8/06	16GWT1507	15:55	SW-846 8260B	Volatile Organic Compounds	16MWT15	GW	4°C/HCL	3	Glass	40ml vials	
5/8/06	16GWT1507	15:55	SW846 9056	Sulfate and Chloride	16MWT15	GW	4°C	1	Plastic	1L HDPE	
5/8/06	16GWT1507	15:55	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT15	GW	4°C	2	Glass	1L Amber	
5/8/06	16GWT1507	15:55	SW-846-8330	Nitroaromatics and Nitramines	16MWT15	GW	4°C	2	Glass	1L Amber	
5/8/06	16GWT1507	15:55	EPA 353.2	Nitrate + Nitrite (as N)	16MWT15	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/8/06 1:00:00 AM	16GWT1707	11:15	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT17	GW	4°C	5	Glass	1L Amber	
5/8/06 1:00:00 AM	16GWT1707	11:15	SW-846 8260B	Volatile Organic Compounds	16MWT17	GW	4°C/HCL	9	Glass	40ml vials	
5/8/06										1L	

1:00:00 AM	16GWT1707	11:15	SW846 9056	Sulfate and Chloride	16MWT17	GW	4°C	3	Plastic	HDPE	
5/8/06 1:00:00 AM	16GWT1707	11:15	SW-846-8330	Nitroaromatics and Nitramines	16MWT17	GW	4°C	5	Glass	1L Amber	
5/8/06 1:00:00 AM	16GWT1707	11:15	EPA 353.2	Nitrate + Nitrite (as N)	16MWT17	GW	4° C/H2SO4	3	Plastic	1L HDPE	
5/9/06	12GWT0906	12:30	EPA 353.2	Nitrate + Nitrite (as N)	12MWT09	GW	4° C/H2SO4	1	Plastic	1L HDPE	
5/9/06	12GWT0906	12:30	SW-846-8330	Nitroaromatics and Nitramines	12MWT09	GW	4°C	2	Glass	1L Amber	
5/9/06	12GWT0906	12:30	Modified SW-846-8330	Explosives RDX Degradation Products	12MWT09	GW	4°C	2	Glass	1L Amber	
5/9/06 1:00:00 AM	12GWT2006	12:20	SW-846-8330	Nitroaromatics and Nitramines	12MWT20	GW	4°C	2	Glass	1L Amber	
5/9/06 1:00:00 AM	12GWT2006	12:20	Modified SW-846-8330	Explosives RDX Degradation Products	12MWT20	GW	4°C	2	Glass	1L Amber	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/9/06 1:00:00 AM	12GWT2006	12:20	EPA 353.2	Nitrate + Nitrite (as N)	12MWT20	GW	4°C/H2SO4	1	Plastic	1L HDPE	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	Terry Rojahn
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/22/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-5222006-10	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	8494 1921 7415	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-5222006-10**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	Terry Rojahn
Carrier	Federal Express	**Address**	940 South Harney Street	**Date**	05/22/2006
Carrier/Waybill No.	8494 1921 7415	**City, State, Zip**	Seattle, WA 98108	**Time**	18:00
		Lab Contact	Hugh Prentice/Elaine Walker	**Received By:**	Federal Express
		Lab Telephone	206-767-5060 x1028	**Date**	5/22/06
				Time	18:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/20/06	12GWT1006	12:45	SW-846-8330	Nitroaromatics and Nitramines	12MWT10	GW	4°C	2	Glass	1L Amber	
5/20/06	12GWT1006	12:45	EPA 353.2	Nitrate + Nitrite (as N)	12MWT10	GW	4°C/H2SO4	1	Plastic	500ml PE	
5/20/06	12GWT1106	15:15	EPA 353.2	Nitrate + Nitrite (as N)	12MWT11	GW	4°C/H2SO4	1	Plastic	500ml PE	

5/20/06	12GWT1106	15:15	SW-846-8330	Nitroaromatics and Nitramines	12MWT11	GW	4°C	2	Glass	1L Amber	
5/20/06	12GWT4106	11:05	SW-846-8330	Nitroaromatics and Nitramines	12MWT41	GW	4°C	2	Glass	1L Amber	
5/20/06	12GWT4106	11:05	EPA 353.2	Nitrate + Nitrite (as N)	12MWT41	GW	4°C/H2SO4	1	Plastic	500ml PE	
5/20/06	12GWT4706	10:55	SW-846-8330	Nitroaromatics and Nitramines	12MWT47	GW	4°C	2	Glass	1L Amber	
5/20/06	12GWT4706	10:55	EPA 353.2	Nitrate + Nitrite (as N)	12MWT47	GW	4°C/H2SO4	1	Plastic	500ml PE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/21/06	13GWT3707	10:25	SW-846-8330	Nitroaromatics and Nitramines	13MWT37	GW	4°C	2	Glass	1L Amber	
5/21/06	13GWT3707	10:25	EPA 353.2	Nitrate + Nitrite (as N)	13MWT37	GW	4°C/H2SO4	1	Plastic	500ml PE	
5/21/06	13GWT4607	12:45	EPA 353.2	Nitrate + Nitrite (as N)	13MWT46	GW	4°C/H2SO4	1	Plastic	500ml PE	
5/21/06	13GWT4607	12:45	SW-846-8330	Nitroaromatics and Nitramines	13MWT46	GW	4°C	2	Glass	1L Amber	
5/21/06	13SW1906	16:53	SW-846-8330	Nitroaromatics and Nitramines	13SWSD19	SW	4°C	2	Glass	1L Amber	
5/21/06	13SW2006	16:40	SW-846-8330	Nitroaromatics and Nitramines	13SWSD20	SW	4°C	2	Glass	1L Amber	
5/21/06	16GWT1107	17:20	SW846 9056	Sulfate and Chloride	16MWT11	GW	4°C	1	Plastic	1L HDPE	
5/21/06	16GWT1107	17:20	SW-846 8260B	Volatile Organic Compounds	16MWT11	GW	4°C/HCL	3	Glass	40ml vials	
5/21/06	16GWT1107	17:20	EPA 353.2	Nitrate + Nitrite (as N)	16MWT11	GW	4°C/H2SO4	1	Plastic	500ml PE	
5/21/06	16GWT1107	17:20	SW-846-8330	Nitroaromatics and Nitramines	16MWT11	GW	4°C	2	Glass	1L Amber	
5/21/06	TB05210601	17:10	SW-846 8260B	Volatile Organic Compounds	QC	AQ	4°C/HCL	2	Glass	40ml vials	
5/22/06	13SW1105	12:25	SW-846-8330	Nitroaromatics and Nitramines	13SWSD11	SW	4°C	2	Glass	1L Amber	
5/22/06	13SW1407	10:40	SW-846-8330	Nitroaromatics and Nitramines	13SWSD14	SW	4°C	2	Glass	1L Amber	
5/22/06	13SW1507	11:00	SW-846-8330	Nitroaromatics and Nitramines	13SWSD15	SW	4°C	2	Glass	1L Amber	
5/22/06	13SW1607	11:25	SW-846-8330	Nitroaromatics and Nitramines	13SWSD16	SW	4°C	2	Glass	1L Amber	
5/22/06	13SW2206	13:00	SW-846-8330	Nitroaromatics and Nitramines	13SWSD22	SW	4°C	2	Glass	1L Amber	
5/22/06	13SW3007	11:55	SW-846-8330	Nitroaromatics and Nitramines	13SWSD30	SW	4°C	2	Glass	1L Amber	
5/22/06	FD05220601	00:00	SW-846-8330	Nitroaromatics and Nitramines	QC	SW	4°C	2	Glass	1L Amber	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	Terry Rojahn
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/22/06
Task/Contract #	CTO 377	**Field Op Leader (FOL)**	James Goerdt	**Modified By**	
WBS Code #	TP00050125	**FOL Phone**	412-921-8425	**Modified Date**	
Chain of Custody ID	112G00041-5222006-9	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	8494 1921 7404	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-5222006-9**	**Lab Name**	Microseeps, Inc.	**Relenquished By**	Terry Rojahn
Carrier	Federal Express	**Address**	220 William Pitt Way	**Date**	05/22/2006
Carrier/Waybill No.	8494 1921 7404	**City, State, Zip**	Pittsburgh, PA 15238	**Time**	18:00
		Lab Contact	Deb Hallo	**Received By:**	Federal Express
		Lab Telephone	412-826-5245	**Date**	5/22/06
				Time	18:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/21/06	16GWT1107	17:20	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT11	GW	4°C/NA3PO4	2	Glass	40ml vials	

General Observations and Notes

No Notes

- End of Report -

A.4

SWMU 16

WATER LEVEL MEASUREMENTS

ROUND 8

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Site**	SWMU 16	**Created By**	James Goerdt
TtNUS Project #	112G00041	**Measuring Device**	M-scope	**Created Date**	5/6/06
Task/Contract #	CTO 377	**Sampled By**	James Goerdt	**Modified By**	James Goerdt
WBS Code #	TP00050125	**Weather**	PC 70's	**Modified Date**	9/8/06
Status	Archive			**Printed By**	James Goerdt
				Printed Date	11/15/07

Groundwater Measurements

Well ID	Date	Time	Water Level Indicator Reading (ft)	Total Well Depth (ft)	Free Product Thickness (ft)	PID/FID (ppm)	Reference Elevation (ft)	Groundwater Elevation	Tidally Influenced
16MWT01	5/3/06 1:00:00 AM	14:35	15.59		NA	NA		calc	N
16MWT02	5/3/06 1:00:00 AM	14:44	6.83		NA	NA		calc	N
16MWT03	5/3/06 1:00:00 AM	14:32	27.66		NA	NA		calc	N
16MWT04	5/3/06	15:05	10.67		NA	NA		e	N
16MWT05	5/3/06 1:00:00 AM	14:47	30.98		NA	NA		calc	N
16MWT06	5/3/06 1:00:00 AM	14:38	17.58		NA	NA		calc	N
16MWT07	5/3/06 1:00:00 AM	14:45	Dry		NA	NA		calc	N
16MWT08	5/3/06	14:50	95.05		NA	NA		e	N

