Comprehensive Long-term Environmental Action Navy

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NSWC CRANE
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Rev. 0
03/07

Monitored Natural Attenuation Report
for
Mine Fill B (SWMU 13)

Round No. 8

Naval Surface Warfare Center Crane
Crane, Indiana

Contract Task Order 0377

March 2007

NAVFAC
Naval Facilities Engineering Command
Southeast
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North Charleston, South Carolina 29406

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PITT-04-7-010

April 5, 2007

Project No. 112G00041

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Building 1A, Code EV
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Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0377

Subject: NSWC Crane
Mine Fill B (SWMU 13)
Monitored Natural Attenuation Report for Round 8

Dear Mr. Hickey:

Enclosed you will find one copy of the SWMU 13 Monitored Natural Attenuation Report for Round 8 at Mine Fill B (SWMU 13).

Please contact me at (412) 921-8308 (e-mail: Ralph.Basinski@ttnus.com) or Joe Lucas at (412) 921-8882 (e-mail: Joe.Lucas@ttnus.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)
Ms. Debra Humbert, TtNUS, Inc. (letter only)
Mr. Mark Perry, TtNUS, Inc. (1 copy of enclosure unbound and letter)
Mr. Ralph Basinski, TtNUS, Inc. (1 copy of enclosure and letter)
Project File - CTO 0377 (letter only)

REVISION 0
MARCH 2007

MONITORED NATURAL ATTENUATION REPORT FOR MINE FILL B (SWMU 13)

ROUND NO. 8

NAVAL SURFACE WARFARE CENTER, CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command
Southeast
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North Charleston, South Carolina 29406

Submitted by:
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0377

MARCH 2007

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LIST OF ACRONYMS

CMS	Corrective Measures Study
DNX	hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine
DO	dissolved oxygen
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
MFB	Mine Fill B
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
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	polychlorinated biphenyls
Plz	Pennsylvanian Lower 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
RFI	RCRA Facility Investigation
RDX	Royal Demolition Explosive
SOPs	Standard Operating Procedures
SVOCs	Semivolatile Organic Compounds
SWMU	solid waste management unit
TNT	2,4,6-trinitrotoluene
TNX	Hexahydro-1,3,5-trinitroso-1,3,5-triazine
TOC	Total organic carbon
TtNUS	Tetra Tech NUS, Inc.
U.S. EPA	United States Environmental Protection Agency
µg/L	micrograms per liter

1.0 INTRODUCTION

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) has been conducted at the Naval Surface Warfare Center (NSWC) Crane Mine Fill B (MFB) solid waste management unit (SWMU), also known as SWMU 13. The purpose of the RFI was to determine whether explosives contamination in groundwater, surface water or sediment presented unacceptable risk, or if any residual explosives in soil presented unacceptable levels of risk to human health and the environment. The RFI was conducted at SWMU 13 in accordance with applicable RCRA corrective action requirements and provides data on the nature and extent of select explosives, metals, miscellaneous semivolatile organic compounds (SVOCs), herbicides, polychlorinated biphenyls (PCBs), and polynuclear aromatic hydrocarbons (PAHs) concentrations in surface soils, subsurface soils, sediment, surface water, and groundwater. The RFI indicates that explosives and herbicide contamination remains in soil around buildings and that explosives have migrated to groundwater and gully water and unacceptable levels of risk remain for various combinations of human and ecological receptors.

Historically, MFB was used for the production of large mines, depth charges, rocket heads, aerial bombs, and projectiles. In the past, explosive powders were released from roof vents. The explosive powders accumulated on the roofs and were washed down to the ground, resulting in the contamination of surface soils. In addition, wastewaters containing explosives were previously discharged into ditches. These explosives migrated into subsurface soils and into groundwater and from groundwater into surface water. The Navy has conducted a remedial action at MFB in which explosive-contaminated soils have been remediated by composting procedures. Therefore, the source of explosives contamination has been largely removed. In the absence of a source, residual explosives remain in the soil and may be naturally degrading.

A corrective measures study (CMS) will be conducted at SWMU 13. Among the remedial alternatives expected to be evaluated will be the potential for natural attenuation to reduce concentrations of explosives in the groundwater. 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). In order to determine whether residual explosives are naturally degrading at SWMU 13, a long-term groundwater monitoring plan for explosives and explosives degradation products is being conducted. The long-term monitoring program, as planned, consists of nine rounds of sampling to provide information on trends in groundwater concentrations of explosives and explosives degradation

by-products. Recently, 8 rounds of quarterly groundwater, soils, sediments, and surface water sampling and analyses were completed at SWMU 13. Information regarding the results of Rounds 1 through 3 is presented in the SWMU 13 RFI (Tetra Tech NUS, Inc. [TtNUS], 2005a). The MNA monitoring results for Rounds 4 through 7 have been provided in previous reports (TtNUS, 2005, 2006a, 2006b).

The purpose of this report is to present the results of monitoring activities in Round 8, including field documentation, and to provide the framework for evaluation of data once all nine rounds 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 MNA report for SWMU 13 will contain an evaluation as to whether residual explosives may be naturally degrading and if MNA is a viable remedial option for contaminated groundwater and surface water at SWMU 13. 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 13 meets the U.S. EPA Region V MNA requirements (U.S. EPA, 2000).

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 13.

2.1 OVERVIEW

Field activities for Round 8 were conducted in May 2006 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 SAMPLING OPERATIONS

This section discusses the methodology for groundwater and surface water sampling activities performed at SWMU 13 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 13 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 discussed 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.

2.2.1 Groundwater Purging and Sampling

During Round 8, the groundwater wells were sampled using previously installed dedicated bladder pumps. 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 forms (see Appendix A.1). See Figure 2-1 for all groundwater sampling locations.

All 17 proposed groundwater samples were collected at SWMU 13 during Round 8 (See Table 2-2). As in previous rounds, monitoring well 13MWT28 recharged at a very slow rate. The well was purged dry on one day and sampled the next.

2.2.2 Surface Water Sampling

Surface water samples were collected from intermittent streams, drainage ditches, and surface runoff locations throughout SWMU 13. 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. Round 8 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 electronically on a surface water sample log sheet (see Appendix A.2). See Figure 2-2 for all surface water sampling locations.

All 8 proposed surface water samples were collected at SWMU 13 during Round 8 (See Table 2-2).

2.3 QUALITY CONTROL SAMPLES

Quality assurance (QA)/quality control (QC) samples were generated and collected during Round 8 sampling activities to monitor both field and laboratory procedures. These procedures are detailed in the approved QAPP addendum. QA/QC samples for Round 8 included field duplicates, matrix spike/matrix spike duplicate (MS/MSD), and temperature blanks.

2.4 GROUNDWATER LEVEL MEASUREMENTS

A complete synoptic round of water levels for all SMWU 13 groundwater wells was taken prior to sampling activities in Round 8. The synoptic water level measurements were obtained within a 24 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.4 of this document. Table 2-1 contains water level/elevation data.

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Screened Interval				Water-Bearing Zone	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6		Round 7		Round 8	
				Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005		January 4, 2006		May 21, 2006	
									Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
MONITORING WELLS																								
13MWT01	1310541.57	3025015.94	713.10	5.00	15.00	708.10	698.10	Puz	6.21	709.13	5.82	709.52	7.55	707.79	7.56	707.78	7.71	707.63	9.79	705.55	7.20	708.14	6.70	708.64
13MWT02	1310776.56	3024743.55	702.10	17.00	27.00	685.10	675.10	Puz	17.15	687.57	17.10	687.62	16.24	688.48	15.88	688.84	16.19	688.53	16.00	688.72	15.37	689.35	16.91	687.81
13MWT03	1310240.95	3024891.66	718.34	5.00	15.00	713.34	703.34	Puz	8.79	712.31	8.88	712.22	9.98	711.12	12.17	708.93	9.72	711.38	11.18	709.92	9.63	711.47	8.45	712.65
13MWT04	1310383.40	3024546.11	704.37	5.00	15.00	699.37	689.37	Puz	12.98	693.86	12.75	694.09	14.09	692.75	15.42	691.42	14.27	692.57	15.83	691.01	14.31	692.53	13.82	693.02
13MWT05	1310758.93	3024380.03	693.61	6.00	16.00	687.61	677.61	Puz	5.42	691.02	4.13	692.31	5.78	690.66	8.73	687.71	5.96	690.48	8.31	688.13	5.75	690.69	5.06	691.38
13MWT06	1309916.18	3024495.27	715.30	5.00	15.00	710.30	700.30	Puz	15.11	702.82	15.62	702.31	11.91	706.02	14.78	703.15	11.66	706.27	14.95	702.98	13.91	704.02	11.20	706.73
13MWT07	1310539.32	3024094.13	684.38	5.00	15.00	679.38	669.38	Puz	3.12	684.10	3.10	684.12	4.21	683.01	4.84	682.38	3.44	683.78	3.35	683.87	4.32	682.90	3.02	684.20
13MWT08	1310247.86	3024337.56	698.42	5.00	15.00	693.42	683.42	Puz	3.17	697.39	2.92	697.64	3.88	696.68	3.87	696.69	4.85	695.71	8.77	691.79	3.35	697.21	3.81	696.75
13MWT09	1309662.07	3024049.03	703.29	10.00	20.00	693.29	683.29	Puz	7.74	698.16	7.40	698.50	8.77	697.13	8.64	697.26	9.15	696.75	10.40	695.50	8.10	697.80	7.96	697.94
13MWT10	1309979.69	3024001.26	697.77	15.00	25.00	682.77	672.77	Puz	13.65	686.50	13.11	687.04	14.96	685.19	16.11	684.04	13.68	686.47	15.32	684.83	15.14	685.01	13.00	687.15
13MWT11	1310233.72	3023750.09	679.76	5.00	15.00	674.76	664.76	Puz	7.87	674.42	7.00	675.29	8.76	673.53	8.82	673.47	9.03	673.26	10.14	672.15	8.64	673.65	8.56	673.73
13MWT12	1310080.21	3023574.95	679.96	10.00	20.00	669.96	659.96	Puz	7.88	674.24	7.78	674.34	10.75	671.37	11.50	670.62	10.14	671.98	11.93	670.19	11.27	670.85	9.87	672.25
13MWT13	1309441.27	3024163.61	699.28	8.00	18.00	691.28	681.28	Puz	3.62	698.36	3.18	698.80	4.93	697.05	4.40	697.58	5.13	696.85	6.04	695.94	4.49	697.49	3.91	698.07
13MWT14	1309142.23	3024110.17	703.15	13.00	23.00	690.15	680.15	Puz	13.25	692.25	13.08	692.42	14.17	691.33	14.69	690.81	14.10	691.40	16.09	689.41	14.00	691.50	13.46	692.04
13MWT15	1309565.52	3023717.80	694.27	15.00	25.00	679.27	669.27	Puz	12.88	683.77	12.63	684.02	14.59	682.06	15.49	681.16	13.88	682.77	15.89	680.76	14.92	681.73	13.22	683.43
13MWT16	1309854.28	3023341.92	682.13	5.00	15.00	677.13	667.13	Puz	8.49	675.86	8.61	675.74	11.01	673.34	14.29	670.06	12.33	672.02	14.76	669.59	13.39	670.96	9.72	674.63
13MWT17	1309605.27	3023123.97	690.68	8.00	18.00	682.68	672.68	Puz	8.70	684.31	8.09	684.92	8.89	684.12	9.04	683.97	9.91	683.10	11.23	681.78	8.48	684.53	8.52	684.49
13MWT18	1309326.98	3023293.42	700.05	20.00	30.00	680.05	670.05	Puz	19.06	683.86	19.04	683.88	20.21	682.71	20.52	682.40	19.41	683.51	20.31	682.61	20.02	682.90	18.76	684.16
13MWT19	1308893.97	3023834.57	703.10	9.00	19.00	694.10	684.10	Puz	8.31	697.51	6.80	699.02	10.96	694.86	11.31	694.51	10.40	695.42	12.08	693.74	10.78	695.04	9.14	696.68
13MWT20	1309066.76	3023527.23	699.33	10.00	20.00	689.33	679.33	Puz	4.22	697.85	4.00	698.07	5.00	697.07	5.23	696.84	4.94	697.13	4.96	697.11	4.76	697.31	4.34	697.73
13MWT21	1309391.01	3022916.22	688.37	5.00	15.00	683.37	673.37	Puz	7.69	683.05	7.34	683.40	9.09	681.65	9.20	681.54	9.30	681.44	10.37	680.37	8.30	682.44	8.02	682.72
13MWT22	1308936.34	3022785.67	669.53	5.00	15.00	664.53	654.53	Puz	7.44	664.52	7.25	664.71	8.18	663.78	9.13	662.83	8.21	663.75	9.92	662.04	8.40	663.56	7.84	664.12
13MWT23	1308708.02	3023245.12	696.66	11.50	21.50	685.16	675.16	Puz	7.45	691.69	7.17	691.97	8.50	690.64	9.25	689.89	8.60	690.54	9.39	689.75	8.90	690.24	8.06	691.08
13MWT24	1308397.23	3022916.48	691.33	12.00	22.00	679.33	669.33	Puz	8.45	685.48	8.23	685.70	9.25	684.68	10.04	683.89	9.27	684.66	10.52	683.41	9.41	684.52	8.68	685.25
13MWT25	1308625.62	3022677.44	678.87	5.00	15.00	673.87	663.87	Puz	16.00	665.57	16.61	664.96	7.05	674.52	6.79	674.78	6.65	674.92	9.27	672.30	5.86	675.71	5.80	675.77
13MWT26	1308232.69	3022690.14	684.86	10.00	20.00	674.86	664.86	Puz	9.10	678.39	8.93	678.56	10.05	677.44	11.09	676.40	9.81	677.68	10.79	676.70	10.51	676.98	9.44	678.05
13MWT27	1309786.55	3023829.07	696.09	10.00	20.00	686.09	676.09	Puz	NA	NA	NA	NA	9.31	688.82	9.86	688.27	9.27	688.86	10.97	687.16	8.80	689.33	8.35	689.78

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Screened Interval				Water-Bearing Zone	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6		Round 7		Round 8	
				Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005		January 4, 2006		May 21, 2006	
									Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
13MWT28	1309678.62	3024066.67	703.54	78.00	88.00	625.54	615.54	Plz	NA	NA	NA	NA	79.63	625.92	78.38	627.17	77.88	627.67	71.76	633.79	77.21	628.34	77.29	628.26
13MWT29	1309538.75	3024290.72	698.10	9.00	19.00	689.10	679.10	Puz	NA	NA	NA	NA	5.82	694.62	5.46	694.98	5.61	694.83	6.32	694.12	5.51	694.93	5.06	695.38
13MWT30	1309174.84	3024237.45	696.57	14.00	24.00	682.57	672.57	Puz	NA	NA	NA	NA	11.72	687.22	11.37	687.57	11.55	687.39	13.13	685.81	11.13	687.81	11.02	687.92
13MWT31	1308631.83	3023583.85	693.56	10.00	20.00	683.56	673.56	Puz	NA	NA	NA	NA	10.65	685.56	10.74	685.47	10.74	685.47	13.00	683.21	10.39	685.82	9.98	686.23
13MWT32	1308214.11	3023162.00	693.62	8.00	18.00	685.62	675.62	Puz	NA	NA	NA	NA	9.52	686.52	10.55	685.49	9.02	687.02	10.16	685.88	10.00	686.04	8.30	687.74
13MWT33	1308749.27	3023868.77	700.14	10.00	20.00	690.14	680.14	Puz	NA	NA	NA	NA	10.63	691.34	11.54	690.43	10.41	691.56	13.92	688.05	12.21	689.76	9.60	692.37
13MWT34	1309304.31	3023084.25	693.35	10.00	20.00	683.35	673.35	Puz	NA	NA	NA	NA	5.42	690.51	6.45	689.48	5.26	690.67	5.81	690.12	5.64	690.29	4.86	691.07
13MWT35	1310254.91	3023773.29	679.51	57.00	67.00	622.51	612.51	Plz	NA	NA	NA	NA	63.96	617.77	64.40	617.33	63.94	617.79	63.98	617.75	63.65	618.08	63.65	618.08
13MWT36	1309053.39	3022677.86	664.91	15.00	25.00	649.91	639.91	Puz	NA	NA	NA	NA	19.26	647.95	19.56	647.65	18.83	648.38	18.80	648.41	18.61	648.60	18.55	648.66
13MWT37	1309402.93	3022617.27	659.96	14.50	24.50	645.46	635.46	Puz	NA	NA	NA	NA	14.37	647.92	14.71	647.58	13.64	648.65	13.56	648.73	14.14	648.15	13.29	649.00
13MWT38	1309376.76	3022619.53	659.03	55.00	65.00	604.03	594.03	Plz	NA	NA	NA	NA	61.90	599.14	62.33	598.71	61.81	599.23	61.63	599.41	61.41	599.63	61.58	599.46
13MWT39	1309804.48	3022589.03	652.42	14.00	24.00	638.42	628.42	Puz	NA	NA	NA	NA	14.25	640.19	13.84	640.60	13.36	641.08	16.31	638.13	3.47	650.97	12.88	641.56
13MWT40	1309622.33	3022833.33	664.93	15.00	25.00	649.93	639.93	Puz	NA	NA	NA	NA	18.55	648.63	18.74	648.44	18.15	649.03	17.93	649.25	18.16	649.02	17.96	649.22
13MWT41	1309645.20	3022819.00	663.65	55.00	65.00	608.65	598.65	Plz	NA	NA	NA	NA	66.58	599.09	67.05	598.62	65.52	600.15	66.21	599.46	66.03	599.64	66.28	599.39
13MWT42	1309862.28	3023113.22	668.05	11.00	21.00	657.05	647.05	Puz	NA	NA	NA	NA	21.14	649.17	21.21	649.10	20.38	649.93	20.28	650.03	20.77	649.54	20.23	650.08
13MWT43	1310558.56	3023939.45	688.88	10.00	20.00	678.88	668.88	Puz	NA	NA	NA	NA	8.50	682.40	9.70	681.20	8.17	682.73	10.05	680.85	8.77	682.13	7.85	683.05
13MWT44	1310621.14	3023530.33	682.11	73.00	83.00	609.11	599.11	Plz	NA	NA	NA	NA	64.57	619.25	64.80	619.02	64.36	619.46	64.47	619.35	64.13	619.69	64.06	619.76
13MWT45	1309373.68	3022901.38	688.76	70.00	80.00	618.76	608.76	Plz	NA	NA	NA	NA	72.75	617.84	69.83	620.76	70.76	619.83	70.55	620.04	70.39	620.20	70.85	619.74
13MWT46	1309812.02	3022565.94	651.64	55.00	65.00	596.64	586.64	Plz	NA	NA	NA	NA	58.10	595.51	58.25	595.36	56.61	597.00	57.12	596.49	57.34	596.27	56.23	597.38
13MWT47	1309389.47	3024437.45	675.41	8.00	18.00	667.41	657.41	Puz	NA	NA	NA	NA	7.32	669.91	7.02	670.21	7.15	670.08	3.95	673.28	7.68	669.55	6.84	670.39
13MWT48	1309618.82	3021409.02	546.20	5.00	10.00	541.20	536.20	Valley Fill(2)	NA	NA	NA	NA	NA	NA	10.02	538.65	10.29	538.38	12.21	536.46	9.78	538.89	9.88	538.79
13MWT49	1309795.96	3021713.21	551.05	4.00	9.00	547.05	542.05	Valley Fill(2)	NA	NA	NA	NA	NA	NA	7.21	546.69	7.25	546.65	8.65	545.25	7.19	546.71	7.20	546.70
13MWT50	1310002.40	3022085.22	557.77	15.00	25.00	542.77	532.77	Valley Fill(2)	NA	NA	NA	NA	NA	NA	7.02	553.47	7.90	552.59	8.76	551.73	7.43	553.06	7.33	553.16
13MWT51	1310206.30	3022381.03	569.28	5.00	15.00	564.28	554.28	Valley Fill(2)	NA	NA	NA	NA	NA	NA	3.77	567.59	5.80	565.56	14.00	557.36	5.80	565.56	5.62	565.74
STAFF GAUGES																								
13SG01	1310836.89	3024771.44	698.35	NA	NA	NA	NA	(3)	NA	NA	1.73	696.62	1.77	696.58	1.76	696.59	1.77	696.58	Dry	NA	1.77	696.58	1.77	696.58
13SG02	1310746.57	3024854.37	701.95	NA	NA	NA	NA	Puz	NA	NA	3.64	698.31	3.68	698.27	3.71	698.24	3.73	698.22	Dry	NA	3.69	698.26	3.69	698.26
13SG03	1309585.70	3024436.89	696.24	NA	NA	NA	NA	Puz	NA	NA	1.96	694.28	1.87	694.37	1.95	694.29	1.96	694.28	Dry	NA	1.94	694.30	1.94	694.30
13SG04	1309478.26	3024317.86	688.99	NA	NA	NA	NA	Puz	NA	NA	2.38	686.61	2.45	686.54	2.46	686.53	2.45	686.54	Dry	NA	2.42	686.57	2.43	686.56

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Screened Interval				Water-Bearing Zone	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6		Round 7		Round 8	
				Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005		January 4, 2006		May 21, 2006	
									Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
STAFF GAUGES CONTINUED																								
13SG05	1309341.46	3024185.40	692.94	NA	NA	NA	NA	Puz	NA	NA	3.89	689.05	3.90	689.04	3.92	689.02	3.89	689.05	Dry	NA	3.90	689.04	3.89	689.05
13SG06	1308991.98	3023849.68	704.88	NA	NA	NA	NA	(3)	NA	NA	2.37	702.51	2.35	702.53	2.35	702.53	Dry	NA	Dry	NA	2.35	702.53	2.34	702.54
13SG07	1308164.25	3022622.07	680.30	NA	NA	NA	NA	Puz	NA	NA	1.50	678.80	1.47	678.83	1.55	678.75	1.69	678.61	Dry	NA	1.48	678.82	1.56	678.74
13SG08	1308846.74	3022744.78	665.95	NA	NA	NA	NA	Puz	NA	NA	5.05	660.90	5.08	660.87	5.10	660.85	5.13	660.82	Dry	NA	5.10	660.85	5.08	660.87
13SG09	1309868.61	3023412.15	675.30	NA	NA	NA	NA	Puz	NA	NA	4.15	671.15	4.15	671.15	4.18	671.12	4.21	671.09	Dry	NA	4.15	671.15	4.14	671.16
13SG10	1310366.98	3023821.25	676.10	NA	NA	NA	NA	Puz	NA	NA	4.78	671.32	4.82	671.28	4.96	671.14	4.84	671.26	Dry	NA	4.80	671.30	4.93	671.17
13SG11	1309388.01	3024416.84	675.36	NA	NA	NA	NA	Puz	NA	NA	NA	NA	2.74	672.62	2.30	673.06	2.51	672.85	Dry	NA	2.15	673.21	2.24	673.12
13SG12	1312371.18	3022662.06	595.28	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	6.87	588.41	6.85	588.43	Dry	NA	6.81	588.47	6.88	588.40
13SG13	1311077.60	3022704.86	572.52	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	5.87	566.65	6.06	566.46	Dry	NA	5.58	566.94	4.83	567.69
13SG14	1310424.91	3022481.79	567.75	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	6.37	561.38	6.41	561.34	Dry	NA	6.32	561.43	6.35	561.40
13SG15	1309660.62	3021524.54	544.18	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	9.97	534.21	5.24	538.94	Destroyed by Construction	NA	Destroyed by Construction	NA	Destroyed by Construction	NA
13SG16	1309270.46	3021074.88	537.01	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA
13SG17	1309034.25	3020747.93	532.48	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA
13SG18	1308276.51	3019633.62	524.23	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	8.16	516.07	8.19	516.04	Dry	NA	8.16	516.07	8.14	516.09

Notes:
1 = Total depth of boring, total depth of well may be less.
2 = Valley Fill includes alluvium, colluvium, and weathered siltstone directly below fill material. Total thickness of these materials is 26 feet or less.
3 = Staff gauge measured surface water level that appears to be perched above groundwater in the Pennsylvanian geologic unit immediately adjacent to or underlying the drainageway.
bgs = Below ground surface.
btor = Below top of riser/reference point.
amsl = Above mean sea level (NAVD88).
NA = Not applicable or Not Available.
NAVD88 = North American Vertical Datum of 1988.
Puz = Pennsylvanian Upper Water Bearing Zone
Plz = Pennsylvanian Lower Water Bearing Zone

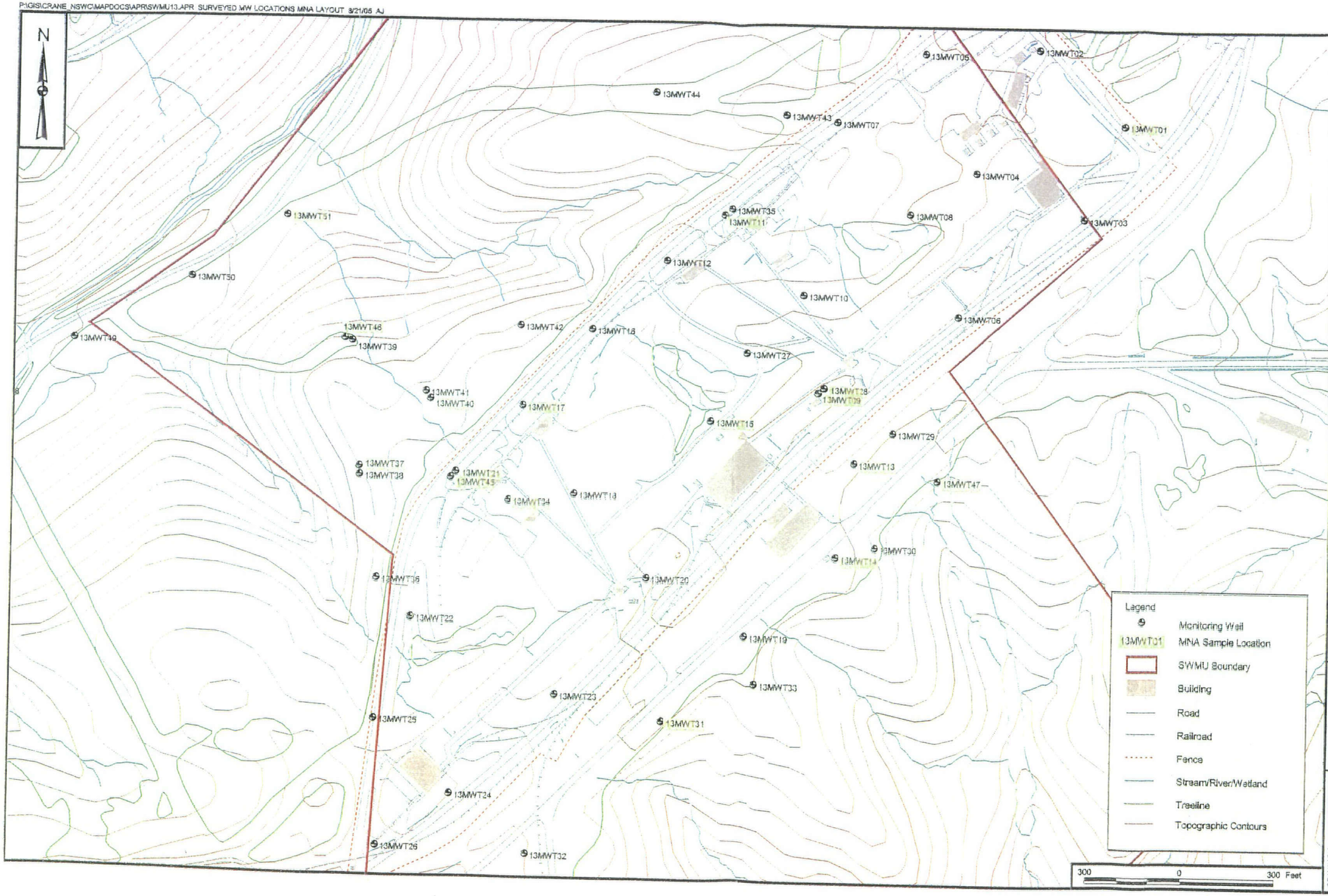
TABLE 2-2

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 13 - MINE FILL B
ROUND 8
NSWC CRANE
CRANE, INDIANA

Sample Number	Analytical Fraction Explosives Nitroaromatics and Nitramines SW-846 8330	Reason Why Sample Was Not Collected
Groundwater (Round 8)		
13GWT0108	X	
13GWT0909	X	
13GWT1108	X	
13GWT1308	X	
13GWT1408	X	
13GWT1508	X	
13GWT1708	X	
13GWT2108	X	
13GWT2807	X	
13GWT3107	X	
13GWT3407	X	
13GWT3707	X	
13GWT4007	X	
13GWT4507	X	
13GWT4607	X	
13GWT4707	X	
13GWT5106	X	
GW TOTALS	**17**	
Surface Water (Round 8)		
13SW1105	X	
13SW1407	X	
13SW1507	X	
13SW1607	X	
13SW1906	X	
13SW2006	X	
13SW2206	X	
13SW3007	X	
SW TOTALS	**8**	

X - Sample collected as proposed.
O - Sample not collected as proposed.

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU13.APR SURVEYED MW LOCATIONS MNA LAYOUT 8/21/05 AJ



CONTRACT NO. 7448

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 2 - 1

REV 0

MONITORING WELL LOCATIONS
SWMU 13 MINE FILL B
NWSC CRANE
CRANE, INDIANA

NAVFAC

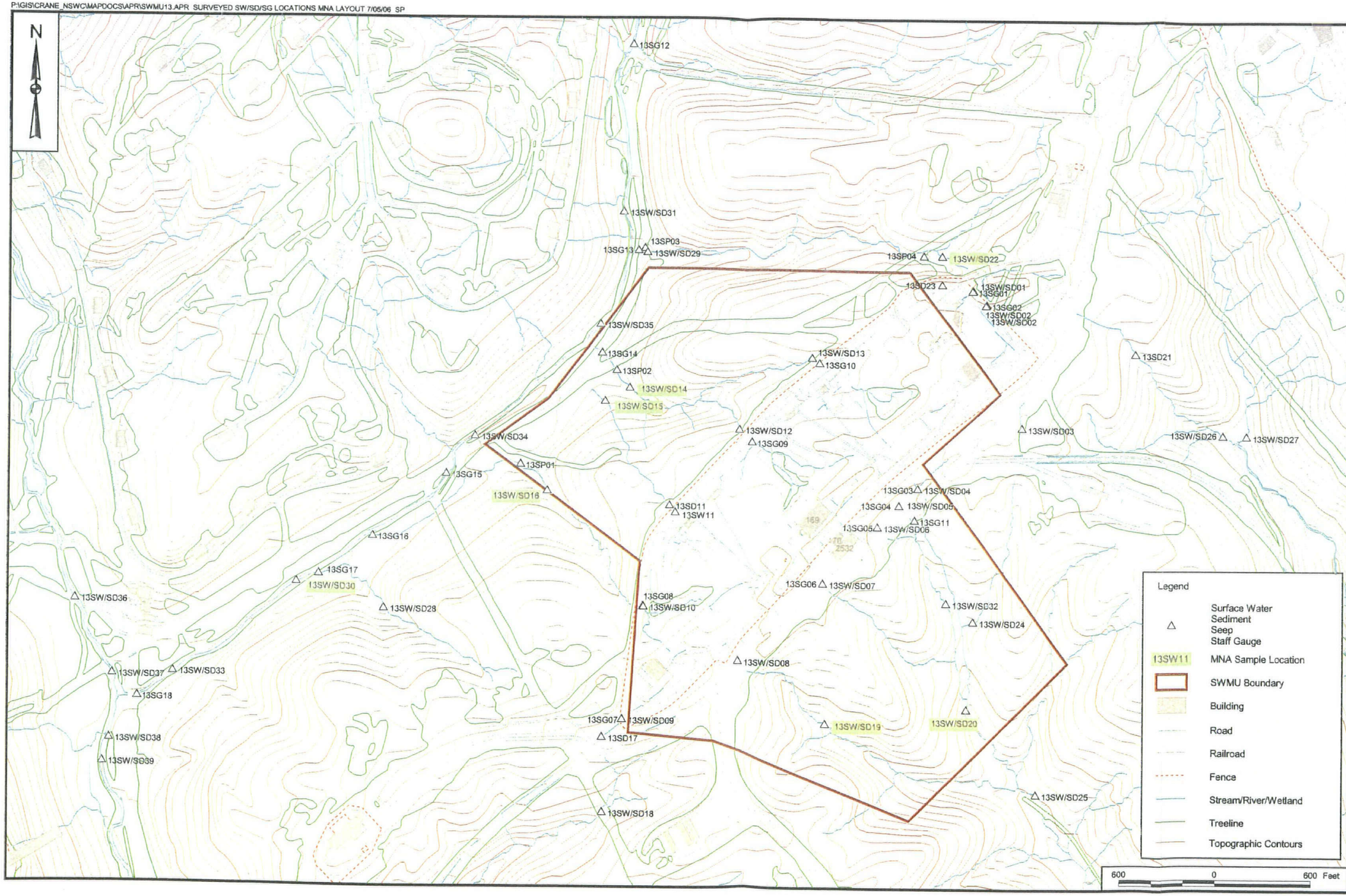
DRAWN BY C. FOSTER DATE 12/29/04

CHECKED BY J. LUCAS DATE 8/21/05

COST/SCHED AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU13.APR SURVEYED SW/SD/SG LOCATIONS MNA LAYOUT 7/05/06 SP



CONTRACT NO.
CTO 0377

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 2 - 2

REV 0

SURVEYED SURFACE WATER, SEDIMENT, SEEP, AND STAFF GAUGE LOCATIONS
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY A. JANOCHA DATE 11/17/05

CHECKED BY J. LUCAS DATE 7/05/06

COST/SCHED-AREA

SCALE AS NOTED

3.0 DATA PRESENTATION

This section presents the analytical results for groundwater and surface water sampling conducted in Round 8 at SMWU 13 (see Tables 3-1 to 3-6). The analytical results for Rounds 1 through 7 are also presented to support data evaluation which is discussed in Section 4. Appendix D contains a summary of analytical results for groundwater and surface water samples collected in Round 8.

As stated previously, the SWMU 13 RFI indicated that explosives contamination remains in soil around SWMU 13 buildings and explosives have migrated to groundwater, surface water, and gully water. RDX was identified as the most frequently detected explosive in groundwater, surface water, and surface soil. As a result, RDX is being considered as a parent compound for evaluating the effectiveness of natural attenuation at SWMU 13. Over time, natural attenuation will reduce the mass or concentration of RDX in soil and groundwater and RDX will decompose in stages to other well-defined intermediate by-products. In the case of RDX, it will degrade to give the 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). As a result, the presentation and interpretation of analytical results in Sections 3 and 4 of this report will focus on RDX and its associated degradation products.

3.1 GROUNDWATER DATA

Tables 3-1 and 3-3 show the groundwater analytical results for Rounds 1 through 8 in the Upper and Lower Pennsylvania Water Bearing Zones, respectively. Both tables show summary listings of concentrations for explosives, explosive degradation by-products, and miscellaneous field parameters. Concentrations are presented in micrograms per liter (µg/L) along with data validation qualifiers, as applicable. There was no analysis for RDX degradation products in Round 8. Due to the staggered nature of the groundwater sampling, not all wells were sampled in each of the seven rounds of sampling.

3.1.1 Pennsylvanian Upper Water Bearing Zone (Puz)

Analytical results for Round 8 sampling at the Pennsylvania Upper Water Bearing Zone (Puz) wells are presented in Table 3-1. A summary of descriptive statistics for Round 8 is shown in Table 3-2. In Round 8, explosives were detected at wells 13MWT01, 13MWT09, 13MWT11, 13MWT13, 13MWT14, 13MWT17, 13MWT21, 13MWT31, 13MWT34, 13MWT37, 13MWT40, and 13MWT51. Explosives were not detected at wells 13MWT15 or 13MWT47, which are upgradient and downgradient, respectively, of the RDX plume.

The most frequently detected explosives in Round 8 were HMX and RDX. The highest concentrations of HMX were reported at wells 13MWT21 (540 µg/L), 13MWT37 (210 µg/L), and 13MWT09 (120 µg/L). The highest concentrations of RDX were reported at wells 13MWT21 (3,800 µg/L), 13MWT37 (2,500 µg/L), and 13MWT09 (1,400 µg/L).

In addition to RDX and HMX, several additional energetic compounds were detected in Round 8 primarily at 13MWT09, 13MWT11, and 13MWT21. There additional explosives included 1,3,5-trinitrobenzene, 1,3 dinitrobenzene, 2,4,6-trinitrotoluene (TNT), 2,6 dinitrotoluene, 2,4-dintrotoluene, 2-amino-4,6-dinitrotoluene, and 4-amino-2,6-dintrotoluene.

3.1.2 Pennsylvanian Lower Water Bearing Zone (Plz)

Analytical results for Round 8 sampling in the Pennsylvanian Lower Water Bearing Zone (Plz) wells are presented in Table 3-3. A summary of descriptive statistics for Round 8 is shown in Tables 3-4. In Round 8, there were no positive detections of explosives.

3.2 SURFACE WATER DATA

The surface water sampling results for Round 8 are presented in Table 3-5. A summary of descriptive statistics for Round 8 is shown in Tables 3-6. In Round 8, explosives were detected at all surface water monitoring locations with the exception of 13SW20. There was no analysis for RDX degradation products in Round 8. The most frequently detected explosive in Round 8 was RDX, followed by HMX. RDX concentrations ranged from 0.78 µg/L at 13SW22 to 220 µg/L at 13SW11. HMX was detected at all locations with exception of 13SW2 and concentrations ranged from 0.77 µg/L at 13SW19 to 210 µg/L at 13SW11. In addition to RDX and HMX, low concentrations of 4-amino-2.6-dinitrotolunene (1.8 and 0.61 µg/L) were detected at locations 13SW15 and 13SW16, respectively.