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Groundwater Measurements

Well ID	Date	Time	Water Level Indicator Reading (ft)	Total Well Depth (ft)	Free Product Thickness (ft)	PID/FID (ppm)	Reference Elevation (ft)	Groundwater Elevation	Tidally Influenced
16MWT09	5/3/06 1:00:00 AM	14:55	13.21		NA	NA		calc	N
16MWT10	5/3/06 1:00:00 AM	14:58	21.12		NA	NA		calc	N
16MWT11	5/3/06 1:00:00 AM	15:02	95.95		NA	NA		calc	N
16MWT12	5/3/06 1:00:00 AM	15:06	19.82		NA	NA		calc	N
16MWT13	5/3/06 1:00:00 AM	14:42	8.26		NA	NA		calc	N
16MWT14	5/3/06		Abandoned					e	N
16MWT15	5/3/06 1:00:00 AM	14:40	59.34		NA	NA		calc	N
16MWT16	5/3/06 1:00:00 AM	15:30	33.42		NA	NA		calc	N
16MWT17	5/3/06 1:00:00 AM	14:30	14.65		NA	NA		calc	N
16MWT18	5/3/06 1:00:00 AM	15:28	95.24		NA	NA		calc	N
16MWT19	5/3/06 1:00:00 AM	16:27	3.11		NA	NA		calc	N
16MWT20	5/3/06 1:00:00 AM	16:31	3.41		NA	NA		calc	N
16MWT21	5/5/06 1:00:00 AM	14:51	64.93		NA	NA		calc	N
WES-14-01-83	5/3/06	14:58	31.65		NA	NA		e	N
WES-14-02-83	5/3/06	14:20	14.72		NA	NA		e	N
WES-14-03-83	5/3/06	15:03	19.14		NA	NA		e	N
WES-14-04-83	5/3/06	14:53	25.64		NA	NA		e	N
WES-14-05-83	5/3/06	14:55	33.78		NA	NA		e	N

General Observations and Notes

No Notes

- End of Report -

A.5

SWMU 16

EQUIPMENT CALIBRATION FORMS

ROUND 8

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	Horiba U-22 (JG)	**Created By**	David Hickey
TtNUS Project #	112G00041	**Manufacturer**	Horiba	**Created Date**	5/7/06
Task/Contract #	CTO 377	**Serial Number**	406032	**Modified By**	James Goerdt
WBS Code #	TP00050125			**Modified Date**	7/7/06
Client				**Printed By**	James Goerdt
Status	Archive			**Printed Date**	11/16/07

Calibration Records

Date	Calibrator	pH (4 SU)	Conductivity (mS/cm)	Comments
5/3/06	David Hickey	Pre: 4.53 Post: 3.98 Std: 5216 Exp: 03-20-2008	Pre: 4.33 Post: 4.47 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm
5/4/06	David Hickey	Pre: 4.26 Post: 3.96 Std: 5216 Exp: 03-20-2008	Pre: 4.60 Post: 4.48 Std: 5216 Exp: 03-20-2008	
5/6/06	David Hickey	Pre: 3.14 Post: 4.00 Std: 5216 Exp: 03-20-2008	Pre: 4.37 Post: 4.48 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm
5/7/06	David Hickey	Pre: 3.80 Post: 4.00 Std: 5216 Exp: 03-20-2008	Pre: 4.74 Post: 4.49 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm
5/8/06	David Hickey	Pre: 4.22 Post: 4.00 Std: 5216 Exp: 03-20-2008	Pre: 4.46 Post: 4.49 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm
5/9/06	David Hickey	Pre: 3.80 Post: 4.00 Std: 5216 Exp: 03-20-2008	Pre: 4.39 Post: 4.49 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm
5/17/06	David Hickey	Pre: 4.15 Post: 4.00 Std: 5216 Exp: 03-20-2008	Pre: 4.65 Post: 4.49 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm
		Pre: 4.00	Pre: 4.32	

5/18/06 1:00:00 AM	David Hickey	Post: 4.00 Std: 5216 Exp: 03-20-2008	Post: 4.49 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm
5/19/06 1:00:00 AM	David Hickey	Pre: 4.08 Post: 3.98 Std: 5216 Exp: 03-20-2008	Pre: 4.80 Post: 4.49 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm. Cal standard has no set value for DO but this parameter is included in the auto cal of the instrument
5/20/06 1:00:00 AM	David Hickey	Pre: 3.67 Post: 4.02 Std: 5216 Exp: 03-20-2008	Pre: 4.42 Post: 4.51 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm. Received error message #6 for DO sensor indicating a malfunctioning sensor.
5/21/06 1:00:00 AM	David Hickey	Pre: 4.02 Post: 4.00 Std: 5216 Exp: 03-20-2008	Pre: 4.43 Post: 4.54 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm. Received error message #6 for DO sensor indicating a malfunctioning sensor.
5/23/06 1:00:00 AM	David Hickey	Pre: 3.93 Post: 4.01 Std: 5216 Exp: 03-20-2008	Pre: 4.61 Post: 4.48 Std: 5216 Exp: 03-20-2008	Conductivity standard = 4.49 mS/cm. Received error message #6 for DO sensor indicating a malfunctioning sensor.