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT01								13MWT09								
ROUND		1	2	3	4	5	6	7	8	1		2	3	4	5	6	7	8
SAMPLE DATE		4/26/03	11/23/03	8/1/04	1/23/05	5/3/05	8/15/05	1/23/06	6/2/06	4/28/03	5/9/03	12/4/03	7/31/04	2/1/05	5/3/05	8/27/05	1/9/06	6/3/06
EXPLOSIVES	UNITS																	
1,3,5-TRINITROBENZENE	UG/L	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		1.3	1.1	0.94	0.94	1.2	1.2	1
1,3-DINITROBENZENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	1.4 J		2.4	2.1	2.2	2.1	2.2	2.3	1.7
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.526 U									0.505 U						
2,4,6-TRINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	19		25	24	22	21	23	22	17
2,4-DIAMINO-6-NITROTOLUENE			0.263 U		0.264 U		0.27 U					3.9		2.5 R		2.6 R		
2,4-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		0.253 U	1.4 J	0.25 U	0.288 U	0.26 U	1.2 J	1.2 J
2,6-DIAMINO-4-NITROTOLUENE			0.263 U		0.264 U		0.27 U					0.253 U		0.25 U		0.26 U		
2,6-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		9.9	8.8 J	0.25 U	8.3	8.9	7.4 J	7
2-AMINO-4,6-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	8.6 J		13	15 J	13 J	15	18 J	17	12 J
2-NITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U
3,5-DINITROANILINE			0.263 U		0.264 U		0.27 U					0.253 U		2.2 J		2.1 J		
3-NITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U
4,4'-TN-AZOXY					0.528 U		0.54 U							0.5 U		0.52 U		
4-AMINO-2,6-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	18		18	19	18	17	19	21	19
4-NITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U
DNX			0.263 U		0.264 U		0.27 U					4 J		0.27 R		0.27 R		
HMX		1	1	1.3	0.88	0.84	1	0.84	1	84		130	140	99	91	110	110 J	120
MNX			0.263 U		0.264 U		0.27 U					7.1 J		4.2		2.8 J		
NITROBENZENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U
RDX		0.44 U	0.35 J	0.3 J	0.37 J	0.278 U	0.27 U	0.26 U	0.25 U	1100		1700	1500	1200	1300	1400	1300	1400
TETRYL		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U
TNX			0.263 U		0.264 U		0.27 U					1.5 J		1.3 J		0.26 U		
FIELD PARAMETERS																		
TEMPERATURE	C	12.59	17.04	18.75	9.98	11.12	20.97			13.33	14.36	12.82	18.15	12.15	12.47	17.69	12.22	
ALKALINITY	MG/L											0						
CARBON DIOXIDE												48						
DISSOLVED OXYGEN				4.2	0.81							1.5	0.2	0.74			0.73	
DISSOLVED OXYGEN - METER		1.28	1.4			0.96	0.73			1.69	1.21	1.14			1.5	0.065		
HYDROGEN SULFIDE (H2S)												0						
IRON(+2)												0						
MANGANESE(+2)												0.4						
NITRITE-N												0.023						
SULFIDE												0.01						
SPECIFIC CONDUCTANCE	MS/CM	0.229	0.233	0.255	0.192	0.17	188		0.255	0.829	0.725	0.64	0.773	0.57	0.576	0.427	0.784	0.818
OXIDATION REDUCTION POTENTIAL	MV	220	385.4	461.2	295	403.8	687.8		427	205.6	148	251	88.1	29.9	250.1	544.3	302	254
TURBIDITY	NTU	3.8	4.39	9.5	3	1	0.73		0	3	0.1	4.07	3.8	1.6	0.15	1.1	7.8	0
PH	S.U.	4.68	4.17	3.57	3.98	4.45	3.56		4.21	5.36	5.38	5.32	6.27	5.49	5.29	4.73	5.62	5.67
MISCELLANEOUS PARAMETERS																		
TEMPERATURE	C								14.1									14.5
AMMONIA-N	MG/L	0.01 U	0.005 UJ							3.3		3.4						
DISSOLVED OXYGEN									0.67									0.53
NITRITE/NITRATE-N		0.07	0.15 J		0.1 J		0.025 U		0.16	92		54 J		77 J		59		62
TOTAL ORGANIC CARBON							1 U									2.3		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT11								13MWT13							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
SAMPLE DATE		4/27/03	11/20/03	7/23/04	1/23/05	5/4/05	8/11/05	1/24/06	6/2/06	5/7/03	11/25/03	8/1/04	2/2/05	5/5/05	8/15/05	1/8/06	5/23/06
EXPLOSIVES	UNITS																
1,3,5-TRINITROBENZENE	UG/L	0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
1,3-DINITROBENZENE		0.83 J	0.258 U	0.46 J	1.2	0.248 U	0.55	1.4	0.89	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.515 U								0.515 U						
2,4,6-TRINITROTOLUENE		31	9.5	11	44	47	16	49	30	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			1.4 J		1.6 R		0.77 J				0.258 U		0.245 U		0.26 U		
2,4-DINITROTOLUENE		0.43 U	1.2	1.6	4	4.3	1.9	4.1 J	3.3	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			1.8 J		0.269 U		0.26 U				0.258 U		0.245 U		0.26 U		
2,6-DINITROTOLUENE		0.43 U	1.2 J	2.1 J	5.7 J	6.5	3.2	0.26 U	4.5 J	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE		6 J	4.4 J	6.6 J	12 J	20	11 J	14 J	12 J	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
2-NITROTOLUENE		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
3,5-DINITROANILINE			0.258 U		0.269 U		0.26 U				0.258 U		0.245 U		0.26 U		
3-NITROTOLUENE		0.43 U	0.258 U	0.58 J	0.45 R	0.47 J	0.26 U	1.3 J	0.25 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
4,4'-TN-AZOXY					0.538 U		0.52 U						0.49 U		0.52 U		
4-AMINO-2,6-DINITROTOLUENE		19	9.8	14	27	29	18	29	21	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
4-NITROTOLUENE		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
DNX			0.258 U		0.269 U		0.26 U				0.258 U		0.245 U		0.26 U		
HMX		34	44	45	68	70	66	80	84	9.5	12	12	8.4	8.8	11	9.7 J	10
MNX			1.2		0.74 J		0.75 J				0.258 U		0.245 U		0.26 U		
NITROBENZENE		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
RDX		560	520	490	830	830	620	760	740	12	20	17	18	15	21	17	16
TETRYL		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U
TNX			0.258 U		0.269 U		0.26 U				0.258 U		0.245 U		0.26 U		
FIELD PARAMETERS																	
TEMPERATURE	C	15.73	16.35	21.2	10.8	15.27	23	9.55		13.82	12.33	20.61	9.87	13.3	19.47	12.32	
ALKALINITY	MG/L		10 U								10 U						
CARBON DIOXIDE			165								120						
DISSOLVED OXYGEN			1.5	4.95	0.71			0.82			11	0.73	5.31			3.12	
DISSOLVED OXYGEN - METER		0.85	3.49			0.73	0.39			3.37	3.26			3.67	3.3		
HYDROGEN SULFIDE (H2S)			0								0						
IRON(+2)			3.3 >								0.03						
MANGANESE(+2)			0.3								0.5						
NITRITE-N			0.009								0						
SULFIDE			0.01								0						
SPECIFIC CONDUCTANCE	MS/CM	0.251	0.238	0.262	0.222	0.224	0.253	0.307	0.286	0.106	0.113	0.131	1.01	0.085	97	0.127	
OXIDATION REDUCTION POTENTIAL	MV	265	355	127	284	401	154.1	290	288	268.2	385.1	132	392.7	421.6	688.9	396	
TURBIDITY	NTU	10	4.52	2.5	10	6.1	6.3	8.8	1.7	5.8	0.38	0.7	7.2	1	0	4.3	
PH	S.U.	3.64	3.93	3.85	3.8	3.2	4.09	4.19	4.16	4.2	3.56	4.31	3.94	4.52	3.58	4.28	
MISCELLANEOUS PARAMETERS																	
TEMPERATURE	C								15.3								
AMMONIA-N	MG/L	0.1	0.1 J							0.03	0.01						
DISSOLVED OXYGEN									0.64								
NITRITE/NITRATE-N		0.02 U	0.19 J		0.1 J		0.025 U		0.11	1.1	1 J		1.1 J		0.025 U		0.51
TOTAL ORGANIC CARBON							1.7								1 U		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT14								13MWT15							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
SAMPLE DATE		4/29/03	11/24/03	7/27/04	1/25/05	5/5/05	8/16/05	1/9/06	5/23/06	5/6/03	11/25/03	7/29/04	2/3/05	5/5/05	8/11/05	1/19/06	6/4/06
EXPLOSIVES	UNITS																
1,3,5-TRINITROBENZENE	UG/L	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
1,3-DINITROBENZENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.5 U								0.515 U						
2,4,6-TRINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.25 U		0.242 U		0.24 U				0.258 U		0.238 U		0.27 U		
2,4-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.25 U		0.242 U		0.24 U				0.258 U		0.238 U		0.27 U		
2,6-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
2-NITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
3,5-DINITROANILINE			0.25 U		0.242 U		0.24 U				0.258 U		0.238 U		0.27 U		
3-NITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
4,4'-TN-AZOXY					0.485 U		0.48 U						0.475 U		0.53 U		
4-AMINO-2,6-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
4-NITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
DNX			0.25 U		0.242 U		0.24 U				0.258 U		0.238 U		0.27 U		
HMX		0.345 U	0.89 J	0.34 J	0.54 J	0.38 J	0.52	0.76 J	0.57	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
MNX			0.25 U		0.242 U		0.24 U				0.258 U		0.238 U		0.27 U		
NITROBENZENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
RDX		1.6	4.7	2	2.8	2.2	2.7	3.7	2.5	0.46 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
TETRYL		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U
TNX			0.25 U		0.242 U		0.24 U				0.258 U		0.238 U		0.27 U		
FIELD PARAMETERS																	
TEMPERATURE	C	14.34	10.77	17.41	14.39	15.29	19.15	10.98		15.89	12.28	15.66	13.29	13.95	18.4	13.6	
ALKALINITY	MG/L										10 U						
CARBON DIOXIDE											137						
DISSOLVED OXYGEN				6.74	0.91			1.43			0.07	0.53	1.57			0.58	
DISSOLVED OXYGEN - METER		1.2	0.52			1.69	0.54			0.53	7.79			1	0.91		
HYDROGEN SULFIDE (H2S)											0						
IRON(+2)											3.3 >						
MANGANESE(+2)											0.9						
NITRITE-N											0.001						
SULFIDE											0.14						
SPECIFIC CONDUCTANCE	MS/CM	0.885	0.623	0.714	0.595	0.704	586	1.03		0.391	0.34	0.352	0.314	0.313	0.309	0.449	
OXIDATION REDUCTION POTENTIAL	MV	23.2	100.5	71	62.4	134.8	526.8	97		286.8	322	6.85	373.3	401	342	326	
TURBIDITY	NTU	1.6	0	3	3.3	2.6	0.8	4.1		7.3	45.4	10	8.31	15	4.4	10	
PH	S.U.	5.5	5.48	6.86	5.58	5.84	5.48	5.77		3.74	3.98	3.26	3.65	3.02	3.14	3.92	
MISCELLANEOUS PARAMETERS																	
TEMPERATURE	C																
AMMONIA-N	MG/L	0.08	0.06 J							1	1.3						
DISSOLVED OXYGEN																	
NITRITE/NITRATE-N		0.13	0.05 J		0.025 UJ		0.025 U		0.079	0.02 U	0.05 U		0.025 U		0.025 U		0.14
TOTAL ORGANIC CARBON							4.2				1.1				1.1		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT17								13MWT21							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
SAMPLE DATE		5/7/03	11/5/03	7/29/04	1/23/05	5/4/05	8/11/05	1/24/06	6/4/06	4/25/03	11/5/03	7/28/04	1/22/05	5/4/05	8/10/05	1/19/06	6/1/06
EXPLOSIVES	UNITS																
1,3,5-TRINITROBENZENE	UG/L	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	1.3 J	0.4 J	0.36 J	0.41 J	0.47 J	0.26 U	0.25 U
1,3-DINITROBENZENE		0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	1.8 J	0.8	0.78	0.26 U	0.96	0.26 U	0.6
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.5 U								0.481 U						
2,4,6-TRINITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	26 J	69 J	26	24	29	30	0.48 J	15
2,4-DIAMINO-6-NITROTOLUENE			0.25 U		0.248 U		0.26 U				0.77 J		0.29 R		0.3 J		
2,4-DINITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	1.4 J	0.65 J	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.25 U		0.248 U		0.26 U				0.24 U		0.238 U		0.28 U		
2,6-DINITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	5.8 J	2.8	2.6 J	2.9	2.8	0.26 U	2
2-AMINO-4,6-DINITROTOLUENE		0.43 U	0.28 J	0.37 J	0.27 J	0.271 U	0.31 J	0.4 J	0.25 U	0.28 U	0.24 UJ	3.8 J	1.9 J	0.26 U	8.1 J	0.76 J	2.1 J
2-NITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U
3,5-DINITROANILINE			0.25 U		0.248 U		0.26 U				0.24 U		0.238 U		0.31 J		
3-NITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U
4,4'-TN-AZOXY					0.495 U		0.51 U						0.475 U		0.56 U		
4-AMINO-2,6-DINITROTOLUENE		0.6 J	0.71	0.84	0.54	0.44 J	0.56	0.41 J	0.25 U	0.28 U	0.24 U	2.9 J	3.2	3 J	5	1.1	3.4
4-NITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.5 J	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U
DNX			2.2 J		0.41 J		0.44 J				50 J		0.238 U		0.28 U		
HMX		92 J	140	120	100	80	110	92	100	390	640	460	410	430	560	230	540
MNX			11		6.2		6.5				9.3 J		3.3 R		0.28 U		
NITROBENZENE		0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	0.24 U	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U
RDX		430	580	490	480	390	560	500	560	2700	7700	4000	3200	4500	4200	180	3800
TETRYL		0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.28 U	0.24 U	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U
TNX			1.2		0.248 U		0.3 J				1.4 J		0.238 U		0.28 U		
FIELD PARAMETERS																	
TEMPERATURE	C	15.7	15.97	18.57	11.51	13.52	21.81	12.05		13.01	15.17	20.07	9.15	13.1	22.3	10.7	
ALKALINITY	MG/L		10 U								10 U						
CARBON DIOXIDE			170								125						
DISSOLVED OXYGEN			0.9	2.01	0.35			0.48			1	2.94	1.56			6.41	
DISSOLVED OXYGEN - METER		0.53	0.84			0.18	0.96			1.45	2.09			0.42	0.65		
HYDROGEN SULFIDE (H2S)			0								0						
IRON(+2)			0.06								0.1						
MANGANESE(+2)			0								0.6						
NITRITE-N			0.006								0.031						
SULFIDE			0.02								0.04						
SPECIFIC CONDUCTANCE	MS/CM	0.17	0.153	0.159	0.118	0.135	0.233	0.368		0.212	0.195	0.298	0.148	0.176	171	0.371	
OXIDATION REDUCTION POTENTIAL	MV	112	338	129.4	4	289.6	517	230		193.6	247.2	107.3	56.1	283.7	748.2	259	
TURBIDITY	NTU	10	3.74	4.1	15	0.4	0	1.1		8.2	2.61	4	4	2.8	4.2	5	
PH	S.U.	5.35	5.38	5.28	5.4	5.16	4.43	5.28		5.46	5.59	7.32	5.71	5.42	5	6.83	
MISCELLANEOUS PARAMETERS																	
TEMPERATURE	C																
AMMONIA-N	MG/L	0.01	0.005 U							0.05	0.02						
DISSOLVED OXYGEN																	
NITRITE/NITRATE-N		0.86	0.65		1.7 J		0.22		0.52	0.64	1.2		0.81 J		0.45		0.49
TOTAL ORGANIC CARBON							3.4								2.3		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT31								13MWT34							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
SAMPLE DATE		No Sample	11/24/03	7/26/04	2/1/05	5/5/05	8/29/05	1/10/06	6/4/06	No Sample	12/4/03	7/29/04	1/23/05	5/5/05	8/11/05	1/10/06	6/3/06
EXPLOSIVES	UNITS																
1,3,5-TRINITROBENZENE	UG/L		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
1,3-DINITROBENZENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.581 U								0.5 U						
2,4,6-TRINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.291 U		0.242 U		0.25 U				0.25 U		0.242 U		0.26 U		
2,4-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.291 U		0.242 U		0.25 U				0.25 U		0.242 U		0.26 U		
2,6-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
2-NITROTOLUENE			0.291 U	0.37 J	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
3,5-DINITROANILINE			0.291 U		0.242 U		0.25 U				0.25 U		0.242 U		0.26 U		
3-NITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
4,4'-TN-AZOXY					0.485 U		0.5 U						0.485 U		0.52 U		
4-AMINO-2,6-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.29 J	0.26 J	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
4-NITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
DNX			0.291 U		0.242 U		0.25 U				1		0.242 U		0.26 U		
HMX			4.5	8.1	7.5	7.5	7.9	9.6 J	11		29	28	29	24	28	38 J	26
MNX			0.291 U		0.242 U		0.25 U				4.5		3.3		2.8		
NITROBENZENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
RDX			9.3	22	19	18	14	21	24		460	400	440	340	380	500	340
TETRYL			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U
TNX			0.291 U		0.242 U		0.25 U				0.25 U		0.242 U		0.26 U		
FIELD PARAMETERS																	
TEMPERATURE	C		10.09	15.98	11.08	13.77	19.09	8.65			10.94	18.58	12.06	15.29	16.85	10.75	
ALKALINITY	MG/L										10 U						
CARBON DIOXIDE											32						
DISSOLVED OXYGEN				23.4	1.52			1.93			1	13.42	1.3			0.84	
DISSOLVED OXYGEN - METER			5.66			2.39	0.98				2.35			0.62	0.36		
HYDROGEN SULFIDE (H2S)											0						
IRON(+2)											0.18						
MANGANESE(+2)											0.8						
NITRITE-N											0.005						
SULFIDE											0						
SPECIFIC CONDUCTANCE	MS/CM		0.793	1.444	1228	1.119	0.749	1.58			0.312	0.347	0.271	0.311	0.289	0.391	
OXIDATION REDUCTION POTENTIAL	MV		246.7	518.6	51.9	271.8	126	272			276	149.6	99.9	640	244.6	329	
TURBIDITY	NTU		4.69	6.1	5.2	3.4	4.4	8.8			6.07	21	5.5	28	1.1	5.2	
PH	S.U.		5.67	5.39	5.42	5.74	5.5	5.56			4.97	5.06	5.05	3.87	4.49	5.12	
MISCELLANEOUS PARAMETERS																	
TEMPERATURE	C																
AMMONIA-N	MG/L		0.005 UJ								0.04						
DISSOLVED OXYGEN																	
NITRITE/NITRATE-N			0.13 J		0.06 J		0.025 U		0.22		0.3 J		0.24 J		0.19		0.27
TOTAL ORGANIC CARBON							1 U								1 U		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT37								13MWT40							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
SAMPLE DATE		No Sample	11/6/03	7/30/04	2/2/05	5/4/05	8/11/05	1/6/06	5/21/06	No Sample	11/5/03	7/30/04	2/2/05	5/4/05	8/11/05	1/5/06	6/1/06
EXPLOSIVES	UNITS																
1,3,5-TRINITROBENZENE	UG/L		0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
1,3-DINITROBENZENE			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.52 U								0.51 UJ						
2,4,6-TRINITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.26 U		0.24 U		0.26 J				0.26 U		0.264 U		0.28 U		
2,4-DINITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.26 U		0.24 U		0.26 U				0.26 U		0.264 U		0.28 U		
2,6-DINITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
2-NITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
3,5-DINITROANILINE			0.26 U		0.24 U		0.26 U				0.26 U		0.264 U		0.28 U		
3-NITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
4,4'-TN-AZOXY					0.48 U		0.52 U						0.528 U		0.56 U		
4-AMINO-2,6-DINITROTOLUENE			0.04 U	0.5	0.31 J	0.58	0.51 J	0.36 J	0.61		0.52 J	1.1	0.39 J	0.81	1.1	1.1	1
4-NITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
DNX			1.5 J		0.47 J		0.41 J				0.9 J		0.264 U		0.33 J		
HMX			25	140	110	160	160	170 J	210		14	22	270	100	31	31 J	43
MNX			5.2		6.9		7.8				3.3		3.2		3.6		
NITROBENZENE			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
RDX			650	2100	1500	2300	2100	2100	2500		140	230	110	200	250	250	240
TETRYL			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U
TNX			0.73		0.24 U		0.26 U				0.26 U		0.264 U		0.28 U		
FIELD PARAMETERS																	
TEMPERATURE	C		13.32	17.35	10.9	13.5	16.53	9.61			13.28	15.02	11.71	11.87	15.03	11.65	
ALKALINITY	MG/L																
CARBON DIOXIDE																	
DISSOLVED OXYGEN				2.9	4.2			9.29				0.39	13.39			8.46	
DISSOLVED OXYGEN - METER			4.82			4.64	4.39				6.28			8.41	7.84		
HYDROGEN SULFIDE (H2S)																	
IRON(+2)																	
MANGANESE(+2)																	
NITRITE-N																	
SULFIDE																	
SPECIFIC CONDUCTANCE	MS/CM		0.307	0.174	0.24	0.127	127	0.309			0.273	0.329	0.314	0.287	248	0.383	
OXIDATION REDUCTION POTENTIAL	MV		-144.9	133.5	64.2	300.8	472.7	235			100.3	538	168.9	256.7	588.7	269	
TURBIDITY	NTU		3.2	5	1.3	2.8	1.6	4.3			6.2	1.28	6.5	2.3	1.4	6.4	
PH	S.U.		5.75	6.26	5.65	5.37	5	5.6			5.53	5.04	6.51	6.1	6	5.68	
MISCELLANEOUS PARAMETERS																	
TEMPERATURE	C																
AMMONIA-N	MG/L		0.005 U								0.11 J						
DISSOLVED OXYGEN																	
NITRITE/NITRATE-N			0.28		0.25 J		0.22		0.29		0.28		0.33 J		0.37		0.53
TOTAL ORGANIC CARBON							1 U								1 U		