APPENDIX B

SMWU 16

MISCELLANEOUS FIELD DOCUMENTATION

ROUND 8

B.1

SWMU 16

DAILY ACTIVITIES RECORD

ROUND 8

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	5/1/06	**Weather/Temp**		**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D. Hickey	**Created Date**	5/1/06
TtNUS Project #	112G00041	**Subcontractor Personnel**	NA	**Modified By**	John Wright
Task/Contract #	TP00050125	**Visitors**	NA	**Modified Date**	6/10/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/1/06		James Goerdt	a.m. hours spent traveling from Pgh to Crane.
5/1/06	14:45	James Goerdt	Current time is CST. Checked in at security office and obtained visitors pass, and arrived at Bldg 3245 at 14:55. Spoke additionally with M. Francis.
5/1/06	14:45	James Goerdt	Checked in at hotel in Bloomington. Received Fed Ex shipment sent by J. Wright. Spoke with M. Francis about additional sediment samples at SWMU 17.
5/1/06	15:05	James Goerdt	Began unpacking and checking in GW sampling equipment which included the following:
5/1/06	15:20	James Goerdt	Left hotel for Crane Naval Base.
5/1/06	16:15	James Goerdt	Departed Crane for WalMart to purchase field supplies. 1650-1730.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/04/2006	**Weather/Temp**	am PC low 60's / pm PC low 70's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J.Goerdt;D. Hickey	**Created Date**	5/4/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	James Goerdt
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/15/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/4/06	07:05	James Goerdt	Arrived at Bldg 3245 and attempted to connect to IPASS to sync toughbooks. Checking/responding to numerous e-mails. D. Hickey calibrated equipment.
5/4/06	08:30	James Goerdt	Left Bldg 3245 to to collect remaining SW samples at SWMU 16 and to finish measuring SG locations.
5/4/06	11:30	James Goerdt	Returned to Bldg 3245 and processed SW samples from locations 16SWSD12, 13, and 30. Collected FD and MS/MSD samples at location 16SWSD30.
5/4/06	12:30	James Goerdt	D. Hickey and myself went to Cafe for lunch. Returned to Bldg 3245 at 13:05 and prepared vehicles for GW sampling at SWMU 16.
5/4/06	14:15	James Goerdt	Arrived at SWMU 16 to conduct GW sampling. Stopped at well 16GW02 to help D. Hickey set purge/sample equipment.
5/4/06	15:00	James Goerdt	Setting up on well 16MWT09 to purge and sample.
5/4/06	18:00	James Goerdt	Finished sampling at at 16MWT09 and returned to Bldg 3245 to process samples and unload vehicle.
5/4/06	18:45	James Goerdt	Departed the base.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/06/2006	**Weather/Temp**	am-sun upper 40's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D. Hickey	**Created Date**	5/6/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	James Goerdt
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/7/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/6/06	07:30	James Goerdt	Arrive at Bldg 3245 from Martinsville. Sync computers and prepare vehicles for GW sampling at SWMU 16.
5/6/06	08:20	James Goerdt	Arrived at SWMU 16 to begin GW sampling. Setting up on well 16MWT12 and purged and sampled the well from 8:50-12:10. Stopped at Subway and thne began setting up at well 12MW04. Purged and sampled this well from 12:55-15:35. Moved to well 12MW03 and sampled and purged from 15:45-20:20.
5/6/06	20:30	James Goerdt	Returned to Bldg 3245 and unloaded samples and vehicle. Departed Crane at 20:45 for Martinsville.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/07/2006	**Weather/Temp**	AM-PC 50's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D. Hickey	**Created Date**	5/7/06
TtNUS Project #	112G00041	**Subcontractor Personnel**	NA	**Modified By**	James Goerdt
Task/Contract #	TP00050125	**Visitors**	NA	**Modified Date**	5/8/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/7/06	08:00	James Goerdt	Arrive at Bldg 3245 from Martinsville. Process sample bottles from previous day. Load vehicles for GW sampling.
5/7/06	09:00	James Goerdt	Arrive at SWMU 12 to conduct GW sampling. Gate to SWMU 12 was open. Ran out of bottleware for MEE so had to switch from SWMU 16 to SWMU 12.
5/7/06	12:30	James Goerdt	Finished sampling at 12MWT36. Stopped by Subway and began setting up at 12MWT28 at 12:50.
5/7/06	12:55	James Goerdt	Purged and sampled well 12MWT28 from 12:55-17:25. Stopped by to check on D. Hickey and then headed back to Bldg 3245 to unload samples and vehicle.
5/7/06	18:00	James Goerdt	Departed the base.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/03/2006	**Weather/Temp**	PM-70's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D. Hickey	**Created Date**	5/8/06
TtNUS Project #	112G00041	**Subcontractor Personnel**	NA	**Modified By**	James Goerdt
Task/Contract #	TP00050125	**Visitors**	NA	**Modified Date**	5/8/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/3/06		James Goerdt	Morning spent working on SWMU 17.
5/3/06	13:25	James Goerdt	Preparing to measure GW and SG levels.
5/3/06	14:00	James Goerdt	Checked in at SWMU 16. Was told it was OK to be in the area today, however Friday they would be working at Bldg 146 and therefore not accessible to us. Weekend would be OK to sample.
5/3/06	14:20	James Goerdt	From 14:20-16:30 Measured GW levels at SWMU 16 and collected SW sample at 16SWSD10.
5/3/06	16:35	James Goerdt	Returned to Bldg 3245. Left the base at 16:45.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/08/2006	**Weather/Temp**	AM-Sun low 60's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D.Hickey	**Created Date**	5/8/06
TtNUS Project #	112G00041	**Subcontractor Personnel**	NA	**Modified By**	James Goerdt
Task/Contract #	TP00050125			**Modified Date**	5/8/06
WBS Code #	TP00050125	**Visitors**	NA	**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/8/06	07:10	James Goerdt	Arrived at Bldg 3245. Processed weekend samples for shipping. Called Fed Ex and scheduled pick up today. Rcv'd additional MEE bottleware from Microseeps and the Cyanide sample bottles from Laucks.
5/8/06	09:50	James Goerdt	Checked in at SWMU 16. Spoke with Supervisor Wanda who said it was OK to sample wells in the area.
5/8/06	10:00	James Goerdt	Setting up on well 16MWT17. Purged and sampled 10:00-12:40. Collected MS/MSD.
5/8/06	10:50	James Goerdt	Contacted E. Sedlmyer and requested 12 cases of 1 L glass amber bottles, 3 cases of 1 L plastic bottles with H2SO4, and 20 additional coolers for shipping.
5/8/06	12:50	James Goerdt	Stopped by to check on D. Hickey. Stopped by cafe for lunch and fueled vehicle. Returned to SWMU 16 and set up on well 16MWT06.
5/8/06	13:20	James Goerdt	Purged and sampled well 16MWT06 from 13:20-18:30. Water level dropped below pump intake after collecting VOC's, MEE, Nitrates, and 1 L of explosives. Well not recovering. Will complete sampling on 5/9/06.
5/8/06	18:45	James Goerdt	Returned to Bldg 3245 to drop off samples and unload vehicle. Departed base at 19:00.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/09/2006	**Weather/Temp**	AM-sun 50's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D. Hickey	**Created Date**	5/9/06
TtNUS Project #	112G00041	**Subcontractor Personnel**	NA	**Modified By**	James Goerdt
Task/Contract #	TP00050125	**Visitors**	NA	**Modified Date**	5/15/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/9/06	07:15	James Goerdt	Arrived at Crane Bldg 3245. Calibrated equipment. Went over area map for SWMU 17. Started initial cleaning of field office. Awaiting on conference call from PGH office regarding SWMU 17. Never received the call. Loaded vehicles and headed to SWMU 8 to collect SW samples at the pond.
5/9/06	09:30	James Goerdt	Arrived at SWMU 08 and began collecting SW samples from the pond at locations 08SWSD022, 23, and 24, including field duplicate and MS/MSD. 08-22 collected just inside fence area near access gate (SW corner). 08-23 collected on SE side of pond. 08-24 collected next to concrete basin on west side of pond.
5/9/06	10:35	James Goerdt	Returned to well location 16MWT06 at SWMU 16 to check water level. Water level still below pump intake. No additional sample to be collected at this location this shift.
5/9/06	10:45	James Goerdt	Began purge/sample at location 12MWT20 at SWMU 12. Water level of the well is much lower than last round. Set purge rate very low (50 mL/min) and water level seems to be holding.
5/9/06	12:20	James Goerdt	Began collecting sample at location 12MWT20. Finished sampling ~ 14:00. Returned to Bldg 3245 to process samples and get them ready for shipping via Fed Ex. Cleaned up the field office.
5/9/06	18:15	James Goerdt	Dropped off samples at Fed Ex in Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/02/2006	**Weather/Temp**		**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D. Hickey	**Created Date**	5/15/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	James Goerdt
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/15/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/2/06		James Goerdt	Day spent working at SWMU 17. See Daily Activity at CTO 376.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/05/2006	**Weather/Temp**	AM PC 50's PM PC 60's	**Created By**	James Goerdt
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;D. Hickey	**Created Date**	5/15/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	James Goerdt
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/15/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/5/06	07:10	James Goerdt	Arrived at Bldg 3245. Sync computers, completed time sheets for submittal, printed labels for a few of the previous days samples. Processed samples for shipment and called Fed Ex for pick up. Generated COCs for Laucks and Microseeps. Spoke with US Environmental regarding the wrong flow thru cell they sent with one of the Horibas. They will ship a replacement overnight. Spoke with T. Brent regarding collection of cyanide samples at SWMU 8 pond. Faxed COCs to E. Sedlmyer.
5/5/06	11:00	James Goerdt	Went to SWMU 12 to measure GW level and staff gauge levels.
5/5/06	17:10	James Goerdt	Returned to Bldg 3245. Prepared vehicles for GW sampling for next day. Left Crane at 18:30

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/15/2006	**Weather/Temp**	Overcast and light rain	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	5/15/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/15/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/15/06	12:00	Terry Rojahn	Arrive at B-3245:
5/15/06	16:00	Terry Rojahn	Leave B-3245 for Sam's Club and Menards to pick up supplies.
5/15/06	16:59	Terry Rojahn	Purchase supplies at Sam's Club.
5/15/06	17:25	Terry Rojahn	Purchase supplies at Menards.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/16/2006	**Weather/Temp**	Partly sunny to rainy and 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC			**Created Date**	5/16/06
TtNUS Project #	112G00041	**TtNUS Personnel**	T.Rojahn;D. Hickey	**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Subcontractor Personnel**		**Modified Date**	5/16/06
WBS Code #	TP00050125	**Visitors**		**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/16/06	07:17	Terry Rojahn	Arrive at B-3245.
5/16/06	09:30	Terry Rojahn	Arrive @ SWMU 12 to sample surface water.
5/16/06	12:30	Terry Rojahn	Lunch
5/16/06	13:00	Terry Rojahn	Return to B-3245:
5/16/06	15:00	Terry Rojahn	Sit in on a conference call regarding soil sampling at SWMUs 9 & 13 w/ Mr Tom Brent, Mr Bill Gates, R. Basinski and R. Clark.
5/16/06	16:00	Terry Rojahn	Return to B-3245:
5/16/06	16:45	Terry Rojahn	D. hickey arrived at B-3245
5/16/06	17:15	Terry Rojahn	Arrive at SWMU 12 w/DH.

Daily Activity

Date	Time	Author	Notes
5/16/06	18:40	Terry Rojahn	Return to B-3245:
5/16/06	19:00	Terry Rojahn	Leave B-3245 for Wal Mart
5/16/06	19:50	Terry Rojahn	Purchase field supplies.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/17/2006	**Weather/Temp**	Partly cloudy and 70s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;T. Rojahn	**Created Date**	5/17/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/18/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/17/06	07:00	Terry Rojahn	Arive at B-3245:
5/17/06	09:40	Terry Rojahn	Arrive at SWMU 12
5/17/06	10:00	Terry Rojahn	Begin purge at monitoring well 12MWT22.
5/17/06	14:00	Terry Rojahn	Finish purge at monitoring well 12MWT22
5/17/06	14:50	Terry Rojahn	Finish collecting ground water sample 12GWT2206.
5/17/06	15:05	Terry Rojahn	Arrive at B-3245:
5/17/06	17:30	Terry Rojahn	Leave B-3245 for Federal Express.
5/17/06	18:10	Terry Rojahn	Dropped off samples on COC# 112G00041-5172006-7 at Fed Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/18/2006	**Weather/Temp**	Mostly cloundy, periods of rain and 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;T. Rojahn	**Created Date**	5/18/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/19/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/18/06	07:15	Terry Rojahn	Arrive at B-3245:
5/18/06	08:30	Terry Rojahn	Talked to Ryan Roberts at Public Works regarding dig permits for hand auger holes - he wants both SWMUs (9 & 13) to go through the utility clearance process.
5/18/06	08:45	Terry Rojahn	Talked to R. Basinki regarding Mr Roberts comments - need to send both dig permit requests.
5/18/06	09:00	Terry Rojahn	Arrive at SWMU 12
5/18/06	09:25	Terry Rojahn	Start purge at monitoring well 12MWT03.
5/18/06	13:25	Terry Rojahn	End purge at monitoring well 12MWT03.
5/18/06	13:30	Terry Rojahn	Start collecting groud water sample 12GWT0306.
5/18/06	14:15	Terry Rojahn	Start purge at monitoring well 12MWT42.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
5/18/06	17:05	Terry Rojahn	End purge at monitoring well 12MWT42.
5/18/06	17:10	Terry Rojahn	Start collecting groud water sample 12GWT4206.
5/18/06	18:11	Terry Rojahn	Finish clean up at SWMU 12
5/18/06	18:20	Terry Rojahn	Arrive at B-3245:
5/18/06	18:35	Terry Rojahn	Leave B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/20/2006	**Weather/Temp**	Mostly sunny & 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;T. Rojahn	**Created Date**	5/20/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/20/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/20/06	07:10	Terry Rojahn	Arrive at B-3245:
5/20/06	09:15	Terry Rojahn	Arrive at base gas station - fill flat tire on pull cart.
5/20/06	09:35	Terry Rojahn	Arrive at monitoring well 12MWT47.
5/20/06	09:50	Terry Rojahn	Begin purge at monitoring well 12MWT47.
5/20/06	10:50	Terry Rojahn	End purge at monitoring well 12MWT47.
5/20/06	10:55	Terry Rojahn	Start collecting ground water samlpe 12GWT4706.
5/20/06	11:20	Terry Rojahn	Finish clean up at monitoring well 12MWT47.
5/20/06	11:55	Terry Rojahn	Arrive at B-3245:

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
5/20/06	12:55	Terry Rojahn	Arrive at B-2708 and check in for B-146 area (SWMU 16).
5/20/06	13:15	Terry Rojahn	Start collecting ground water samlpe 16GWT1107.
5/20/06	14:30	Terry Rojahn	DRIED OUT MONITORING WELL 16MWT11 - SAVED ALL FILLED CONTAINERS FOR SAMPLE IN CASE WELL DOESN'T RECHARGE. ALSO, REPACED BLADDER PUMP WITH DEDICATED TEFLON BAILER - WATER LEVEL WAS BELOW PUMP.
5/20/06	14:40	Terry Rojahn	Return to building B-3245:
5/20/06	15:10	Terry Rojahn	Checked on DH at SWMU 12 - he got out of the utility line corridor OK.
5/20/06	15:25	Terry Rojahn	Arrive at SWMU 9 to collect water levels.
5/20/06	16:25	Terry Rojahn	Finish collecting water levels ay SWMU 9.
5/20/06	16:35	Terry Rojahn	Stop at SWMU 12 to check non DH - DH cleaning up at 12MWT11 - will meet DH back at B-3245.
5/20/06	16:42	Terry Rojahn	Return to B-3245:
5/20/06	17:25	Terry Rojahn	Prep to leave B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/19/2006	**Weather/Temp**	Mostly sunny and 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	David Hickey;Terry Rojahn	**Created Date**	5/19/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/20/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/19/06	07:10	Terry Rojahn	Arrive at B-3245:
5/19/06	09:15	Terry Rojahn	Arrive at SWMU 12
5/19/06	09:40	Terry Rojahn	Begin purge at monitoring well 12MWT31.
5/19/06	13:40	Terry Rojahn	End purge at monitoring well 12MWT22.
5/19/06	13:45	Terry Rojahn	Begin collecting ground water sample 12GWT3106.
5/19/06	14:30	Terry Rojahn	Finish clean up at 12MWT31
5/19/06	14:40	Terry Rojahn	Check monitoring well 12MWT30 - DRY WELL.
5/19/06	14:55	Terry Rojahn	Leave SWMU 12.

Daily Activity

Date	Time	Author	Notes
5/19/06	15:10	Terry Rojahn	Arrive at B-3245:
5/19/06	17:00	Terry Rojahn	Prep to leave B-3245 for Fed. Ex.
5/19/06	17:45	Terry Rojahn	Dropped off samples on COC# 112G00041-5192006-8 at Fed Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/21/2006	**Weather/Temp**	Mostly sunny and 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;T. Rojahn	**Created Date**	5/21/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/21/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/21/06	07:15	Terry Rojahn	Arrive at B-3245:
5/21/06	08:40	Terry Rojahn	Arrive at SWMU 13 - 13SG12
5/21/06	09:20	Terry Rojahn	Meet DH ongravel road west on SWMU 13 - tree across utility corridor just north of 13MWT36 - showed DH how to access wells from sewer line corridor just north of 13SW/SD16.
5/21/06	11:20	Terry Rojahn	Break for lunch and to address this log.
5/21/06	11:50	Terry Rojahn	Return to SWMU 12 for water level and staff gauge measurements.
5/21/06	14:38	Terry Rojahn	Finished water level & staff gauge measurements - checked table to make sure all wells and SGs were measured.
5/21/06	15:00	Terry Rojahn	Meet w/DH - downed trees blocking access to 13MWT 40 & 41 cluster - DH will go back and get water levels on foot - will finish out the day collecting surface water samples at 13SW/SD19 & 20.
5/21/06	15:25	Terry Rojahn	Return to B-3245 to pick up sample containers for surface water sampling.

Daily Activity

Date	Time	Author	Notes
5/21/06	15:40	Terry Rojahn	Arrive at SWMU 13 south gate to meet with DH.
5/21/06	16:40	Terry Rojahn	Collected surface water sample 13SW2006.
5/21/06	16:53	Terry Rojahn	Collected surface water sample 13SW1906.
5/21/06	17:10	Terry Rojahn	Prepare trip blank TB05210601.
5/21/06	17:20	Terry Rojahn	Begin collecting ground water sample (purged 5/20) 16GWT1107.
5/21/06	18:05	Terry Rojahn	Finish collecting ground water sample 16GWT1107 and clean up.
5/21/06	18:10	Terry Rojahn	Arrive at B-3245:
5/21/06	18:30	Terry Rojahn	Leave B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/22/2006	**Weather/Temp**	Sunny and 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;T. Rojahn	**Created Date**	5/22/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/22/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/22/06	06:55	Terry Rojahn	Arrive at B-3245:
5/22/06	09:00	Terry Rojahn	Meet with Mr Hicks at B-2516 - trees blocking access to monitoring wells should be removed within the week.
5/22/06	09:30	Terry Rojahn	Returned to B-3245:
5/22/06	10:20	Terry Rojahn	Arrive at SWMU 13 to sample surface water - collected samples at 12SWSD11, 14, 15, 16, 22 & 30.
5/22/06	13:30	Terry Rojahn	Return to B-3245:
5/22/06	17:30	Terry Rojahn	Prep to leave B-3245 for Fed. Ex.
5/22/06	18:00	Terry Rojahn	Dropped off samples on COC#s 112G00041-5192206-9 & 10 at Fed Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/23/2006	**Weather/Temp**	Sunny and 70s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;T.Rojahn	**Created Date**	5/23/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/23/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/23/06	06:55	Terry Rojahn	Arrive at B-3245:
5/23/06	08:30	Terry Rojahn	Meet with Mr Larry Hicks - took Mr Hicks to SWMU 13 and showed him fallen trees along the utility corridor.
5/23/06	09:10	Terry Rojahn	Drop off Mr. Hicks @ B-2516.
5/23/06	09:15	Terry Rojahn	Arrive at Public Works office:
5/23/06	10:05	Terry Rojahn	Begin purge at monitoring well 13MWT47.
5/23/06	11:25	Terry Rojahn	End purge at monitoring well 13MWT47.
5/23/06	12:08	Terry Rojahn	Finish clean up at monitoring well 13MWT47.
5/23/06	12:20	Terry Rojahn	Begin purge at monitoring well 13MWT13.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
5/23/06	14:00	Terry Rojahn	End purge at monitoring well 13MWT13.
5/23/06	14:50	Terry Rojahn	Return to B-3245:
5/23/06	17:30	Terry Rojahn	Prep to leave B-3245 for Fed. Ex.
5/23/06	18:00	Terry Rojahn	Dropped off samples on COC#s 112G00041-5192306-11 at Fed Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	05/31/2006	**Weather/Temp**		**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	6/1/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	6/1/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
5/31/06	15:00	Terry Rojahn	Arrive at Bloomington gate - obtain 10 day pass. Flight in was delayed almost 2Hrs.
5/31/06	15:15	Terry Rojahn	Arrive at B-3245:
5/31/06	16:45	Terry Rojahn	Leave B-3245 for Sam's Club to pick up supplies (paper towels,copy paper & drinking water).
5/31/06	17:44	Terry Rojahn	Check out at Sam's Club.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	06/02/2006	**Weather/Temp**	lt. rain - overcast & 60s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	6/2/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	6/2/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
6/2/06	07:10	Terry Rojahn	Arrive at B-3245:
6/2/06	09:15	Terry Rojahn	Checked on dig permits @ public works (Mr Ryan Roberts and Mr Steve Reddick) -up dated SWMU 9 - told above that holes would be installed via DPT to ~11' and that two additional holes were added 1 between each cluster of 2.
6/2/06	09:45	Terry Rojahn	Stopped @ Mr Mike Roach and Mr Tom Flynn's office to check on SWMU 13 activity - Mike and Tom were both gone. Checked in office down stairs - got in touch w/ Mr Dave Baker -OK to access MFB this week and next.
6/2/06	10:00	Terry Rojahn	Arrive at monitoring well 13MWT01.
6/2/06	10:15	Terry Rojahn	Start purge at monitoring well 13MWT01.
6/2/06	11:25	Terry Rojahn	Finish purge at monitoring well 13MWT01.
6/2/06	11:30	Terry Rojahn	Start collecting ground water sample 13GWT0108.
6/2/06	11:54	Terry Rojahn	Finish clean up at monitoring well 13MWT01.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
6/2/06	12:00	Terry Rojahn	Start purge at monitoring well 13MWT11.
6/2/06	13:10	Terry Rojahn	Finish purge at monitoring well 13MWT11.
6/2/06	13:15	Terry Rojahn	Start collecting ground water sample 13GWT1108.
6/2/06	13:38	Terry Rojahn	Finish clean up at monitoring well 13MWT11.
6/2/06	13:50	Terry Rojahn	Start collecting ground water sample 13GWT4507 purged 6-01-06.
6/2/06	15:00	Terry Rojahn	Finish clean up at monitoring well 13MWT45.
6/2/06	15:12	Terry Rojahn	Return to B-3245:
6/2/06	16:55	Terry Rojahn	Prep to leave B-3245 for Fed Ex.
6/2/06	17:30	Terry Rojahn	Drop off samples for shipment at Fed Ex.
6/2/06	17:43	Terry Rojahn	Purchase supplies at Kroger to decon soil core sampler.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	06/01/2006	**Weather/Temp**	Overcast & 70s.	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	6/1/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	6/1/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
6/1/06	07:15	Terry Rojahn	Arrive at B-3245: Complete 5/31/06 daily log.
6/1/06	08:45	Terry Rojahn	Arrive at monitoring well 13MWT40.
6/1/06	09:00	Terry Rojahn	Start purge at monitoring well 13MWT40.
6/1/06	10:20	Terry Rojahn	Finish purge at monitoring well 13MWT40.
6/1/06	10:25	Terry Rojahn	Start collecting ground water sample 13GWT4007.
6/1/06	11:15	Terry Rojahn	Finish clean up at monitoring well 13MWT40.
6/1/06	11:30	Terry Rojahn	Lunch
6/1/06	11:50	Terry Rojahn	Stopped @ Mr Mike Roach and Mr Tom Flynn's office to check on SWMU 13 activity - Mike and Tom were both gone. Will check again later.