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA UPPER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT47								13MWT51							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
SAMPLE DATE		No Sample	12/9/03	8/1/04	1/25/05	5/5/05	8/15/05	1/5/06	5/23/06	No Sample	No Sample	8/1/04	2/3/05	5/5/05	8/11/05	1/20/06	6/3/06
EXPLOSIVES	UNITS																
1,3,5-TRINITROBENZENE	UG/L		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
1,3-DINITROBENZENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.521 U														
2,4,6-TRINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.26 U		0.242 U		0.27 U						0.264 U		0.38 J		
2,4-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.26 U		0.242 U		0.27 U						0.264 U		0.26 UJ		
2,6-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.39 J	0.264 U	0.39 J	0.26 UJ	0.242 U	0.25 U
2-NITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
3,5-DINITROANILINE			0.26 U		0.242 U		0.27 U						0.264 U		0.26 UJ		
3-NITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
4,4'-TN-AZOXY					0.485 U		0.54 U						0.528 U		0.51 UJ		
4-AMINO-2,6-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.5 J	0.72	0.26 UJ	0.242 U	0.25 U
4-NITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
DNX			0.26 U		0.242 U		0.27 U						0.64 J		0.44 J		
HMX			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			120	69	80	86 J	18	95
MNX			0.26 U		0.242 U		0.27 U						9.3		0.26 UJ		
NITROBENZENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
RDX			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			250	320	230	27 J	58	350
TETRYL			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U
TNX			0.26 U		0.242 U		0.27 U						0.91 J		0.26 UJ		
FIELD PARAMETERS																	
TEMPERATURE	C		12.42	18.41	8.87	11.59	19.16	8.66				20.57	5.07	11.07	17.78	8.22	
ALKALINITY	MG/L																
CARBON DIOXIDE																	
DISSOLVED OXYGEN				0.51	0.81			0.64				8.32	10.19			5.48	
DISSOLVED OXYGEN - METER			1.5			0.07								0.17	0.52		
HYDROGEN SULFIDE (H2S)																	
IRON(+2)																	
MANGANESE(+2)																	
NITRITE-N																	
SULFIDE																	
SPECIFIC CONDUCTANCE	MS/CM		1634	1.056	0.673	0.075	0.793	1.32				0.278	0.14	0.131	344	0.231	
OXIDATION REDUCTION POTENTIAL	MV		409.9	181.2	353.3	320.1	353	303				299	254.4	249.6	356.2	208	
TURBIDITY	NTU		5.4	7	10	0.18	10	10				33	9.7	8.3	110	8.9	
PH	S.U.		3.46	3.4	3.63	3.41	3.38	3.79				5.94	6.2	5.93	6	7.17	
MISCELLANEOUS PARAMETERS																	
TEMPERATURE	C																
AMMONIA-N	MG/L		0.44														
DISSOLVED OXYGEN																	
NITRITE/NITRATE-N			0.05 U		0.025 UJ		0.025 U		0.079				1.5		0.025 U		0.51
TOTAL ORGANIC CARBON							2.1								5.4		

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 by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

UJ – Indicates that the chemical was not detected; however, the detection limit (sample-specific detection limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is
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
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
> - 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.
R – Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies.
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 13 (MINE FILL B) ROUND 8 GROUNDWATER IN THE PENNSYLVANIA 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
Energetics (ug/L)							
1,3,5-Trinitrobenzene	1/13	1	1	0.25	0.192	1.00	13GWT0909
1,3-Dinitrobenzene	3/13	0.6	1.7	0.25	0.342	1.06	13GWT0909
2,4,6-Trinitrotoluene	3/13	15	30	0.25	4.87	20.7	13GWT1108
2,4-Dinitrotoluene	2/13	1.2 J	3.3	0.25	0.452	2.25	13GWT1108
2,6-Dinitrotoluene	3/13	2	7	0.25	1.13	4.50	13GWT0909
2-Amino-4,6-Dinitrotoluene	3/13	2.1 J	12 J	0.25	2.10	8.70	13GWT0909, 13GWT1108
3-Nitrotoluene	5/13	0.61	21	0.25	3.54	9.00	13GWT1108
4-Amino-2,6-Dinitrotoluene	11/13	0.57	540	0.25	95.4	113	13GWT2108
HMX	11/13	2.5	3800	0.25	768	908	13GWT2108
Field Parameters							
Dissolved Oxygen (mg/L)	3/3	0.53	0.67	-	0.613	0.613	13GWT0108
Nitrite/Nitrate-N (mg/L)	13/13	0.079	62	-	5.06	5.06	13GWT0909
Oxidation Reduction Potential (MV)	3/3	254	427	-	323	323	13GWT0108
pH	3/3	4.16	5.67	-	4.68	4.68	13GWT0909
Specific Conductance (ms/cm)	3/3	0.255	0.818	-	0.453	0.453	13GWT0909
Temperature (C)	3/3	14.1	15.3	-	14.6	14.6	13GWT1108
Turbidity (NTU)	1/1	1.7	1.7	-	1.7	1.7	13GWT1108

Associated Samples
13GWT0108
13GWT0909
13GWT1108
13GWT1308
13GWT1408
13GWT1508
13GWT1708
13GWT2108
13GWT3107
13GWT3407
13GWT3407-D
13GWT3707
13GWT4007
13GWT4707
13GWT5106

TABLE 3-3

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND
MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA LOWER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

	LOCATION	13MWT28								13MWT45							
	ROUND	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	DATE	No Sample	12/7/03	7/31/04	2/1/05	5/3/05	8/9/05	1/10/06	6/4/06	No Sample	12/8/03	7/29/04	1/23/05	5/5/05	8/10/05	1/19/06	6/2/06
EXPLOSIVES	**UNITS**																
RDX			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U
DNX			0.258 U		0.275 U		0.27 U				0.258 U		0.24 U		0.27 U		
MNX			0.258 U		0.275 U		0.27 U				0.258 U		0.24 U		0.27 U		
TNX			0.258 U		0.275 U		0.27 U				0.258 U		0.24 U		0.27 U		
FIELD PARAMETERS																	
TEMPERATURE	C		13.59	17.98	13.87	14.09	16.4	11.52			13.36	25.29	10.13	16.63	17.09	9.1	
ALKALINITY	MG/L		150														
CARBON DIOXIDE			10 U														
DISSOLVED OXYGEN			0.5	0.26	8.87			1.78				7.97	0.56			0.94	
DISSOLVED OXYGEN - METER			0.57			0.59	0.49				0.55			0.91	0.72		
HYDROGEN SULFIDE (H2S)			0														
IRON(+2)			0.01														
MANGANESE(+2)			0														
NITRITE-N			0.007														
SULFIDE			0														
SPECIFIC CONDUCTANCE	MS/CM		0.495	1.217	0.918	0.771	808	1.23			0.357	0.703	0.491	0.518	505	0.733	
OXIDATION REDUCTION POTENTIAL	MV		-34.1	73.5	144.6	191.3	564.4	112			55.5	116.5	-48	71	580.3	146	
TURBIDITY	NTU		260	65	50	42	11	54			75	19	14	13	34	14	
PH	S.U.		9.15	8.08	7.78	7.58	4.14	7.75			8.19	6.78	7.08	6.7	4.76	7.17	
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L		0.46 J								0.26						
NITRITE/NITRATE-N			0.66 J		0.15 J		0.77		0.44		0.05 U		0.06 J		0.025 U		0.4
TOTAL ORGANIC CARBON							1 U								1 U		

TABLE 3-3

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND
MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 8
PENNSYLVANIA LOWER WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

LOCATION		13MWT46							
ROUND		1	2	3	4	5	6	7	8
DATE		No Sample	12/9/03	7/30/04	2/2/05	5/4/05	8/10/05	1/6/06	5/21/06
EXPLOSIVES	**UNITS**								
RDX			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U
DNX			0.278 U		0.245 U		0.28 U		
MNX			0.278 U		0.245 U		0.28 U		
TNX			0.278 U		0.245 U		0.28 U		
FIELD PARAMETERS									
TEMPERATURE	C		12.45	14.1	10.45	13.64	15.05	10.28	
ALKALINITY	MG/L								
CARBON DIOXIDE									
DISSOLVED OXYGEN				0.05	1.3			2.64	
DISSOLVED OXYGEN - METER			0.99			0.92	0.84		
HYDROGEN SULFIDE (H2S)									
IRON(+2)									
MANGANESE(+2)									
NITRITE-N									
SULFIDE									
SPECIFIC CONDUCTANCE	MS/CM		1.021	0.786	0.731	0.596	554	1.07	
OXIDATION REDUCTION POTENTIAL	MV		-32.5	131	-21.4	64.7	597.6	-31	
TURBIDITY	NTU		8.72	2.81	1.65	3.5	0.35	6.2	
PH	S.U.		6.6	6.25	6.45	6.44	0	6.56	
MISCELLANEOUS PARAMETERS									
AMMONIA-N	MG/L		0.12						
NITRITE/NITRATE-N			0.05 U		0.025 UJ		0.025 U		0.025 U
TOTAL ORGANIC CARBON							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 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 13 (MINE FILL B) ROUND 8 GROUNDWATER IN THE PENNSYLVANIA 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
Miscellaneous Parameters							
Nitrite/Nitrate-N (mg/L)	2/3	0.4	0.44	0.025	0.284	0.420	13GWT2807

Associated Samples
13GWT2807
13GWT4507
13GWT4607

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

	LOCATION	13SW11								13SW/SD14							
	ROUND	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	DATE	5/8/03	11/18/03	No Sample	2/2/05	No Sample	No Sample	1/5/06	5/22/06	No Sample	10/22/03	10/27/04	2/2/05	5/8/05	8/16/05	1/5/06	5/22/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L	0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
1,3-DINITROBENZENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.575 U								0.47 U						
2,4,6-TRINITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.42 J	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.287 U								0.24 U	0.248 U					
2,4-DINITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.287 U								0.24 U	0.248 U					
2,6-DINITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE		0.25 R	0.9 J		0.242 U			0.242 U	0.25 U		1.3	1 J	0.252 U	0.82 J	0.89 J	0.84 J	0.25 U
2-NITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
3,5-DINITROANILINE			0.287 U								0.24 U	0.248 U					
3-NITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
4,4'-TN-AZOXY												0.495 U					
4-AMINO-2,6-DINITROTOLUENE		1 J	4.5 J		0.34 J			0.242 U	0.25 U		2.9	2.5	1.3	1.9	2.2	1.9	0.25 U
4-NITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
RDX		610	5500		1100			1500	220		77	97	60	46	47	76	120
DNX			35								2.7 J	1					
HMX		93	730		130			210 J	210		20	18	21	30	18	25 J	62
MNX			72								3.8 J	1.9					
NITROBENZENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
TETRYL		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.24 U	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U
TNX			4								0.62 J	0.248 U					
FIELD PARAMETERS																	
TEMPERATURE	C	16.45	15.2		2.72			5.22			12.14	14.69	2.88	15.05	21.68	5.21	
DISSOLVED OXYGEN	MG/L				12.46			10.18				10.3	13.8			10.91	
DISSOLVED OXYGEN - METER		4.35	4.99								5.93			11.85	7.78		
SPECIFIC CONDUCTANCE	MS/CM	2.743	1.024		1.439			2.34	2.06		0.365	0.702	0.278	0.223	0.323	0.605	0.451
OXIDATION REDUCTION POTENTIAL	MV	152.9	216		282			200			224.7	81.7	178	208	78.6	233	
TURBIDITY	NTU	85	242		7.6			14	14		4.4	12.8	4.1	10 U	9.1	6.5	19
PH	S.U.	7.67	6.9		7.76			7.49	8.54		7.33	7.45	7.91	7.51	8.23	6.63	7.02
TEMPERATURE	C								14.4								13.2
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L	3.4	0.26 J								0.005 UJ						
DISSOLVED OXYGEN									9.61								9.9
NITRITE/NITRATE-N		23	8.5 J								0.54 J	7.4					

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

LOCATION		13SW/SD15								13SW/SD16							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		No Sample	10/27/03	10/27/04	2/2/05	5/8/05	8/16/05	1/5/06	5/22/06	No Sample	10/22/03	10/27/04	2/2/05	5/8/05	8/16/05	1/5/06	5/22/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L		0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
1,3-DINITROBENZENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.49 U								0.5 U						
2,4,6-TRINITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.24 U	0.25 U							0.25 U	0.24 U					
2,4-DINITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.24 U	0.25 U							0.25 U	0.24 U					
2,6-DINITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.24 U	0.26 J	0.24 U	0.25 U	0.29 U	0.25 U	0.74		0.8 J	0.35 J	0.24 U	0.36 J	1 J	0.28 J	0.25 U
2-NITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
3,5-DINITROANILINE			0.24 U	0.25 U							0.25 U	0.24 U					
3-NITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.29 J	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
4,4'-TN-AZOXY				0.5 U								0.48 U					
4-AMINO-2,6-DINITROTOLUENE			0.24 U	0.62	0.29 J	0.32 J	0.29 U	0.25 U	1.8		1.6	0.83	0.37 J	0.87 J	2.2	0.59	0.61
4-NITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
RDX			1500	1000	390	100	200	450	50		50	43	29	37 J	41	34	32
DNX			23 J	1.8 J							3.6 J	0.24 U					
HMX			210	160	81	60	47	94 J	30		21	15	13	22 J	23	17 J	19
MNX			47	22							3	1.2					
NITROBENZENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
TETRYL			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.25 U
TNX			4	0.74 J							0.48 J	0.24 U					
FIELD PARAMETERS																	
TEMPERATURE	C		8.93	14.22	2.44	16.88	21.47	4.88			12.18	14.56	1.43	14.24	21.08	5	
DISSOLVED OXYGEN	MG/L			11.97	13.38			11.02				11.63	13.88			10.67	
DISSOLVED OXYGEN - METER			10.59			10.43	8.56				8.48			11.35	5.4		
SPECIFIC CONDUCTANCE	MS/CM		0.251	0.361	0.132	0.14	0.181	0.276	0.222		0.254	0.297	0.106	0.134	0.215	0.614	0.257
OXIDATION REDUCTION POTENTIAL	MV		290.5	101.4	195	194	74.6	209			213.7	71.5	188	173	92.3	244	
TURBIDITY	NTU		10.4	23.8	85	10 U	655	34	75		6.5	12.7	10	10 U	24.5	12	19
PH	S.U.		7.43	7.41	8.13	7.4	8.6	6.98	6.96		7.17	7.61	8.29	7.53	7.91	6.87	7.21
TEMPERATURE	C								12.8								12.6
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L		0.01								0.005 UJ						
DISSOLVED OXYGEN									8.7								9.83
NITRITE/NITRATE-N			0.14	3.4							0.66 J	1.3					

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

	LOCATION	13SW/SD19								13SW/SD20							
	ROUND	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	DATE	No Sample	10/23/03	No Sample	2/2/05	5/8/05	8/16/05	1/5/06	5/21/06	No Sample	10/23/03	No Sample	2/2/05	5/8/05	8/16/05	1/5/06	5/21/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L		0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
1,3-DINITROBENZENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.49 U								0.54 U						
2,4,6-TRINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.24 U								0.27 U						
2,4-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.24 U								0.27 U						
2,6-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
2-NITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
3,5-DINITROANILINE			0.24 U								0.27 U						
3-NITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
4,4'-TN-AZOXY																	
4-AMINO-2,6-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
4-NITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
RDX			0.24 U		0.92	0.41 J	0.29 U	0.84	0.83		0.46 J		0.38 J	0.26 U	0.29 U	0.31 J	0.25 U
DNX			0.24 U								0.27 U						
HMX			0.24 U		0.54	0.51	0.29 U	0.55 J	0.77		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
MNX			0.24 U								0.27 U						
NITROBENZENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
TETRYL			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U
TNX			0.24 U								0.27 U						
FIELD PARAMETERS																	
TEMPERATURE	C		11.69		2.64	15.03	21.35	4.9			13.22		2.24	14.94	21.73	5.4	
DISSOLVED OXYGEN	MG/L				13.12			9.91					13.25			10.44	
DISSOLVED OXYGEN - METER			6.03			11.58	12.02				4.39			11.18	2.54		
SPECIFIC CONDUCTANCE	MS/CM		0.566		0.236	0.316	0.376	0.562	0.474		0.3		0.154	0.174	0.231	0.396	0.296
OXIDATION REDUCTION POTENTIAL	MV		203.5		220	213	134.2	136			158.3		205	214	103.3	163	
TURBIDITY	NTU		1.93		36	10 U	12	0.5	3.83		6.25		6.1	10 U	3.71	3.3	11.1
PH	S.U.		7.25		7.9	7.13	8.51	7.67	5.57		7.75		8.17	7.21	7.58	8.11	5.84
TEMPERATURE	C								14.43								14.36
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L		0.04 J								0.005 UJ						
DISSOLVED OXYGEN																	
NITRITE/NITRATE-N			0.13 U								0.11 U						