Daily Activity

Date	Time	Author	Notes
6/1/06	12:00	Terry Rojahn	Arrive at monitoring well 13MWT21.
6/1/06	12:15	Terry Rojahn	Start purge at monitoring well 13MWT21.
6/1/06	13:15	Terry Rojahn	End purge at monitoring well 13MWT21.
6/1/06	13:20	Terry Rojahn	Start collecting ground water sample 13GWT2108.
6/1/06	13:58	Terry Rojahn	Finish clean up at monitoring well 13MWT21.
6/1/06	14:10	Terry Rojahn	Start purge at monitoring well 13MWT45.
6/1/06	16:05	Terry Rojahn	End purge at monitoring well 13MWT45.
6/1/06	16:24	Terry Rojahn	Finish clean up at monitoring well 13MWT45.
6/1/06	16:34	Terry Rojahn	Arrive at B-3245:Ret
6/1/06	17:25	Terry Rojahn	Prep to leave B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	06/03/2006	**Weather/Temp**	Mostly sunny & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	6/3/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	6/3/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
6/3/06	07:15	Terry Rojahn	Arrive at B-3245:
6/3/06	08:20	Terry Rojahn	Arrive at monitoring well 13MWT09.
6/3/06	08:45	Terry Rojahn	Start purge at monitoring well 13MWT09.
6/3/06	09:55	Terry Rojahn	End purge at monitoring well 13MWT09.
6/3/06	10:00	Terry Rojahn	Start collecting ground water sample 13GWT0909 (MS/MSD).
6/3/06	10:55	Terry Rojahn	Start purge at monitoring well 13MWT28.
6/3/06	13:41	Terry Rojahn	End purge at monitoring well 13MWT28 will sample 6/04/06.
6/3/06	14:00	Terry Rojahn	Return to B-32435

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
6/3/06	14:45	Terry Rojahn	Arrive at monitoring well 13MWT51.
6/3/06	15:05	Terry Rojahn	Start purge at monitoring well 13MWT51.
6/3/06	15:45	Terry Rojahn	End purge at monitoring well 13MWT51.
6/3/06	15:50	Terry Rojahn	Start collecting ground water sample 13GWT5106.
6/3/06	16:47	Terry Rojahn	Finish clean up at monitoring well 13MWT51.
6/3/06	17:00	Terry Rojahn	Start purge at monitoring well 13MWT34.
6/3/06	18:30	Terry Rojahn	End purge at monitoring well 13MWT34.
6/3/06	18:35	Terry Rojahn	Start collecting ground water sample 13GWT3407 & FD06030601.
6/3/06	19:21	Terry Rojahn	Finish clean up at monitoring well 13MWT34.
6/3/06	19:30	Terry Rojahn	Arrive at B-3245:
6/3/06	19:50	Terry Rojahn	Prep to leave B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	06/04/2006	**Weather/Temp**	Mostly sunny and 70s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	6/4/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	6/5/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
6/4/06	07:10	Terry Rojahn	Arrive @ B-3245:
6/4/06	08:10	Terry Rojahn	Arrive at monitoring well 13MWT31.
6/4/06	08:25	Terry Rojahn	Begin purging monitoring well 13MWT31.
6/4/06	09:35	Terry Rojahn	End purging monitoring well 13MWT31.
6/4/06	09:40	Terry Rojahn	Begin collecting ground water sample 13GWT3107.
6/4/06	10:19	Terry Rojahn	Finish clean up at monitoring well 13MWT31.
6/4/06	10:30	Terry Rojahn	Begin collecting ground water sample 13GWT3107 (purged 6/03/06).
6/4/06	11:00	Terry Rojahn	Finish clean up at monitoring well 13MWT28.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
6/4/06	11:25	Terry Rojahn	Begin purging monitoring well 13MWT17.
6/4/06	12:25	Terry Rojahn	End purging monitoring well 13MWT17.
6/4/06	12:30	Terry Rojahn	Begin collecting ground water sample 13GWT1708.
6/4/06	12:55	Terry Rojahn	Finish clean up at monitoring well 13MWT17.
6/4/06	13:10	Terry Rojahn	Begin purging monitoring well 13MWT15.
6/4/06	15:10	Terry Rojahn	End purging monitoring well 13MWT15.
6/4/06	15:28	Terry Rojahn	Begin collecting ground water sample 13GWT1508.
6/4/06	16:05	Terry Rojahn	Finish clean up at monitoring well 13MWT15.
6/4/06	16:15	Terry Rojahn	Returned to B-3245:
6/4/06	17:30	Terry Rojahn	Prep to leave B-3245 for Bloomington. SAMPLPE SUMMARY FOR THIS DATE - FINISH GROUND WATER SAAMPLING AT SWMU 12 WITH THE COLLECTION OF GROUND WATER SAMPLES AT MONITORING WELLS 13MWT25, 17, 28 & 31.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	06/05/2006	**Weather/Temp**	Mostly sunny & 70s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Hickey;T. Rojahn	**Created Date**	6/5/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	6/5/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
6/5/06	07:00	Terry Rojahn	Arrive @ B-3245:
6/5/06	07:50	Terry Rojahn	Arrive @ Public Works - check on MFB dig permit. Talked to Mr Ryan Roberts - he thinks that all utilities been cleared, but a few signatures are needed on the permit - said to stop back at lunch time and the permit should been ready.
6/5/06	08:20	Terry Rojahn	Return to B-32435:
6/5/06	11:45	Terry Rojahn	Lunch
6/5/06	12:15	Terry Rojahn	Stop at Public Works - no one around - water wasn't signed off on as of yet.
6/5/06	12:35	Terry Rojahn	Return to B-3245:
6/5/06	13:55	Terry Rojahn	Pick up dig permit at Public Works - cancel permit request for SWMU 9.
6/5/06	14:20	Terry Rojahn	Arrive at SWMU 13: Collect sediment samples at locations 13SD46, 48 through 50 and 54. Sediment location 13SD47 was a catch basin/culvert w/ a concrete bottom - voil of any sediment material. Also, collect surface soil sample at location 13SB76 inside inclosed transport corridor w/ concrete floor.

Daily Activity

Date	Time	Author	Notes
6/5/06	15:45	Terry Rojahn	Return to B-3245:
6/5/06	17:30	Terry Rojahn	Leave B-3245 for Fed Ex.
6/5/06	18:05	Terry Rojahn	Drop off rental equipment and ground water samples for shipment on the above AB#s at Fed Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMUs 12 (Round 6) and 13/16 (Round 8) MNA Routine Sampling (May 2006) - CRANE NSWC

Project Information

Activity Date	6/6/06	**Weather/Temp**	Sunny, Humid & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D.Hickey;T.Rojahn	**Created Date**	6/6/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	John Wright
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	6/10/06
WBS Code #	TP00050125			**Printed By**	James Goerdt
Client	SouthDiv			**Printed Date**	7/19/06

Daily Activity

Date	Time	Author	Notes
6/6/06	07:00	Terry Rojahn	Arrive at B-3245
6/6/06	08:30	Terry Rojahn	Arrive at SWMU 13 - collected sediment samples at 13SD51 through 53 and soil samples at boring locations 13SB73, 75 and 77.
6/6/06	11:55	Terry Rojahn	Return to B-3245:
6/6/06	12:10	Terry Rojahn	Lunch at cafe
6/6/06	12:35	Terry Rojahn	Return to B-3245:
6/6/06	16:10	Terry Rojahn	Return to SWMU 13: Collected soil samples at boring locations 13SB74, and 78 through 84.
6/6/06	18:45	Terry Rojahn	Return to B-3245:
6/6/06	19:45	Terry Rojahn	Prep to leave B-3245 for Bloomington.

- End of Report -

APPENDIX C

SWMU 16

HEALTH AND SAFETY DOCUMENTATION

ROUND 8

APPENDIX C

SWMU 16

HEALTH AND SAFETY DOCUMENTATION

ROUND 8

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 9, 2006

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

October 28, 2005

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

James Goerdt

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 29, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by all on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project NSWC Crane

Name David Alan Hickey JR Home Telephone (865) 925-2255

Address 7646 Emory Cove Way

Age 41 Height 5'10" Weight 185'

Name of Next Kin Kristi Hickey

Drug or other Allergies None

Particular Sensitivities None

Do You Wear Contacts? NO

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals NA

What medications are you presently using? Xyrem (8-16 ml/day), D-Amphetamine w/ Salt (40 mg/day), Clarinex (5 mg/day)

Do you have any medical restrictions? No

Name, Address, and Phone Number of personal physician: DR. Sunil John 865-632-5885 Knoxville, TN

I am the individual described above. I have read and understand this HASP.