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER
ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

LOCATION		13SW/SD22								13SW/SD30							
ROUND		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
DATE		No Sample	10/22/03	10/27/04	2/2/05	5/8/05	No Sample	1/5/06	5/22/06	No Sample	10/22/03	10/26/04	2/2/05	5/8/05	8/16/05	1/5/06	5/22/06
EXPLOSIVES	**UNITS**																
1,3,5-TRINITROBENZENE	UG/L		0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
1,3-DINITROBENZENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.52 U								0.5 U						
2,4,6-TRINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE			0.26 U								0.25 U	0.24 U					
2,4-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
2,6-DIAMINO-4-NITROTOLUENE			0.26 U								0.25 U	0.24 U					
2,6-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
2-NITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
3,5-DINITROANILINE			0.26 U								0.25 U	0.24 U					
3-NITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
4,4'-TN-AZOXY												0.48 U					
4-AMINO-2,6-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
4-NITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
RDX			1.6		1.1	0.33 J		1	0.78		6.2	9.9	6	4.9	5.3	6.7	5.8
DNX			0.26 U								0.25 U	0.24 U					
HMX			0.26 U		0.36 J	0.27 U		0.258 U	0.25 U		3.2 J	2.9	2	2.6	2.4	2.4 J	3.3
MNX			0.26 U								0.28 J	0.31 J					
NITROBENZENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
TETRYL			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U		0.25 U	0.24 U	0.252 U	0.25 U	0.25 U	0.26 U	0.25 U
TNX			0.26 U								0.25 U	0.24 U					
FIELD PARAMETERS																	
TEMPERATURE	C		13.65	15.14	2.02	13.53		5.12			13.09	14.39	1.63	19.29	22.52	4.91	
DISSOLVED OXYGEN	MG/L			10.84	8.25			9.72				9.44	14.1			11.18	
DISSOLVED OXYGEN - METER			3.71			6.86					9.63			11.3	10.21		
SPECIFIC CONDUCTANCE	MS/CM		0.434	0.205	0.151	0.184		0.342	0.406		0.395	0.359	0.168	0.234	0.364	0.389	0.371
OXIDATION REDUCTION POTENTIAL	MV		264.7	74.1	139	199		188			222.1	39.6	201	165	71	199	
TURBIDITY	NTU		1.5	21.3	3.1	10 U		6.7	5.6		2.6	5.69	4.5	3.5	2.18	40	4.2
PH	S.U.		7.02	7.7	8.18	7.03		7.24	7.88		7.84	7.52	8.07	8.06	8.59	7.15	8.11
TEMPERATURE	C								13								14.1
MISCELLANEOUS PARAMETERS																	
AMMONIA-N	MG/L		0.005 UJ								0.005 UJ						
DISSOLVED OXYGEN									7.95								11.11
NITRITE/NITRATE-N			0.025 U								0.025 U	0.26					

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
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
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
R – Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies.
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 13 (MINE FILL B) 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
Energetics (ug/L)							
2-Amino-4,6-Dinitrotoluene	1/8	0.74	0.74	0.25	0.202	0.740	13SW1507
4-Amino-2,6-Dinitrotoluene	2/8	0.61	1.8	0.25	0.395	1.21	13SW1507
HMX	6/8	0.77	210	0.25	40.7	54.2	13SW1105
RDX	7/8	0.78	220	0.25	53.7	61.3	13SW1105
Field Parameters							
Dissolved Oxygen (mg/L)	6/6	7.95	11.11	- - -	9.52	9.52	13SW3007
pH	8/8	5.57	8.54	- - -	7.14	7.14	13SW1105
Specific Conductance (ms/cm)	8/8	0.222	2.06	- - -	0.567	0.567	13SW1105
Temperature (C)	8/8	12.6	14.43	- - -	13.6	13.6	13SW1906
Turbidity (NTU)	8/8	3.83	75	- - -	19.0	19.0	13SW1507

Associated Samples
13SW1105
13SW1407
13SW1507
13SW1607
13SW1607-D
13SW1906
13SW2006
13SW2206
13SW3007

4.0 DATA EVALUATION

Section 4 presents an evaluation of groundwater and surface monitoring data for Rounds 1 through 8. The information presented includes temporal plots of RDX and degradation by-product concentration results by round for each groundwater and surface sampling location included in the SWMU 13 long term monitoring program. Also presented in this section are potentiometric surface maps showing groundwater elevations at all SWMU 13 wells in Round 8. The objective of the long term monitoring program at SWMU 13 is to collect enough monitoring data (up to nine rounds) to determine the nature and extent of contamination, whether residual explosives are naturally degrading, and provide data for making remedy decisions for residual explosives 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 followed by supporting information being provided by the SWMU 13 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 13 long term monitoring program is providing analytical results for select explosives and degradation products. As indicated in the SWMU 13 RFI, RDX is considered to be the principal chemical of concern because it is a site related contaminant and has been detected more frequently and at higher concentrations than any other explosive compound. The degradation by-products for RDX are DNX, MNX, and TNX. The long-term monitoring program will include nine rounds of sampling, under non-pumping conditions, to provide information on trends in groundwater concentrations of explosives and degradation by-products. To date, eight rounds of groundwater sampling have been conducted on the following dates: April-May 2003, October-December 2003, July-August 2004, January-February 2005, May 2005, August 2005, January 2006, and May 2006. The ninth round of sampling will be completed in 2007.

- **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 at SWMU 13, quarterly monitoring will have been conducted for a period spanning at least 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 13 long term monitoring program includes 17 wells. The location of each well relative to 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.** At SWMU 13, explosives contamination has been detected in the Puz aquifer but not in the Plz aquifer. The long term monitoring program includes monitoring wells located in the Puz and Plz water bearing zones to evaluate if contamination is migrating to the lower aquifer. 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. The location of each well relative to the contamination plume is discussed in Section 4.1 below.

- **The most recent analytical data on groundwater should be no more than two years old at the time of evaluation.** 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 2 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 13 MNA report for nine rounds of sampling will include temporal plots of RDX and degradation product concentrations, along with a detailed statistical evaluation.

- **Additional rounds of samples, beyond nine rounds, may be required to demonstrate the decreasing trend.** SWMU 13 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 followed by supporting information being provided by the SWMU 13 long term monitoring program:

- **The monitoring data should be collected from appropriate locations that are distributed both vertically and horizontally throughout the plume.** As indicated previously, explosives contamination has been detected in the Puz aquifer but not the Plz aquifer at SWMU 13. The long term monitoring program includes monitoring wells located in the Puz and Plz water bearing zones to evaluate if contamination is migrating to the lower aquifer. 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. The location of each well relative to the contamination plume is discussed in Section 4.1 below.

- **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 evaluated 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 products.** All sampling is being conducted under non-pumping conditions. The SWMU 13 groundwater monitoring program is providing analytical results for RDX and the degradation by-products DNX, MNX, and TNX.

  - **Routine and Other Indicator Parameters.** The monitoring data being collected in each round also includes the routine indicator parameters DO, ORP, pH, specific conductance, temperature, turbidity, 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 13 monitoring program includes quarterly monitoring which will measure RDX and degradation by-product concentrations and routine indicator parameters by season. The final MNA report will include the presentation of temporal plots to discern any seasonal trends of RDX and degradation by-product concentrations, as well as routine indicator parameters.

4.1 GROUNDWATER MONITORING PROGRAM

MNA groundwater sampling is being conducted at 17 select well locations across SWMU 13 (see Figure 2-1). Fourteen wells are located in the Puz aquifer, while the remaining three wells are in the Plz aquifer. 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 source area, within the center and leading edges of the plume, and from points located vertically (above and below) and horizontally (upgradient and downgradient) outside the area of groundwater contamination. The selected wells are distributed as follows in the Puz and Plz:

<u>Pennsylvanian Upper Water Bearing Zone Wells</u>

- Two clean, laterally upgradient wells (13MWT01 and 13MWT15)
- Four source area wells (13MWT09, 13MWT11, 13MWT17, and 13 MWT21)
- Four wells within the RDX plumes (13 MWT13, 13 MWT34, 13MWT37, and 13MWT40)
- Three wells at the leading edge of the RDX plumes (13MWT14, 13MWT31, and 13MWT51)
- One laterally downgradient well that is clean (13MWT47)

<u>Pennsylvanian Lower Water Bearing Zone Wells</u>

- Three clean, deep wells below the RDX plumes (13MWT28, 13MWT45, and 13MWT46)

In Rounds 4 through 9, all groundwater samples are being analyzed for explosives and well stabilization parameters with occasional analyses for routine indicator MNA parameters and RDX degradation by-products. Groundwater elevations are also being collected during each sampling round.

4.2 SURFACE WATER MONITORING PROGRAM

In support of the MNA demonstration, surface water samples are also being collected at eight select locations (see Figure 2-2). These locations include 13SW11, 13SW14, 13SW15, 13SW16, 13SW19, 13SW20, 13SW22, and 13SW30. In Rounds 4 through 9, these locations are being analyzed for explosives only.

4.3 POTENTIOMETRIC SURFACES

Groundwater elevations were measured at all Puz and Plz monitoring wells in Round 8. The potentiometric surface maps for Round 8 are shown in Figures 4-1 and 4-2 based on groundwater measurements presented in Table 2-1.

The Round 8 water level elevations were measured in the Puz monitoring wells on May 21, 2006. The potentiometric surface for Puz wells in Round 8 is shown in Figure 4-1. In general, Puz groundwater elevations measured in Round 8 were about the same or slightly higher than reported in Round 7. Groundwater elevations in Round 8 ranged from 641.56 feet above mean sea level (amsl) in well 13MWT39 to 712.65 feet amsl in well 13MWT03. Groundwater flow directions in the Puz in Round 8 were the same as reported in Round 7.

The potentiometric surface map for groundwater elevations measured in Plz wells in Round 8 is presented in Figure 4-2. Groundwater elevations measured in Round 8 were generally the same as reported in Round 7 and ranged from 597.38 feet amsl in well 13MWT46 to 628.26 feet amsl in well 13MWT28. The Plz groundwater flow directions in Round 8 were essentially the same as in Round 7.

4.4 GROUNDWATER AND SURFACE TEMPORAL PLOTS

The section presents temporal plots of RDX and degradation by-product concentrations by round for groundwater and surface water. The temporal plots of Puz and Plz groundwater zones are arranged in columns by monitoring well location showing the concentration trend for RDX followed by the trend for each degradation by-product. The data points shown in each plot represent the parameter concentration by round and the data validation qualifier abbreviation, as needed. The absence of a data point in a round indicates that no sample was collected or no analysis was conducted for a specific parameter.

Puz Aquifer

Figure 4-3 shows temporal plots of RDX and degradation by-product (DNX, MNX, and TNX) concentrations for Rounds 1 through 8 in the Puz wells. A review of analytical results for Rounds 1 through 8 indicates some evidence of potential concentration trends for RDX at selected wells. Potential trends in RDX or degradation product concentrations after 7 rounds are indicated at the following wells:

- 13MWT09 (source area well) – decrease in MNX
- 13MWT31 (source area well) – increase in RDX
- 13MWT34 (in RDX plume) – increase in RDX
- 13MWT37 (in RDX plume) – increase in RDX; decrease in DNX; and increase in MNX
- 13MWT40 (in RDX plume) - increase in RDX

Plz Aquifer

Figure 4-4 shows temporal plots of RDX and degradation by-products for Rounds 1 through 8 at Plz well locations. Through Round 8, there have been no positive detections of RDX or degradation products in the Plz monitoring wells (13MWT28, 13MWT45, and 13MWT46).

4.5 SURFACE WATER TEMPORAL PLOT TREND ANALYSIS

Figure 4-5 shows temporal plots of explosive and degradation by-product surface water concentrations for Rounds 1 through 8. RDX has been detected at all surface water monitoring locations in all 8 rounds with the exception of locations 13SW19 and 13SW20. At 13SW19, RDX was not detected in Round 6. At 13SW20, RDX was not detected in Rounds 5, 6, and 8. Through 8 rounds of sampling, RDX concentrations at locations 13SW11, 13SW15, and 13SW16 show a potential downward trend since Round 2. There is no clear trend in RDX concentrations at all other surface water sampling locations. Analysis for degradation products has not been conducted since Round 3. As a result, there is insufficient data to indicate a trend in degradation products in surface water.

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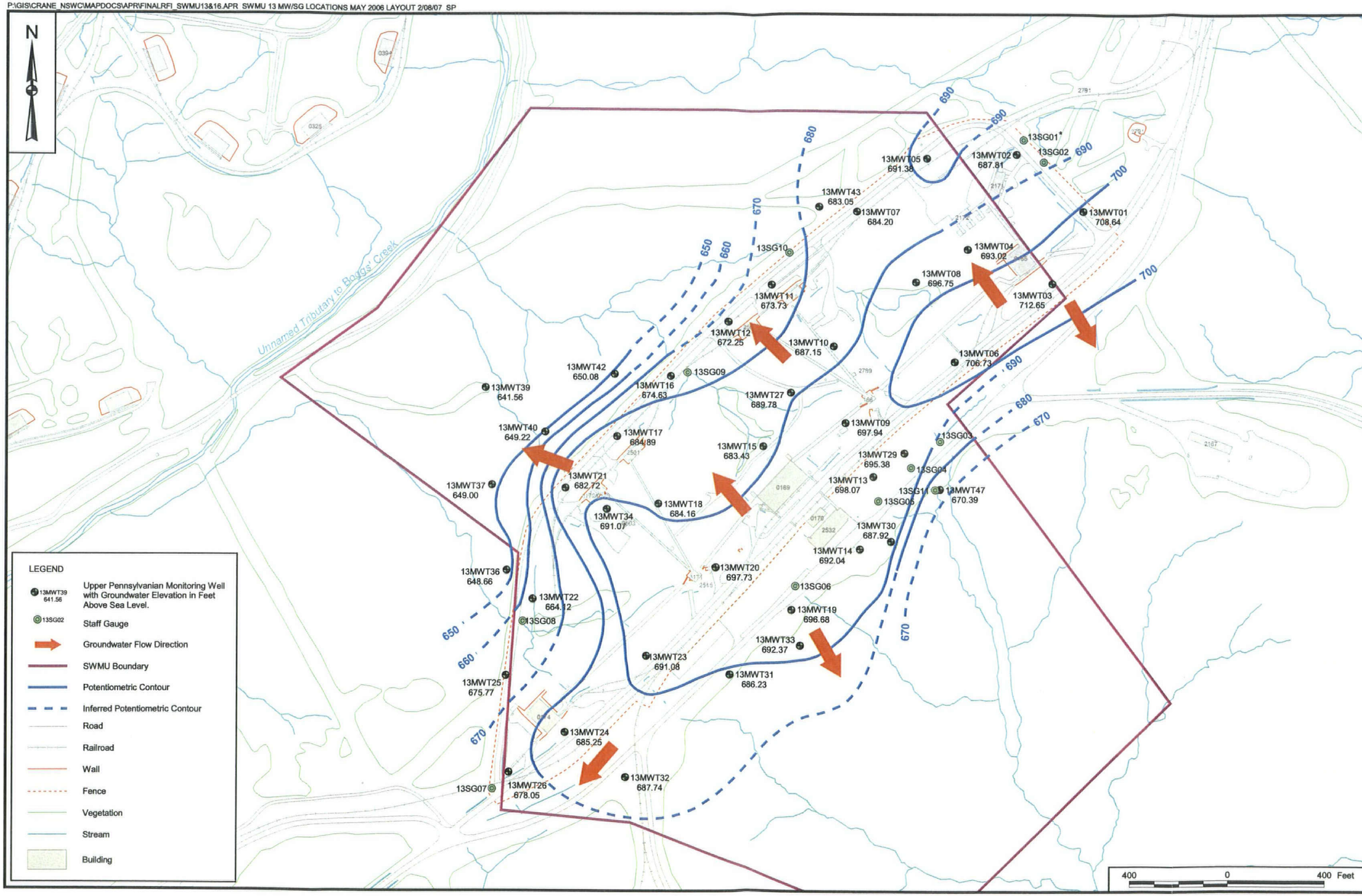

CONTRACT NO. 0377

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4 - 1

REV 0

MONITORING WELL AND STAFF GAUGE LOCATION MAP
FOR THE UPPER PENNSYLVANIAN
WATER-BEARING ZONE - MAY 21, 2006
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY S. STROZ DATE 9/15/06

CHECKED BY J. LUCAS DATE 2/08/07

COST/SCHED-AREA

SCALE AS NOTED

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CONTRACT NO. 0377

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4 - 2

REV 0

MONITORING WELL LOCATION MAP
FOR THE LOWER PENNSYLVANIAN
WATER-BEARING ZONE - MAY 21, 2006
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

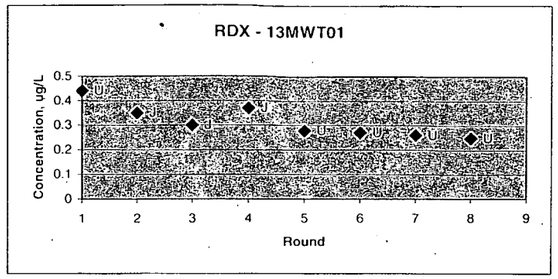
DRAWN BY S. STROZ DATE 9/15/06

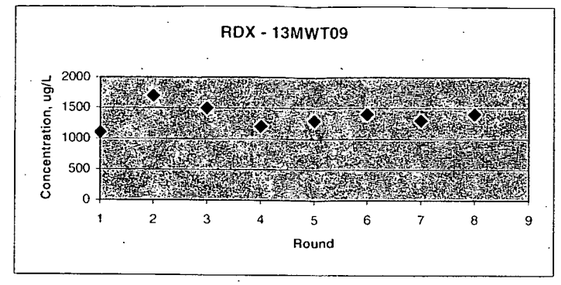
CHECKED BY J. LUCAS DATE 2/08/07

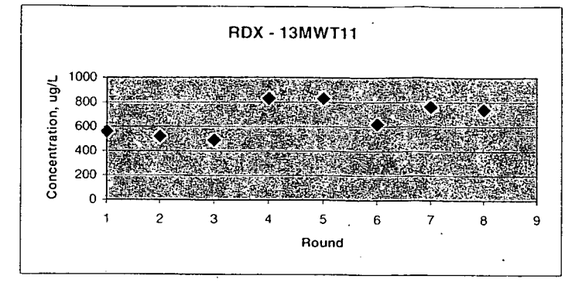
COST/SCHED-AREA

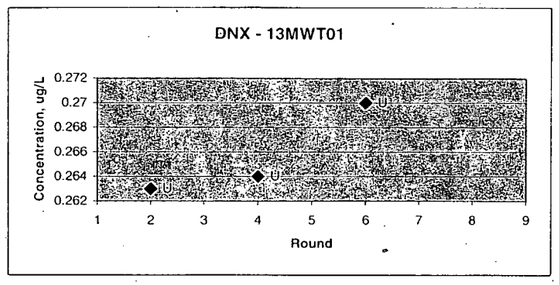
SCALE AS NOTED

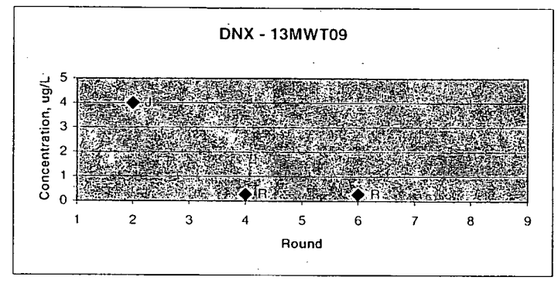
FIGURE 4-3
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE
AT SWMU 13 FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 1 OF 5

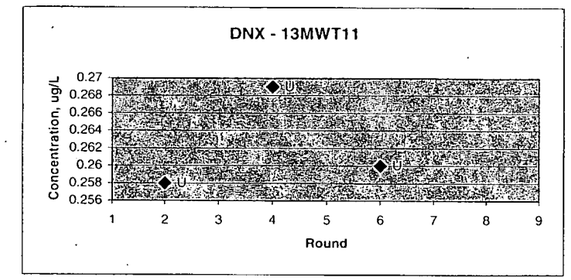


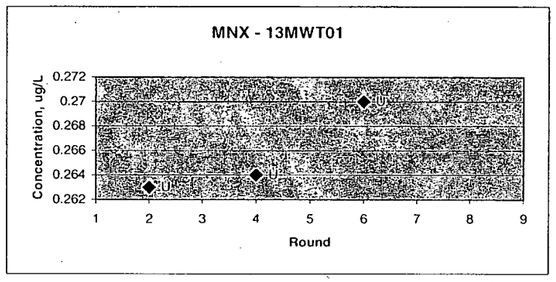


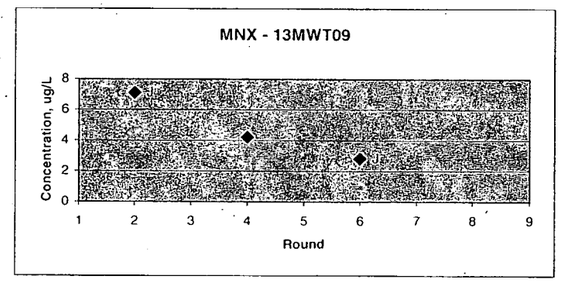


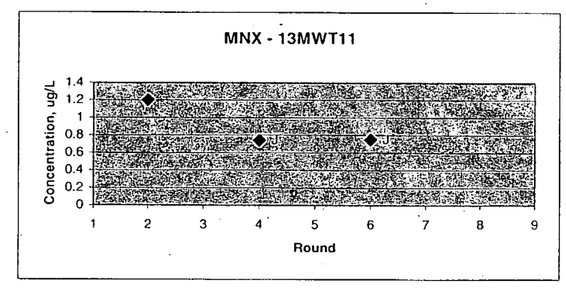


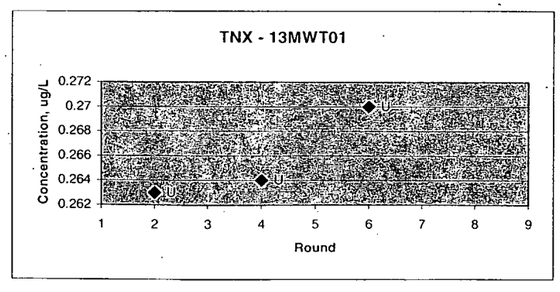


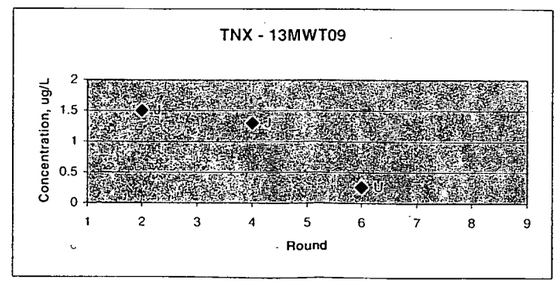












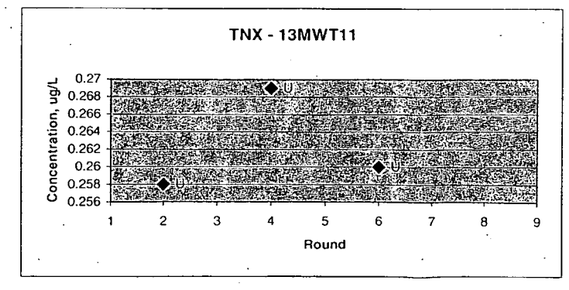


FIGURE 4-3
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE
AT SWMU 13 FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 2 OF 5

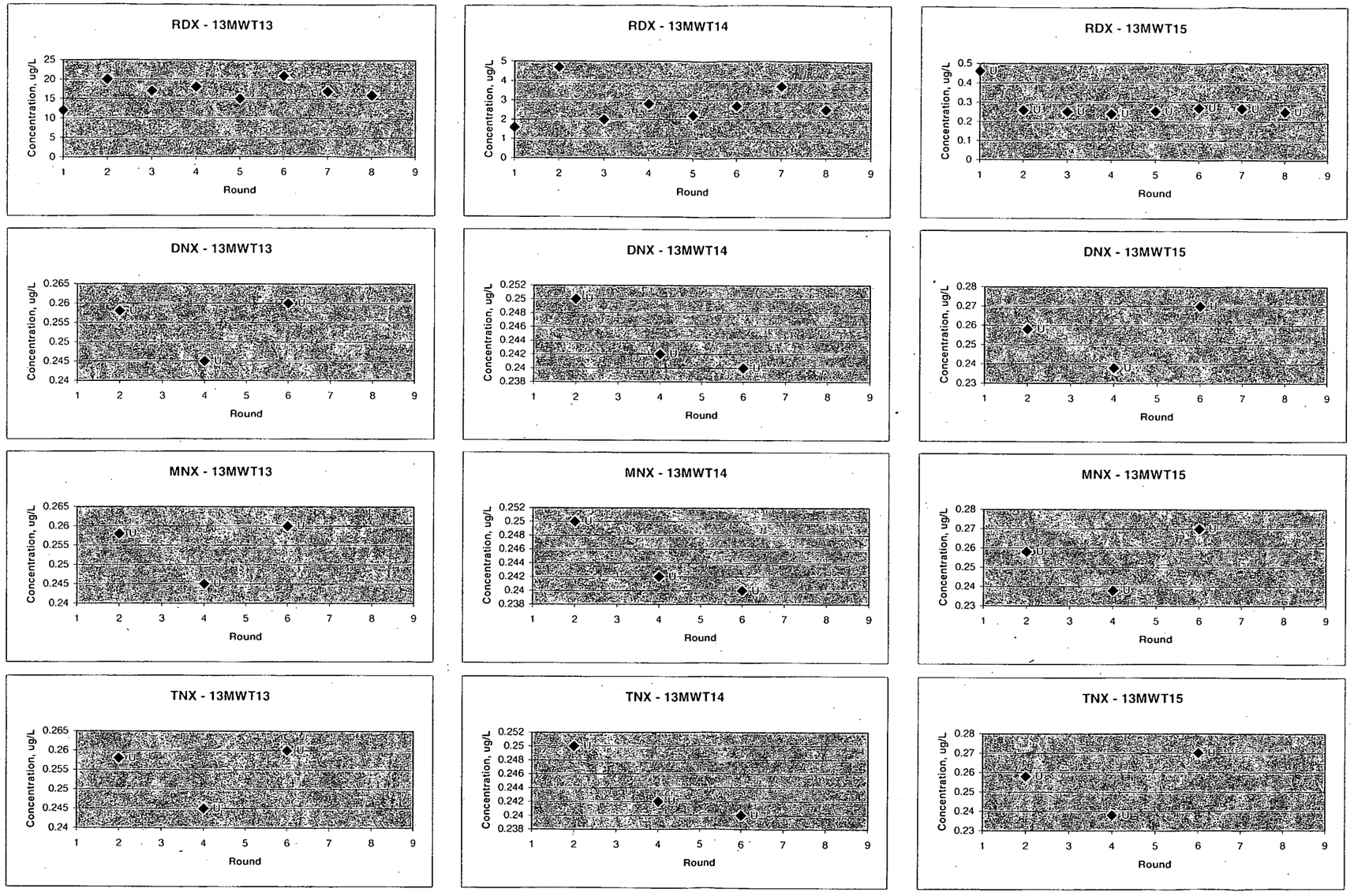
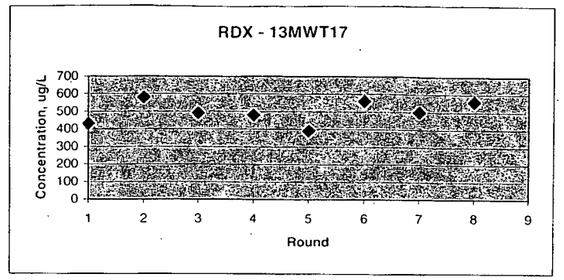
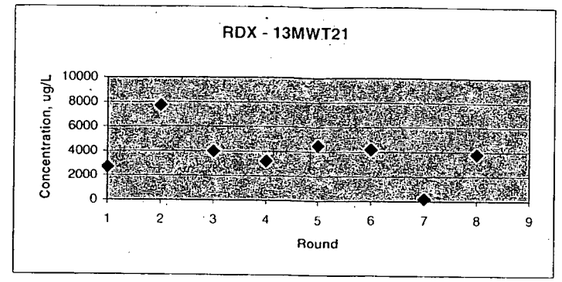
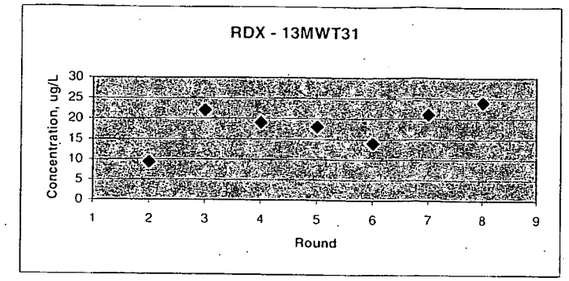
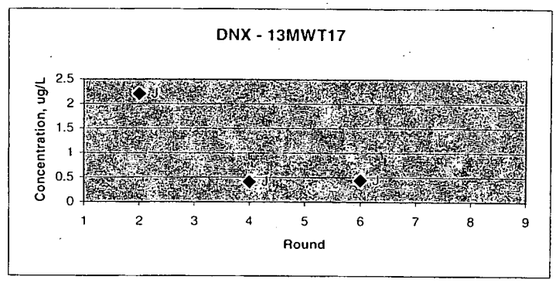


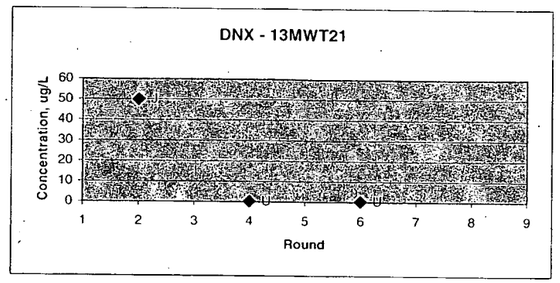
FIGURE 4-3
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE
AT SWMU 13 FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

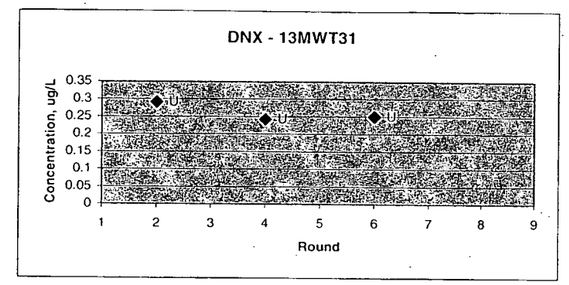


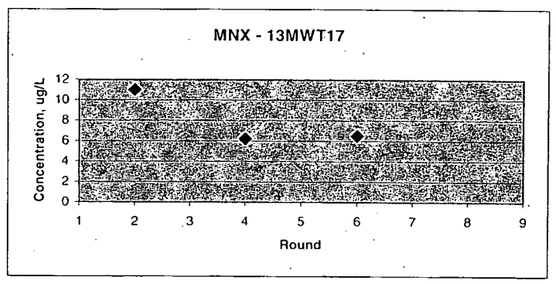


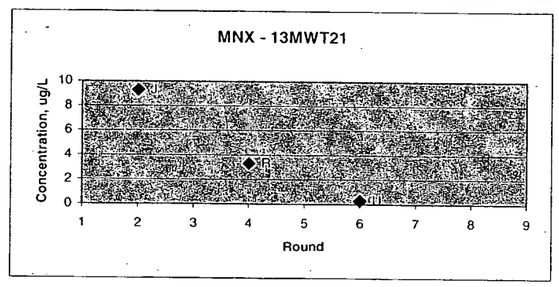


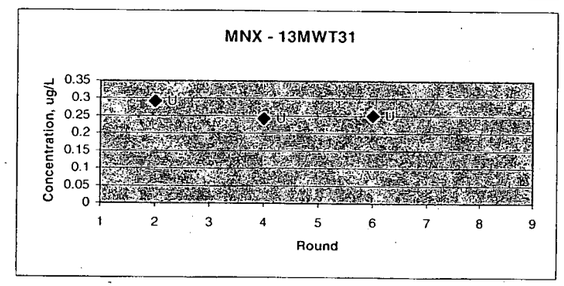


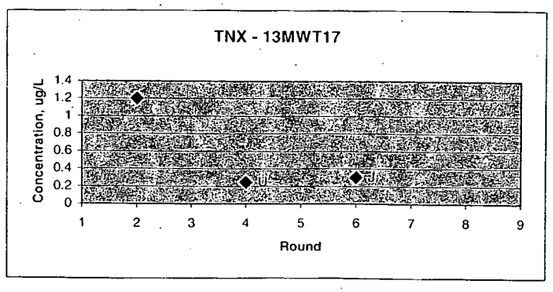


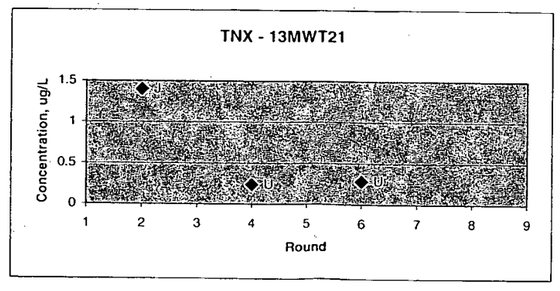












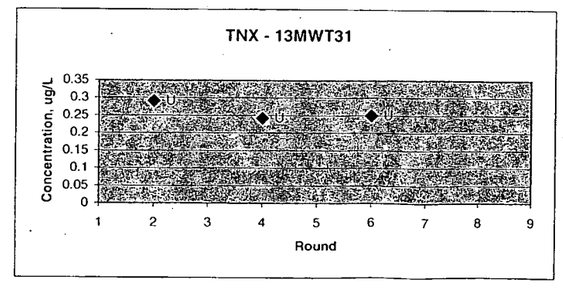


FIGURE 4-3
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE
AT SWMU 13 FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA

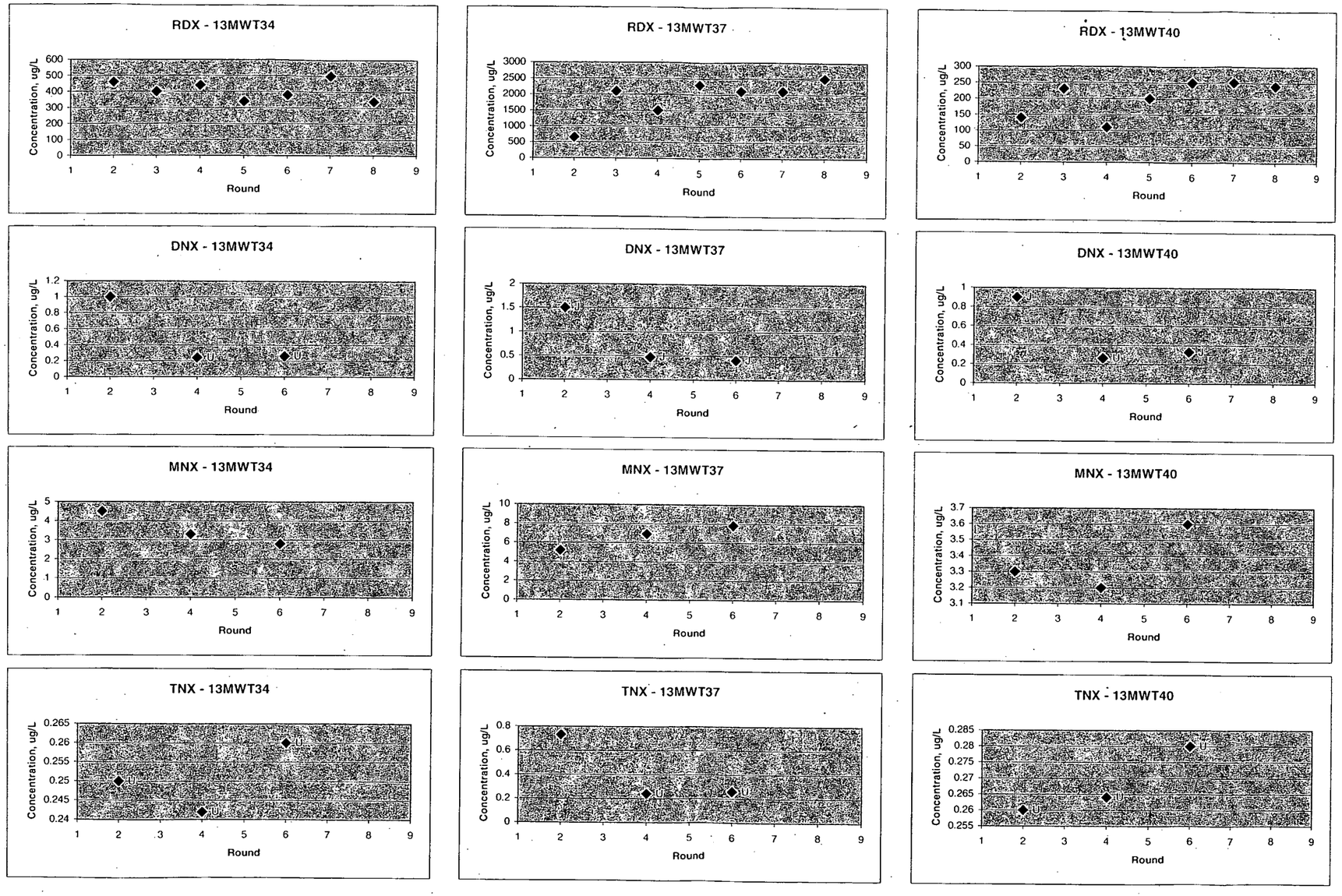
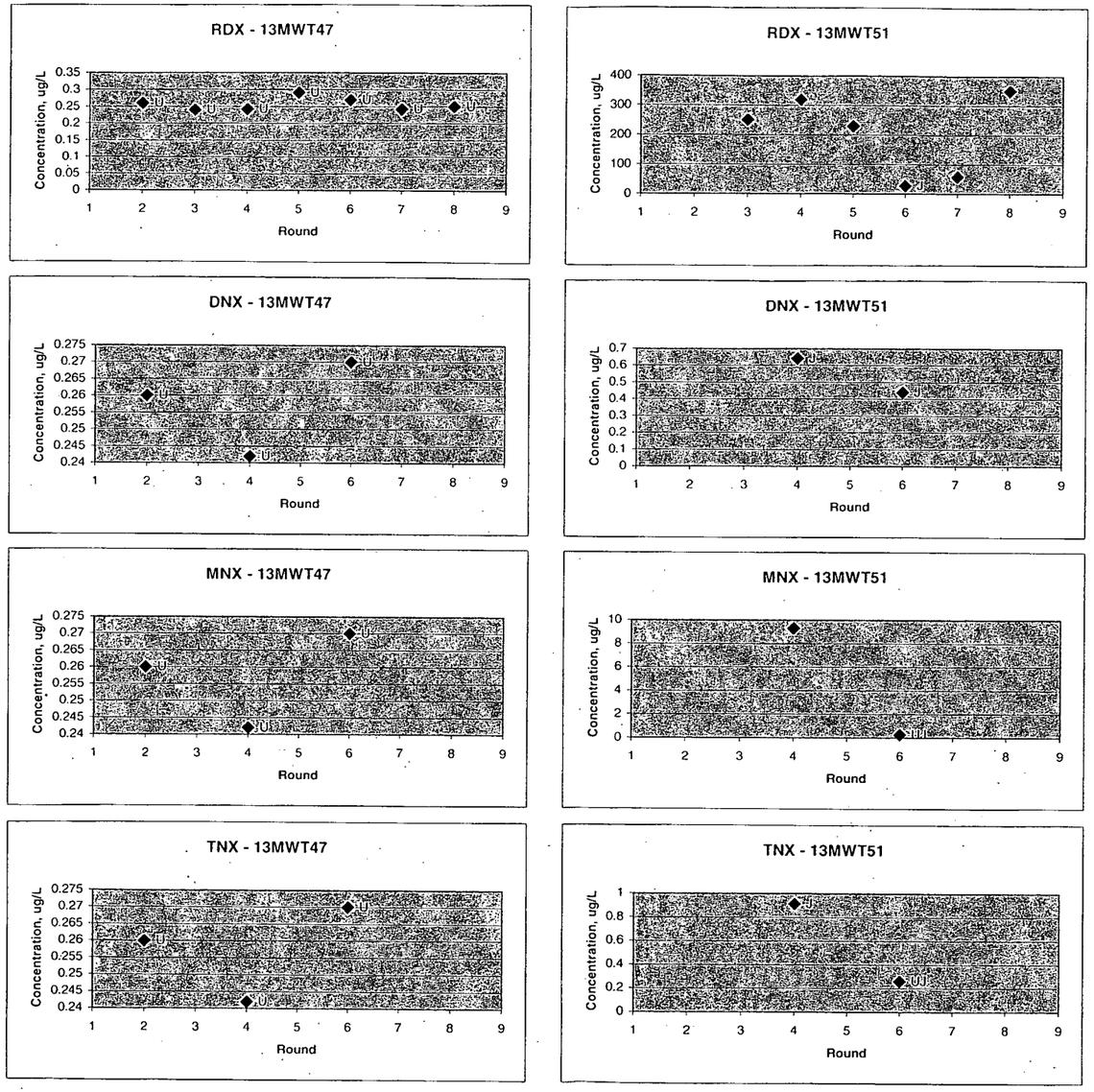