David A. Hickey Jr 2-14-06

Signature Date

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by all on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project NSWC Crane CTO 377

Name Jim Goerdt Home Telephone 412-319-7303

Address 5418 Forest Edge Drive McDonald PA

Age 41 Height 5'11" Weight 175

Name of Next Kin Shanan Goerdt

Drug or other Allergies None

Particular Sensitivities Poison Ivy

Do You Wear Contacts? No

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals NA

What medications are you presently using? NA

Do you have any medical restrictions? NA

Name, Address, and Phone Number of personal physician: Dr. Fatigadi
412-343-1770

I am the individual described above. I have read and understand this HASP.

Signature

1/5/06

Date

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by all on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project NSWC CRANE

Name TERRY ROJAHN Home Telephone (724) 695-3573

Address 61 Rodgers Dr Coraopolis PA 15108

Age 57 Height 5'11" Weight 205

Name of Next Kin VERONICA ROJAHN

Drug or other Allergies Hay Fever

Particular Sensitivities Cat Dander, Poison Ivy, Rubber cement

Do You Wear Contacts? No

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals NA

What medications are you presently using? NA

Do you have any medical restrictions? NONE

Name, Address, and Phone Number of personal physician:

Family Practice Asso., Moon Township

412-264-1918 Dr Cone

I am the individual described above. I have read and understand this HASP.

Signature

1-4-06

Date

APPENDIX D
SWMU 16
ANALYTICAL DATA
ROUND 8

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

SITE	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR
AOC	PUZ	PUZ	PUZ	PUZ	PUZ
SWMU	16	16	16	16	16
PHASE	08	08	08	08	08
LOCATION	16MW02	16MW03	16MWT04	16MWT04	16MWT06
NSAMPLE	16GW0209	16GW0308	16GWT0408	16GWT0408-D	16GWT0609
MATRIX	GW	GW	GW	GW	GW
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL
SAMPLE DATE	5/04/2006	5/06/2006	5/08/2006	5/08/2006	5/08/2006
Explosives (ug/L)					
1,3,5-Trinitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	7.4
1,3-Dinitrobenzene	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	21
2,4-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	3.3
2,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	2.3 J
2-Amino-4,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	130 J
2-Nitrotoluene	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	1.25 U
4-Amino-2,6-Dinitrotoluene	0.25 U	0.84	0.25 U	0.25 U	43
4-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	0.25 U	5.9	8	9.1	2.5
Nitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
RDX	0.25 U	51	130	150	18
Tetryl	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Miscellaneous (mg/L)					
Chloride	18	3.8	4.1	3.8	
Nitrite/Nitrate-N	0.025 U	0.59	0.34	0.35	
Sulfate	55	250	23	23	
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,1,1-Trichloroethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,1,2,2-Tetrachloroethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,1,2-Trichloroethane	0.3 U	0.3 U	0.3 U	0.3 U	120
1,1-Dichloroethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,1-Dichloroethene	0.3 U	0.3 U	0.3 U	0.3 U	94
1,2,3-Trichloropropane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,2-Dibromo-3-Chloropropane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,2-Dibromoethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,2-Dichloroethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
1,2-Dichloropropane	0.3 U	0.3 U	0.3 U	0.3 U	15 U

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

SITE	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR
AOC	PUZ	PUZ	PUZ	PUZ	PUZ
SWMU	16	16	16	16	16
PHASE	08	08	08	08	08
LOCATION	16MW02	16MW03	16MWT04	16MWT04	16MWT06
NSAMPLE	16GW0209	16GW0308	16GWT0408	16GWT0408-D	16GWT0609
MATRIX	GW	GW	GW	GW	GW
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL
SAMPLE DATE	5/04/2006	5/06/2006	5/08/2006	5/08/2006	5/08/2006
2-Butanone	0.5 U	0.5 U	0.5 U	0.5 U	25 U
2-Hexanone	0.5 U	0.5 U	0.5 U	0.5 U	25 U
3-Chloropropene	0.5 U	0.5 U	0.5 U	0.5 U	25 U
4-Methyl-2-Pentanone	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Acetone	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Acrolein	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Acrylonitrile	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Benzene	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Bromodichloromethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Bromoform	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Bromomethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Carbon Disulfide	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Carbon Tetrachloride	0.3 U	16	0.3 U	0.3 U	15 U
Chlorobenzene	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Chlorodibromomethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Chloroform	0.3 U	4.6	0.3 U	0.3 U	15 U
Chloromethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Chloroprene	0.5 U	0.5 U	0.5 U	0.5 U	25 U
cis-1,2-Dichloroethene	0.3 U	0.3 U	0.3 U	0.3 U	3100
cis-1,3-Dichloropropene	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Dibromomethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Dichlorodifluoromethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Ethyl Methacrylate	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Ethylbenzene	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Methacrylonitrile	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Methyl Iodide	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Methyl Methacrylate	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Methyl Tert-Butyl Ether	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Methylene Chloride	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Styrene	0.3 U	0.3 U	0.3 U	0.3 U	15 U

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

SITE	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR
AOC	PUZ	PUZ	PUZ	PUZ	PUZ
SWMU	16	16	16	16	16
PHASE	08	08	08	08	08
LOCATION	16MW02	16MW03	16MWT04	16MWT04	16MWT06
NSAMPLE	16GW0209	16GW0308	16GWT0408	16GWT0408-D	16GWT0609
MATRIX	GW	GW	GW	GW	GW
SACODE	NORMAL	NORMAL	ORIG	DUP	NORMAL
SAMPLE DATE	5/04/2006	5/06/2006	5/08/2006	5/08/2006	5/08/2006
Tetrachloroethene	0.3 U	0.3 U	0.3 U	0.3 U	100
Toluene	0.3 U	0.3 U	0.3 U	0.3 U	200
Total Xylenes	0.3 U	0.3 U	0.3 U	0.3 U	15 U
trans-1,2-Dichloroethene	0.3 U	0.3 U	0.3 U	0.3 U	15 U
trans-1,3-Dichloropropene	0.3 U	0.3 U	0.3 U	0.3 U	15 U
trans-1,4-Dichloro-2-Butene	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Trichloroethene	0.3 U	5.7	1.4	1.9	150000
Trichlorofluoromethane	0.3 U	0.3 U	0.3 U	0.3 U	15 U
Vinyl Acetate	0.5 U	0.5 U	0.5 U	0.5 U	25 U
Vinyl Chloride	0.3 U	0.3 U	0.3 U	0.3 U	360
Ethane	0.074	0.017 J	0.005 J	0.004 J	1
Ethene	0.039	0.051	0.015 J	0.016 J	22
Methane	96	2.8	1.9 J	5.4 J	190

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

SITE	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR
AOC	PUZ	PUZ	PUZ	PLZMGD
SWMU	16	16	16	16
PHASE	08	08	08	08
LOCATION	16MWT09	16MWT10	16MWT13	16MWT17
NSAMPLE	16GWT0907	16GWT1007	16GWT1307	16GWT1707
MATRIX	GW	GW	GW	GW
SACODE	NORMAL	NORMAL	NORMAL	NORMAL
SAMPLE DATE	5/04/2006	5/05/2006	5/05/2006	5/08/2006
Explosives (ug/L)				
1,3,5-Trinitrobenzene	0.25 U	0.25 U	0.25 U	0.28 U
1,3-Dinitrobenzene	0.25 U	0.25 U	0.25 U	0.28 U
2,4,6-Trinitrotoluene	0.25 U	0.25 U	0.25 U	0.28 U
2,4-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.28 U
2,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.28 U
2-Amino-4,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.28 U
2-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.28 U
3-Nitrotoluene	1.2 J	0.25 U	0.25 U	0.28 U
4-Amino-2,6-Dinitrotoluene	1.1	0.25 U	0.25 U	0.28 U
4-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.28 U
HMX	9.9	4.5	0.25 U	0.28 U
Nitrobenzene	0.25 U	0.25 U	0.25 U	0.28 U
RDX	100	47	0.25 U	5.8
Tetryl	0.25 U	0.25 U	0.25 U	0.28 U
Miscellaneous (mg/L)				
Chloride	8.8	6.9	21	110
Nitrite/Nitrate-N	0.51	0.43	0.025 U	0.025 U
Sulfate	190	690	44	120
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	0.3 U	0.3 U	0.3 U	30 U
1,1,1-Trichloroethane	0.3 U	0.3 U	0.3 U	30 U
1,1,2,2-Tetrachloroethane	0.3 U	0.3 U	0.3 U	30 U
1,1,2-Trichloroethane	0.3 U	0.3 U	0.3 U	30 U
1,1-Dichloroethane	0.3 U	0.3 U	0.3 U	30 U
1,1-Dichloroethene	0.3 U	0.3 U	0.3 U	30 U
1,2,3-Trichloropropane	0.3 U	0.3 U	0.3 U	30 U
1,2-Dibromo-3-Chloropropane	0.3 U	0.3 U	0.3 U	30 U
1,2-Dibromoethane	0.3 U	0.3 U	0.3 U	30 U
1,2-Dichloroethane	0.3 U	0.3 U	0.3 U	30 U
1,2-Dichloropropane	0.3 U	0.3 U	0.3 U	30 U