FIGURE 4-3
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE
AT SWMU 13 FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA



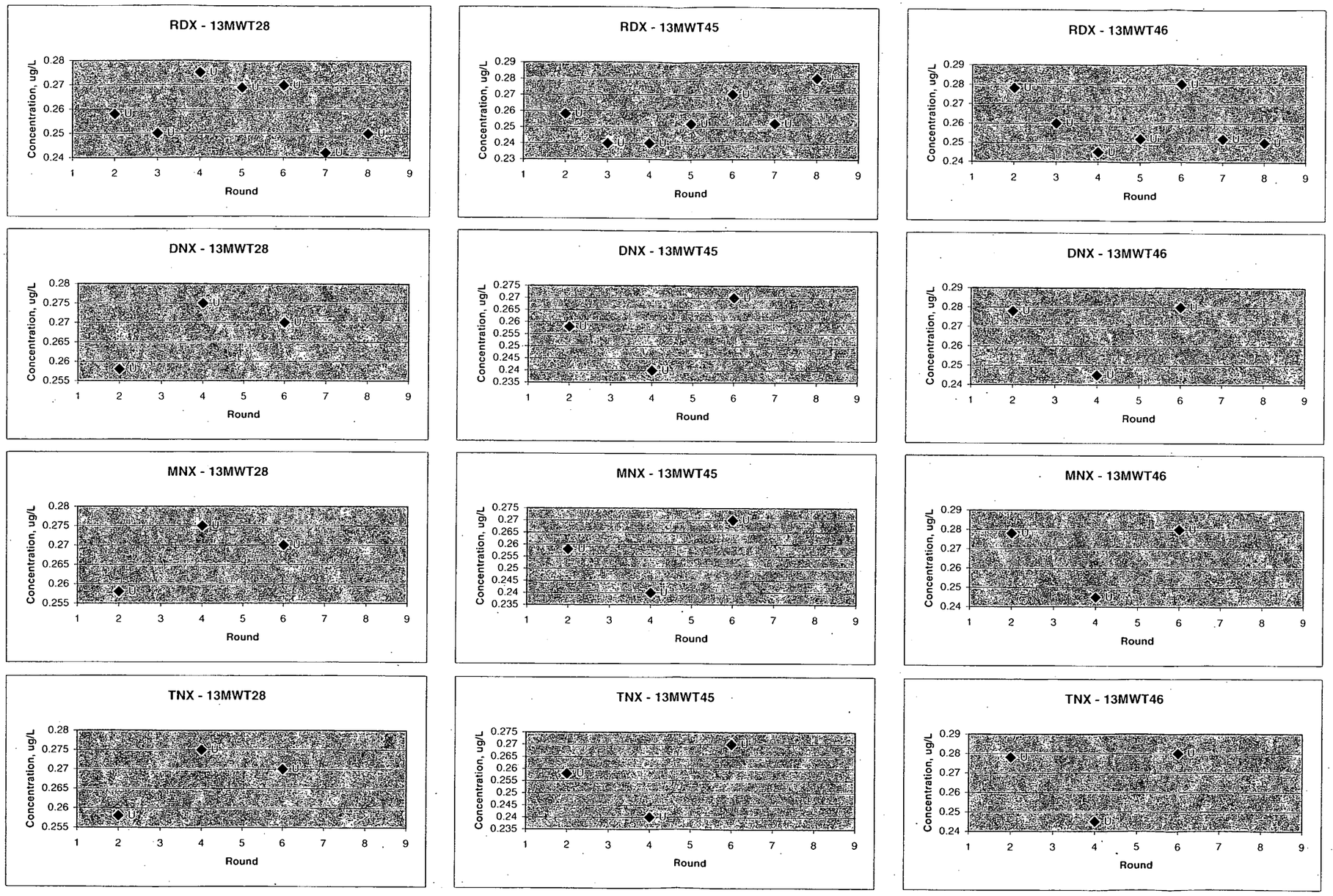
U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

UJ – Indicates that the chemical was not detected; however, the detection limit (sample-specific detection limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

R – Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies.

FIGURE 4-4
TEMPORAL PLOTS FOR RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA LOWER WATER BEARING ZONE AT SWMU 13
FOR ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA



U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

FIGURE 4-5
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13 IN ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 1 OF 3

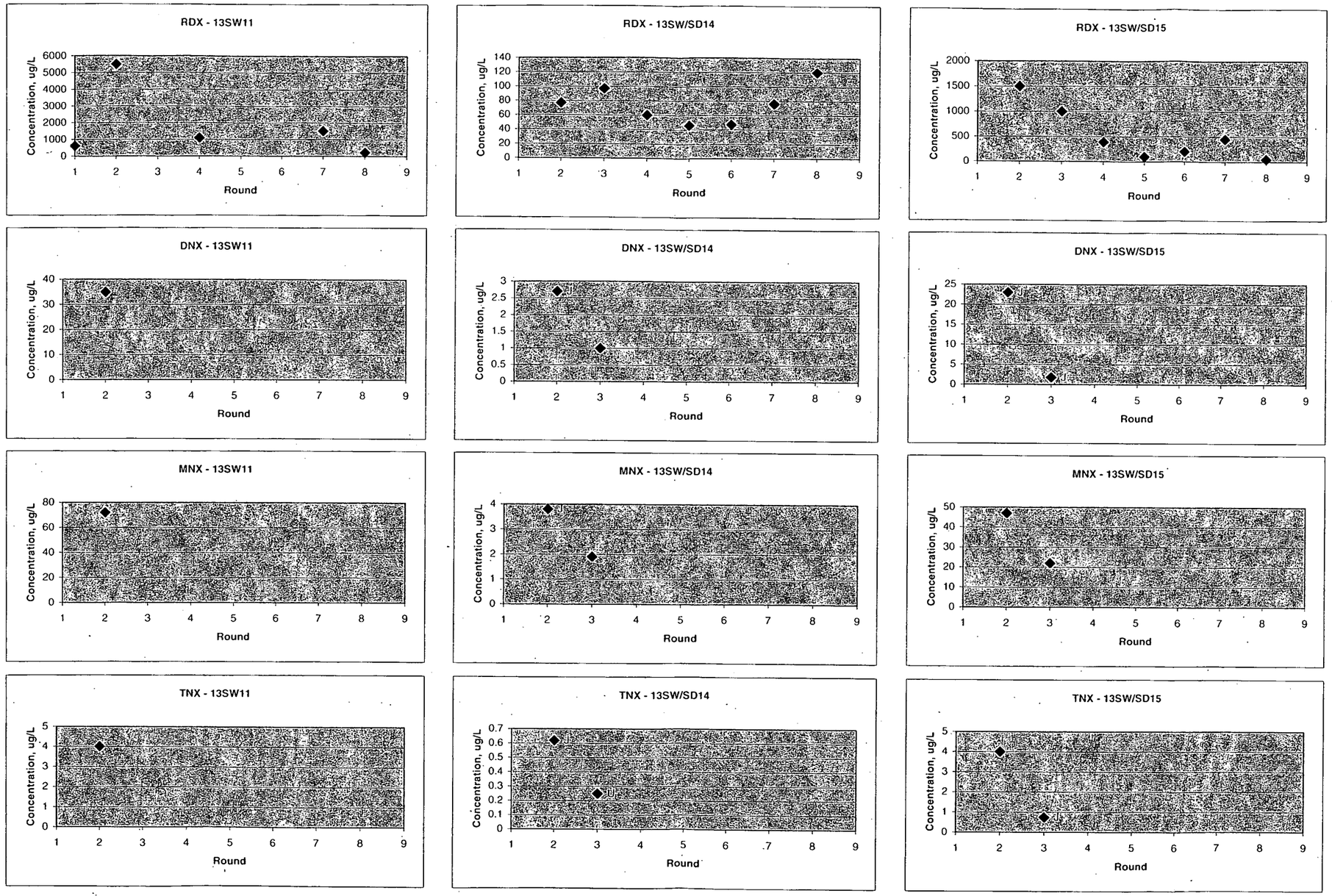


FIGURE 4-5
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13 IN ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 2 OF 3

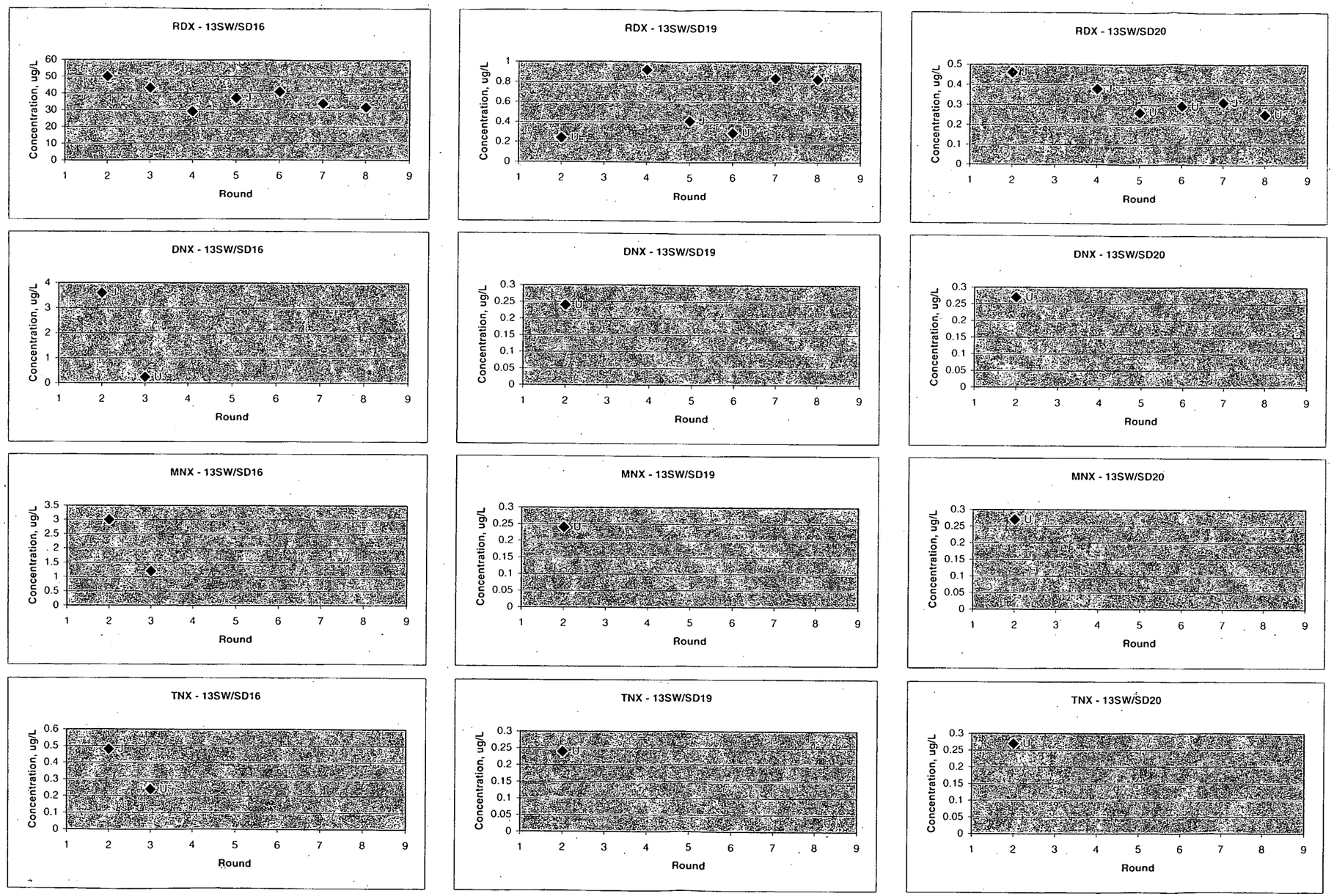
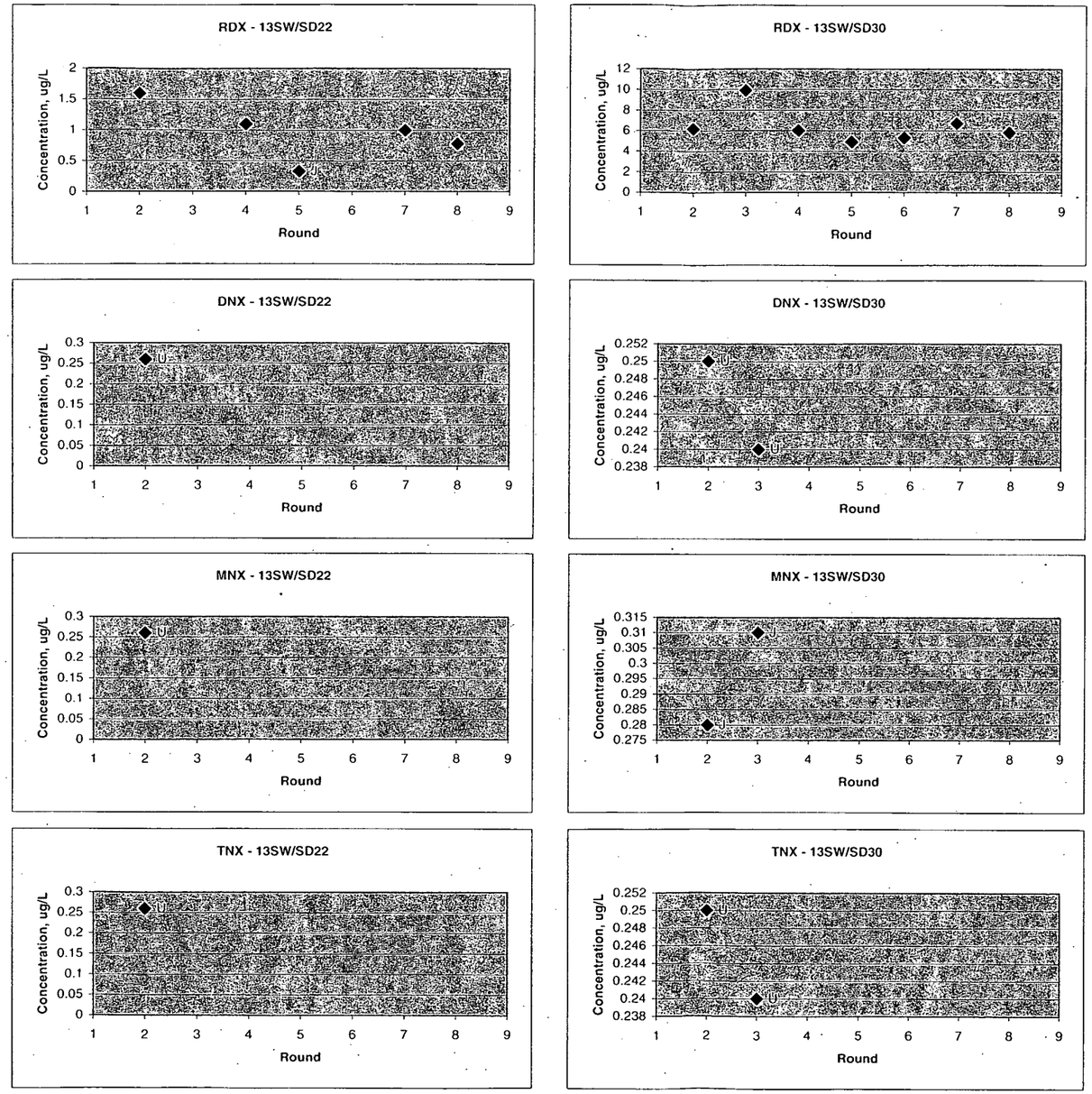


FIGURE 4-5
TEMPORAL PLOTS OF RDX AND DEGRADATION BY-PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13 IN ROUNDS 1 THROUGH 8
NSWC CRANE
CRANE, INDIANA
PAGE 3 OF 3



U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

REFERENCES

Tetra Tech NUS, Inc. (TtNUS), 2004. QAPP Addendum No. 2 for Mine Fill A (SWMU 12), Mine Fill B (SWMU 13), Cast High Explosives Fill/B146 Incinerator (SWMU 16), and Pyrotechnic Test Area (SWMU 19) RCRA Facility Investigation, Tetra Tech NUS, Inc., June.