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

SITE	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR
AOC	PUZ	PUZ	PUZ	PLZMGD
SWMU	16	16	16	16
PHASE	08	08	08	08
LOCATION	16MWT09	16MWT10	16MWT13	16MWT17
NSAMPLE	16GWT0907	16GWT1007	16GWT1307	16GWT1707
MATRIX	GW	GW	GW	GW
SACODE	NORMAL	NORMAL	NORMAL	NORMAL
SAMPLE DATE	5/04/2006	5/05/2006	5/05/2006	5/08/2006
2-Butanone	0.5 U	0.5 U	0.5 U	50 U
2-Hexanone	0.5 U	0.5 U	0.5 U	50 U
3-Chloropropene	0.5 U	0.5 U	0.5 U	50 U
4-Methyl-2-Pentanone	0.5 U	0.5 U	0.5 U	50 U
Acetone	0.5 U	0.5 U	0.5 U	50 U
Acrolein	0.5 U	0.5 U	0.5 U	50 U
Acrylonitrile	0.5 U	0.5 U	0.5 U	50 U
Benzene	0.3 U	0.3 U	0.3 U	30 U
Bromodichloromethane	0.3 U	0.3 U	0.3 U	30 U
Bromoform	0.3 U	0.3 U	0.3 U	30 U
Bromomethane	0.3 U	0.3 U	0.3 U	30 U
Carbon Disulfide	0.3 U	0.3 U	0.3 U	30 U
Carbon Tetrachloride	0.3 U	0.3 U	0.3 U	30 U
Chlorobenzene	0.3 U	0.3 U	0.3 U	30 U
Chlorodibromomethane	0.3 U	0.3 U	0.3 U	30 U
Chloroethane	0.5 U	0.5 U	0.5 U	50 U
Chloroform	0.6 J	1.8	0.3 U	30 U
Chloromethane	0.3 U	0.3 U	0.4 J	30 U
Chloroprene	0.5 U	0.5 U	0.5 U	50 U
cis-1,2-Dichloroethene	0.3 U	0.3 U	1.5	260
cis-1,3-Dichloropropene	0.3 U	0.3 U	0.3 U	30 U
Dibromomethane	0.3 U	0.3 U	0.3 U	30 U
Dichlorodifluoromethane	0.3 U	0.3 U	0.3 U	30 U
Ethyl Methacrylate	0.5 U	0.5 U	0.5 U	50 U
Ethylbenzene	0.3 U	0.3 U	0.3 U	30 U
Methacrylonitrile	0.3 U	0.3 U	0.3 U	30 U
Methyl Iodide	0.5 U	0.5 U	0.5 U	50 U
Methyl Methacrylate	0.5 U	0.5 U	0.5 U	50 U
Methyl Tert-Butyl Ether	0.5 U	0.5 U	0.5 U	50 U
Methylene Chloride	0.3 U	0.3 U	0.3 U	30 U
Styrene	0.3 U	0.3 U	0.3 U	30 U

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

SITE	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR	B146 INCINERATOR
AOC	PUZ	PUZ	PUZ	PLZMGD
SWMU	16	16	16	16
PHASE	08	08	08	08
LOCATION	16MWT09	16MWT10	16MWT13	16MWT17
NSAMPLE	16GWT0907	16GWT1007	16GWT1307	16GWT1707
MATRIX	GW	GW	GW	GW
SACODE	NORMAL	NORMAL	NORMAL	NORMAL
SAMPLE DATE	5/04/2006	5/05/2006	5/05/2006	5/08/2006
Tetrachloroethene	0.3 U	0.3 U	0.3 U	30 U
Toluene	0.3 U	0.3 U	0.3 U	30 U
Total Xylenes	0.3 U	0.3 U	0.3 U	30 U
trans-1,2-Dichloroethene	0.3 U	0.3 U	0.3 U	30 U
trans-1,3-Dichloropropene	0.3 U	0.3 U	0.3 U	30 U
trans-1,4-Dichloro-2-Butene	0.5 U	0.5 U	0.5 U	50 U
Trichloroethene	6.3	1.5	160	25000
Trichlorofluoromethane	0.3 U	0.3 U	0.3 U	30 U
Vinyl Acetate	0.5 U	0.5 U	0.5 U	50 U
Vinyl Chloride	0.3 U	0.3 U	0.3 U	30 U
Ethane	0.038	0.058	0.07	0.45
Ethene	0.06	0.11	0.11	0.1
Methane	9.4	4.5	190	88

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - SURFACE WATER ROUND 8
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

LOCATION	16SW/SD10	16SW/SD12	16SW/SD13	16SW/SD30	16SW/SD30
NSAMPLE	16SW1006	16SW1207	16SW1307	16SW3006	16SW3006-D
MATRIX	SW	SW	SW	SW	SW
AOC	GULLY	GULLY	GULLY	GULLY	GULLY
PHASE	08	08	08	08	08
SAMPLE DATE	20060503	20060504	20060504	20060504	20060504
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP
Explosives (ug/L)					
1,3,5-Trinitrobenzene	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
2,4,6-Trinitrotoluene	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
2,6-Dinitrotoluene	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
2-Nitrotoluene	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
4-Amino-2,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.94	0.93
4-Nitrotoluene	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	4.9	4.8
Nitrobenzene	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	18	17
Tetryl	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Volatile Organic Compounds (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	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
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	0.5 U
Acetone	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Acrolein	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
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 U
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	0.6 J	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
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 U
Ethyl Methacrylate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - SURFACE WATER ROUND 8
SWMU 16 (CAST HIGH EXPLOSIVES FILL/BUILDING 146)

LOCATION	16SW/SD10	16SW/SD12	16SW/SD13	16SW/SD30	16SW/SD30
NSAMPLE	16SW1006	16SW1207	16SW1307	16SW3006	16SW3006-D
MATRIX	SW	SW	SW	SW	SW
AOC	GULLY	GULLY	GULLY	GULLY	GULLY
PHASE	08	08	08	08	08
SAMPLE DATE	20060503	20060504	20060504	20060504	20060504
SACODE	NORMAL	NORMAL	NORMAL	ORIG	DUP
Ethylbenzene	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
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 U	0.3 U	0.3 U	0.3 U	0.3 U
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	8.7	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
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	0.3 U
FIELD TESTED PARAMETERS					
DISSOLVED OXYGEN - METER (MG/L)	9.14	9.53	10.27		
OXIDATION REDUCTION POTENTIAL (MV)	-9999	-9999	-9999		
PH (S.U.)	5.28	6.62	6.57		
SPECIFIC CONDUCTANCE (MS/CM)	0.25	0.217	0.254		
TEMPERATURE (C)	22.4	19.3	18.7		
TURBIDITY (NTU)	0	11	15		

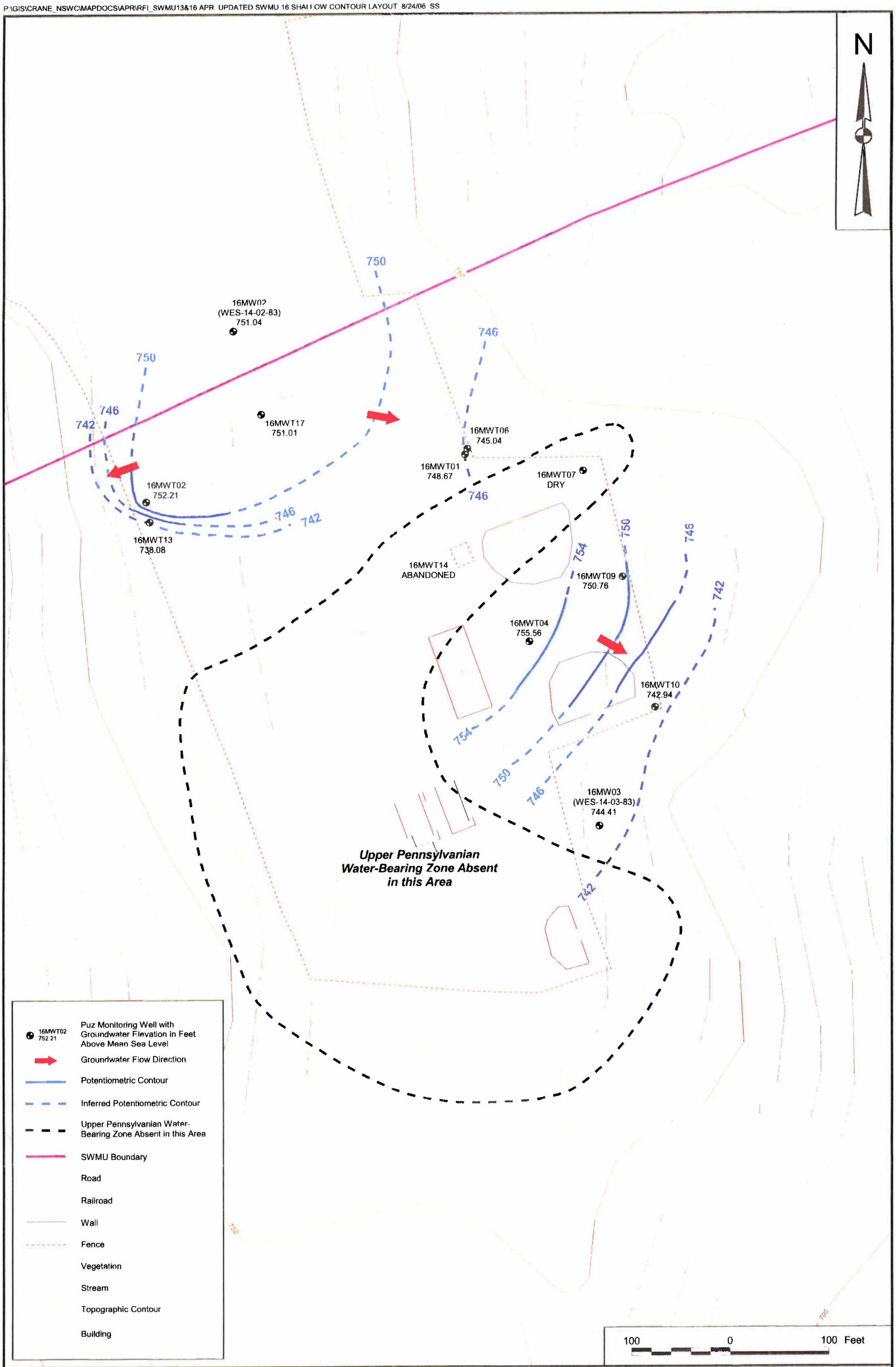
APPENDIX E

SWMU 16

POTENTIOMETRIC SURFACE FIGURES

ROUND 7

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16 APR UPDATED SWMU 16 SHALLOW CONTOUR LAYOUT 8/24/06 SS



DRAWN BY S STROZ DATE 8/21/06	NAVFAC	POTENTIOMETRIC SURFACE MAP FOR UPPER PENNSYLVANIAN WATER-BEARING ZONE - JANUARY 5, 2006 SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0377
CHECKED BY J. LUCAS DATE 8/24/06			APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 1 REV 0

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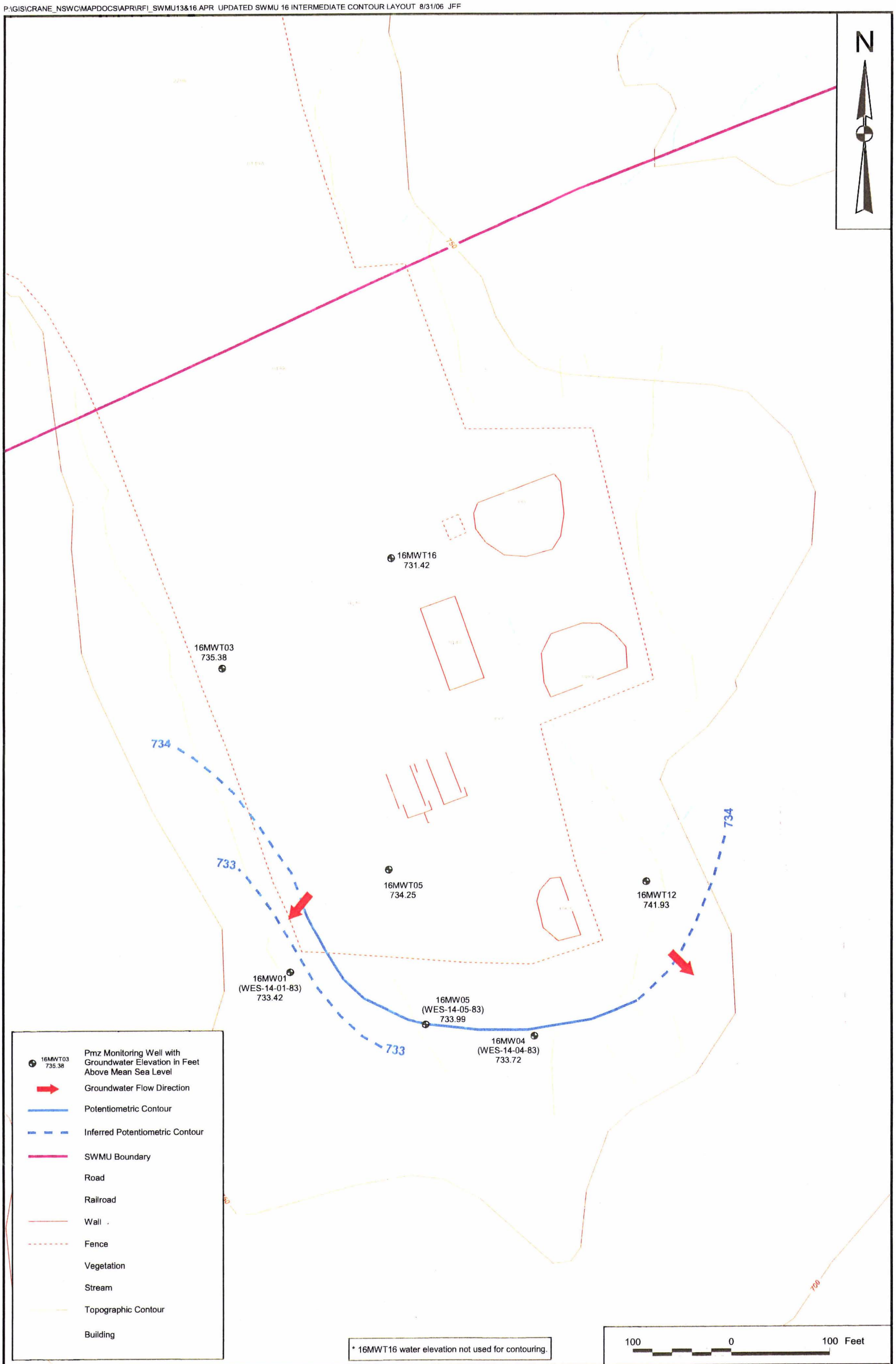
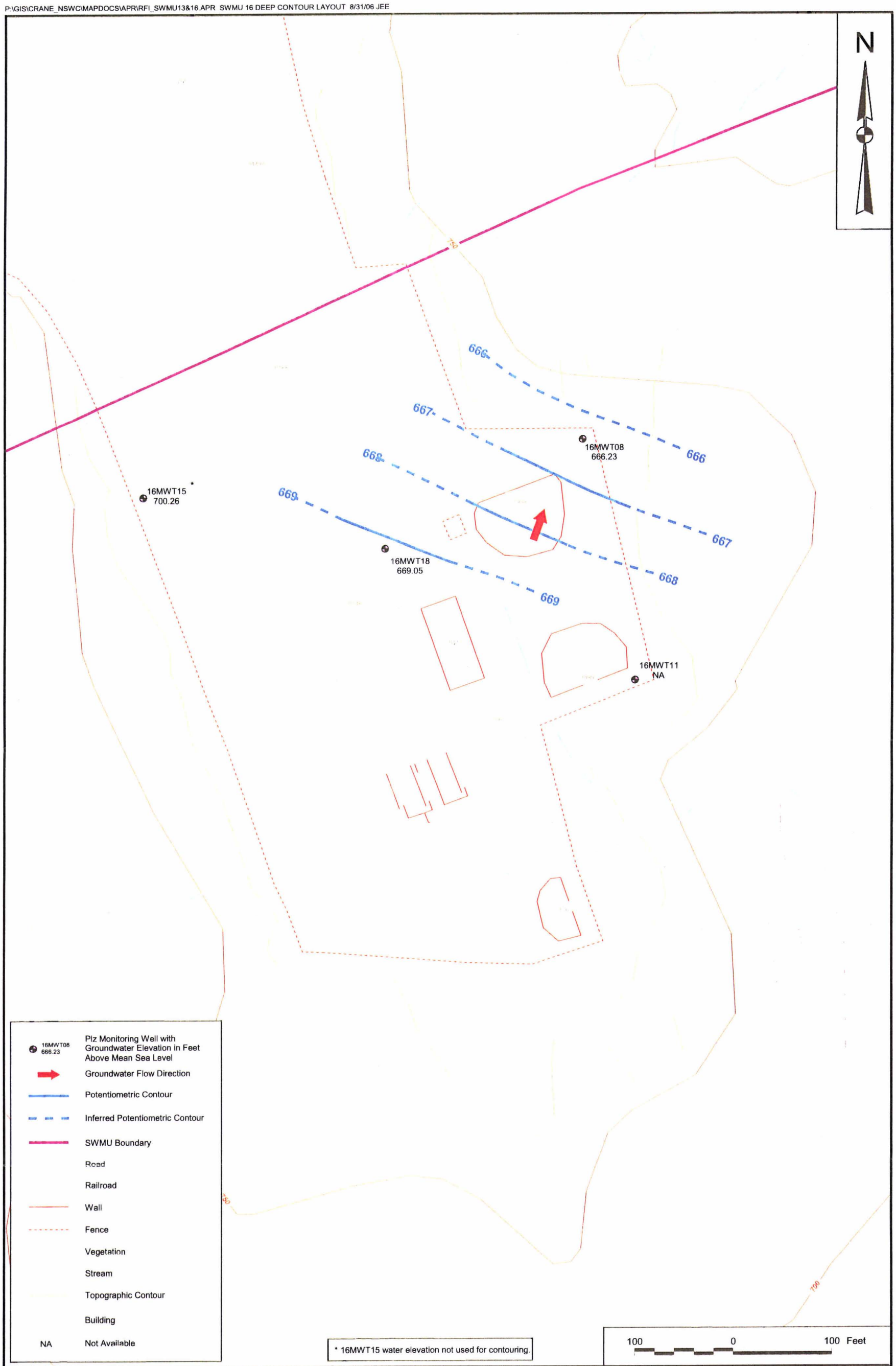


DRAWN BY S. STROZ	DATE 8/18/06	POTENTIOMETRIC SURFACE MAP FOR MIDDLE PENNSYLVANIAN WATER-BEARING ZONE - JANUARY 25, 2006 SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0377
CHECKED BY J. LUCAS	DATE 8/31/06		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 4 - 2 / REV 0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16.APR SWMU 16 DEEP CONTOUR LAYOUT 8/31/06 JEE



DRAWN BY S. STROZ	DATE 8/18/06	POTENTIOMETRIC SURFACE MAP FOR LOWER PENNSYLVANIAN WATER-BEARING UNIT - JANUARY 25, 2006 SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER CTO 0377
CHECKED BY J. LUCAS	DATE 8/31/06		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 4 - 3 / REV 0