TtNUS, 2005a. Resource Conservation and Recovery Act Facility Investigation Report for Mine Fill B (SWMU 13), Tetra Tech NUS, Inc., July.

TtNUS, 2005b. Monitored Natural Attenuation Report for Mine Fill B (SWMU 13), Round No. 4, Tetra Tech NUS, Inc., August.

TtNUS, 2006a. Monitored Natural Attenuation Report for Mine Fill B (SWMU 13), Rounds No. 5 and 6, Tetra Tech NUS, Inc., April.

TtNUS, 2006b. Monitored Natural Attenuation Report for Mine Fill B (SWMU 13), Round No. 7, Tetra Tech NUS, Inc., August.

United States Environmental Protection Agency (U.S. EPA), 2000. Region 5 Framework for Monitored Natural Attenuation Decisions for Groundwater, U.S. EPA Region 5, September.

APPENDIX A

SWMU 13

SAMPLE LOG SHEETS AND OTHER FIELD FORMS

ROUND 8

A.1

SWMU 13

GROUNDWATER SAMPLE LOG SHEETS

ROUND 8

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/2/06	**Modified Date**	6/2/06	**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 #**	13GWT0108
TtNUS Project #	112G00041	**Well ID**	13MWT01
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/2/06	**Static Water Level (ft.)**	7.67	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	15.00	**Pump Control Box**	MP10-1100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2	**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)
6/2/06	10:15	7.67	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/2/06	10:25	8.35	130	Clear	4.13	0.239	0.96	0.40	14.0	421	NA	NA	1300

6/2/06	10:35	8.31	100	Clear	4.08	0.251	0.88	0.05	14.0	428			1000
6/2/06	10:45	8.31	100	Clear	4.11	0.255	0.84	0.01	14.0	431			1000
6/2/06	10:55	8.31	100	Clear	4.16	0.256	0.76	0.05	14.0	429			1000
6/2/06	11:05	8.31	100	Clear	4.18	0.255	0.73	0.10	14.1	428			1000
6/2/06	11:15	8.31	100	Clear	4.20	0.256	0.69	0.05	14.0	426			1000
6/2/06	11:25	8.31	100	Clear	4.21	0.255	0.67	0.00	14.1	427			1000

Final Purge / Sample Data

One Casing Volume	4.53	**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.67
Total Vo. Purge (L)	7.3	**Waterlevel (ft.)**	8.31	**Turbidity (NTUs)**	0.00
Start Purge (hrs.)	10:15:00 AM	**Flowrate (mL/min)**	100	**Temp (C)**	14.1
End Purge (hrs.)	11:25:00 AM	**Color**	Clear	**ORP (mV)**	427
Total Purge Time (min.)	70	**pH (S.U.)**	4.21	**Salinity**	
		Conductivity (mS/cm)	0.255	**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#
✓	6/2/06	11:30	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-622006-12
✓	6/2/06	11:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-622006-12

General Observations and Notes

TD = 17.91 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/3/06	**Modified Date**	6/3/06	**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 #**	13GWT0909
TtNUS Project #	112G00041	**Well ID**	13MWT09
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/3/06	**Static Water Level (ft.)**	8.40	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	20.00	**Pump Control Box**	MP10-1100
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)
6/3/06	08:45	8.40	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/3/06	08:55	8.76	130	Clear	5.48	0.806	1.15	0.30	14.2	253	NA	NA	1300

6/3/06	09:05	8.91	130	Clear	5.56	0.815	0.60	0.45	14.3	255			1300
6/3/06	09:15	8.91	130	Clear	5.58	0.806	0.56	0.00	14.4	256			1300
6/3/06	09:25	8.91	130	Clear	5.61	0.800	0.55	0.05	14.4	255			1300
6/3/06	09:35	8.91	130	Clear	5.63	0.804	0.54	0.05	14.5	255			1300
6/3/06	09:45	8.92	130	Clear	5.63	0.811	0.53	0.15	14.5	255			1300
6/3/06	09:55	8.92	130	Clear	5.67	0.818	0.53	0.00	14.5	254			1300

Final Purge / Sample Data

One Casing Volume	0	**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.53
Total Vo. Purge (L)	9.1	**Waterlevel (ft.)**	8.92	**Turbidity (NTUs)**	0.00
Start Purge (hrs.)	8:45:00 AM	**Flowrate (mL/min)**	130	**Temp (C)**	14.5
End Purge (hrs.)	9:55:00 AM	**Color**	Clear	**ORP (mV)**	254
Total Purge Time (min.)	70	**pH (S.U.)**	5.67	**Salinity**	
		Conductivity (mS/cm)	0.818	**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#
✓	6/3/06	10:00	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	3	Plastic	500ml PE		112G00041-642006-13
✓	6/3/06	10:00	SW-846-8330	Nitroaromatics and Nitramines	4°C	4	Glass	1L Amber		112G00041-642006-13

General Observations and Notes

TD = 23' - CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/2/06	**Modified Date**	6/2/06	**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 #**	13GWT1108
TtNUS Project #	112G00041	**Well ID**	13MWT11
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/2/06	**Static Water Level (ft.)**	9.10	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	15.00	**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)
6/2/06	12:00	9.10	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/2/06	12:10	9.60	140	Clear	4.22	0.279	1.30	1.1	15.1	271	NA	NA	1400

6/2/06	12:20	9.96	110	Clear	4.30	0.279	1.28	2.0	15.0	274			1100
6/2/06	12:30	10.10	110	Clear	4.27	0.277	1.25	3.6	15.0	282			1100
6/2/06	12:40	10.08	100	Clear	4.19	0.276	0.83	2.1	15.7	287			1000
6/2/06	12:50	10.09	100	Clear	4.16	0.281	0.67	1.2	15.2	287			1000
6/2/06	13:00	10.09	100	Clear	4.16	0.288	0.65	0.85	15.2	287			1000
6/2/06	13:10	10.09	100	Clear	4.16	0.286	0.64	1.7	15.3	288			1000

Final Purge / Sample Data

One Casing Volume	0	**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.64
Total Vo. Purge (L)	7.6	**Waterlevel (ft.)**	10.09	**Turbidity (NTUs)**	1.7
Start Purge (hrs.)	12:00:00 PM	**Flowrate (mL/min)**	100	**Temp (C)**	15.3
End Purge (hrs.)	1:10:00 PM	**Color**	Clear	**ORP (mV)**	288
Total Purge Time (min.)	70	**pH (S.U.)**	4.16	**Salinity**	
		Conductivity (mS/cm)	0.286	**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#
✓	6/2/06	13:15	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-622006-12
✓	6/2/06	13:15	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-622006-12

General Observations and Notes

TD = 17.75 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	5/23/06	**Modified Date**	5/23/06	**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 #**	13GWT1308
TtNUS Project #	112G00041	**Well ID**	13MWT13
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	5/23/06	**Static Water Level (ft.)**	4.35	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	19.00	**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)
5/23/06	12:20	4.35	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
5/23/06	12:30	4.60	120	Clear	4.35	0.128	4.53	1.3	14.5	425	NA	NA	1200

5/23/06	12:40	4.64	120	Clear	4.25	0.131	3.95	1.1	14.5	443			1200
5/23/06	12:50	4.52	110	Clear	4.34	0.133	4.25	0.80	14.9	438			1100
5/23/06	13:00	4.52	100	Clear	4.35	0.132	3.99	0.65	15.2	441			1000
5/23/06	13:10	4.52	100	Clear	4.25	0.134	3.78	0.85	14.9	446			1000
5/23/06	13:20	4.52	100	Clear	4.22	0.133	3.81	0.80	15.3	453			1000
5/23/06	13:30	4.52	100	Clear	4.25	0.136	3.95	1.30	15.4	449			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)
5/23/06	13:40	4.52	100	Clear	4.27	0.135	3.89	0.30	15.1	450			1000
5/23/06	13:50	4.52	100	Clear	4.29	0.134	3.78	0.15	15.2	451			1000
5/23/06	14:00	4.52	100	Clear	4.34	0.138	3.75	0.00	15.1	449			1000

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)	10.5	**Waterlevel (ft.)**		**Turbidity (NTUs)**	
Start Purge (hrs.)	12:20:00 PM	**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)	2:00:00 PM	**Color**		**ORP (mV)**	
Total Purge Time (min.)	100	**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#
✓	5/23/06	14:05	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-5232006-11
✓	5/23/06	14:05	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-5232006-11

General Observations and Notes

TD = 21.40

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/23/06	**Modified Date**	5/23/06	**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 #**	13GWT1408
TtNUS Project #	112G00041	**Well ID**	13MWT14
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/23/06	**Static Water Level (ft.)**	13.92	**Water Quality Meter**	406032
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)
5/23/06	13:15	13.92	60	Clear	4.17	0.003	NA	20.8	18.07	251	NA	NA	0
5/23/06	13:25	14.03	60	Clear	5.25	1.18	NA	3.60	17.41	199	NA	NA	600

5/23/06	13:35	14.04	50	Clear	5.44	1.15	NA	4.83	17.52	165	NA	NA	500
5/23/06	13:45	14.06	70	Clear	5.49	1.14	NA	1.92	16.06	156	NA	NA	700
5/23/06	13:55	14.11	75	Clear	5.58	1.11	NA	1.85	15.77	147	NA	NA	750
5/23/06	14:05	14.12	75	Clear	5.67	1.08	NA	0.00	15.71	137	NA	NA	750
5/23/06	14:15	14.12	75	Clear	5.75	1.03	NA	0.42	15.98	129	NA	NA	750
5/23/06	14:25	14.13	75	Clear	5.77	1.01	NA	0.28	15.87	127	NA	NA	750

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)
5/23/06	14:35	14.14	90	Clear	5.74	1.00	NA	0.00	15.72	133	NA	NA	900
5/23/06	14:45	14.14	90	Clear	5.73	1.00	NA	0.64	15.97	134	NA	NA	900
5/23/06	14:55	14.15	90	Clear	5.76	0.98	NA	0.00	15.91	129	NA	NA	900

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	NA
Total Vo. Purge (L)	7.5	**Waterlevel (ft.)**	14.15	**Turbidity (NTUs)**	0.00
Start Purge (hrs.)	1:15:00 PM	**Flowrate (mL/min)**	90	**Temp (C)**	15.91
End Purge (hrs.)	2:55:00 PM	**Color**	Clear	**ORP (mV)**	129
Total Purge Time (min.)	100	**pH (S.U.)**	5.76	**Salinity**	NA
		Conductivity (mS/cm)	0.98	**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#
✓	5/23/06	15:00	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-5232006-11
✓	5/23/06	15:00	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-5232006-11

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	6/4/06	**Modified Date**	6/4/06	**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 #**	13GWT1508
TtNUS Project #	112G00041	**Well ID**	13MWT15
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/4/06	**Static Water Level (ft.)**	13.49	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	25.00	**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)
6/4/06	13:10	13.49	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/4/06	13:20	14.38	100	Clear	3.82	0.422	1.71	3.2	14.4	316			1000

6/4/06	13:30	14.67	110	Clear	3.87	0.402	0.91	1.7	16.2	309			1100
6/4/06	13:40	14.18	40	Clear	3.91	0.411	1.06	2.0	18.3	308			400
6/4/06	13:50	14.21	70	Clear	3.90	0.410	0.78	1.2	16.8	310			700
6/4/06	14:00	14.40	80	Clear	3.87	0.402	0.70	1.5	15.2	309			800
6/4/06	14:10	14.56	80	Clear	3.85	0.393	0.74	3.6	15.7	309			800
6/4/06	14:20	14.51	70	Clear	3.86	0.391	0.64	1.1	16.1	307			700

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)
6/4/06	14:30	14.49	70	Clear	3.85	0.399	0.62	1.2	15.1	308			700
6/4/06	14:40	14.54	80	Clear	3.82	0.387	0.55	1.1	15.4	309			800
6/4/06	14:50	14.54	80	Clear	3.81	0.385	0.56	2.3	15.0	306			800
6/4/06	15:00	14.54	80	Clear	3.83	0.382	0.61	1.3	14.6	305			800
6/4/06	15:10	14.54	80	Clear	3.84	0.383	0.60	1.1	15.0	304			800

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)	9.4	**Waterlevel (ft.)**		**Turbidity (NTUs)**	
Start Purge (hrs.)	1:10:00 PM	**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)	3:10:00 PM	**Color**		**ORP (mV)**	
Total Purge Time (min.)	120	**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#
✓	6/4/06	15:15	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-642006-13
✓	6/4/06	15:15	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-642006-13

General Observations and Notes

TD = 27.87 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/4/06	**Modified Date**	6/4/06	**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 #**	13GWT1708
TtNUS Project #	112G00041	**Well ID**	13MWT17
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/4/06	**Static Water Level (ft.)**	9.26	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	18.00	**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)
6/4/06	11:25	9.26	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/4/06	11:35	9.31	130	Clear	5.52	0.158	1.77	2.8	15.1	250	NA	NA	1300

6/4/06	11:45	9.32	130	Clear	5.46	0.160	0.76	2.6	15.1	249	NA	NA	1300
6/4/06	11:55	9.32	130	Clear	5.45	0.162	0.68	2.7	15.4	251			1300
6/4/06	12:05	9.32	130	Clear	5.44	0.163	0.65	3.0	15.4	252			1300
6/4/06	12:15	9.32	130	Clear	5.43	0.164	0.62	4.0	15.3	254			1300
6/4/06	12:25	9.32	130	Clear	5.43	0.165	0.60	2.7	15.3	255			1300

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)	7.8	**Waterlevel (ft.)**		**Turbidity (NTUs)**	
Start Purge (hrs.)	11:25:00 AM	**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)	12:25:00 PM	**Color**		**ORP (mV)**	
Total Purge Time (min.)	60	**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#
✓	6/4/06	12:30	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-642006-13
✓	6/4/06	12:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-642006-13

General Observations and Notes

TD = 20.30 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/1/06	**Modified Date**	6/1/06	**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 #**	13GWT2108
TtNUS Project #	112G00041	**Well ID**	13MWT21
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/1/06	**Static Water Level (ft.)**	9.48	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	15.00	**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)
6/1/06	12:15	9.48	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/1/06	12:25	10.09	140	Clear	5.72	0.230	0.86	7.9	14.8	211			1400

6/1/06	12:35	10.22	110	Clear	5.61	0.246	0.75	17	15.4	223			1100
6/1/06	12:45	10.18	100	Clear	5.62	0.250	0.66	14	15.8	229			1000
6/1/06	12:55	10.19	100	Clear	5.66	0.255	0.64	10	15.7	236			1000
6/1/06	13:05	10.19	100	Clear	5.71	0.256	0.60	7.1	15.6	236			1000
6/1/06	13:15	10.19	100	Clear	5.75	0.258	0.58	5.8	15.7	236			1000

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.58
Total Vo. Purge (L)	6.5	**Waterlevel (ft.)**	10.19	**Turbidity (NTUs)**	5.8
Start Purge (hrs.)	12:15:00 PM	**Flowrate (mL/min)**	100	**Temp (C)**	15.7
End Purge (hrs.)	1:15:00 PM	**Color**	Clear	**ORP (mV)**	236
Total Purge Time (min.)	60	**pH (S.U.)**	5.75	**Salinity**	
		Conductivity (mS/cm)	0.258	**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#
✓	6/1/06	13:20	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-622006-12
✓	6/1/06	13:20	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-622006-12

General Observations and Notes

TD = 17.76 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/3/06	**Modified Date**	6/4/06	**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 #**	13GWT2807
TtNUS Project #	112G00041	**Well ID**	13MWT28
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/3/06	**Static Water Level (ft.)**	77.35	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	88.00	**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)
6/3/06	10:55	77.35	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/3/06	11:05	79.19	160	Clear	7.61	1.16	1.30	3.1	15.7	199			1600

6/3/06	11:15	80.59	150	Clear	7.55	1.17	0.82	2.5	16.1	173			1500
6/3/06	11:25	81.03	150	Clear	7.55	1.17	0.72	1.1	16.1	163			1500
6/3/06	11:35	81.68	150	Clear	7.55	1.16	0.70	0.25	16.1	155			1500
6/3/06	11:45	82.30	150	Clear	7.56	1.13	1.30	5.5	16.2	148			1500
6/3/06	11:55	82.95	150	Clear	7.60	1.11	1.42	14	16.3	143			1500
6/3/06	12:05	83.51	150	Clear	7.61	1.12	1.24	20	16.2	138			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)
6/3/06	12:15	84.11	150	Clear	7.64	1.13	1.05	18	16.1	132			1500
6/3/06	12:25	84.83	150	Clear	7.66	1.15	0.84	15	16.1	125			1500
6/3/06	12:35	85.38	150	Clear	7.68	1.15	0.75	16	16.2	120			1500
6/3/06	12:45	85.82	150	Clear	7.70	1.15	0.66	16	16.3	115			1500
6/3/06	12:55	86.69	150	Clear	7.73	1.12	0.60	18	16.0	109			1500
6/3/06	13:05	**	140	Clear	7.75	1.12	0.62	12	16.5	104			1400
6/3/06	13:15	**	120	Clear	7.75	1.14	0.79	11	17.1	103			1200
6/3/06	13:25	**	100	Clear	7.74	1.16	0.96	11	18.0	104			1000
6/3/06	13:35	**	80	Clear	7.76	1.16	0.79	12	19.4	109			800
6/3/06	13:41	DRY	80	Clear	7.75	1.14	0.80	12	19.6	114			480

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)	22.98	**Waterlevel (ft.)**		**Turbidity (NTUs)**	
Start Purge (hrs.)	10:55:00 AM	**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)	1:41:00 PM	**Color**		**ORP (mV)**	
Total Purge Time (min.)	166	**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#
✓	6/4/06	10:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-642006-13
✓	6/4/06	10:30	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-642006-13

General Observations and Notes

WELL HISTORICALLY DRIES OUT - WILL SAMPLE ON 6/04/06.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/4/06	**Modified Date**	6/4/06	**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 #**	13GWT3107
TtNUS Project #	112G00041	**Well ID**	13MWT31
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/4/06	**Static Water Level (ft.)**	11.40	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	20.0	**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)
6/4/06	08:25	11.40	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/4/06	08:35	12.60	130	Clear	5.35	1.73	1.75	3.5	12.8	258	NA	NA	1300

6/4/06	08:45	12.77	120	Clear	5.34	1.69	1.76	0.40	12.8	259			1200
6/4/06	08:55	12.90	110	Clear	5.38	1.64	1.72	0.20	13.0	257			1100
6/4/06	09:05	12.97	100	Clear	5.42	1.63	1.86	0.75	13.2	255			1000
6/4/06	09:15	12.94	80	Clear	5.44	1.63	1.94	1.2	13.3	257			800
6/4/06	09:25	12.92	70	Clear	5.45	1.61	1.88	1.1	13.8	258			700
6/4/06	09:35	12.92	80	Clear	5.46	1.59	1.82	0.75	13.5	258			800

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	1.82
Total Vo. Purge (L)	6.9	**Waterlevel (ft.)**	12.92	**Turbidity (NTUs)**	0.75
Start Purge (hrs.)	8:25:00 AM	**Flowrate (mL/min)**	80	**Temp (C)**	13.5
End Purge (hrs.)	9:35:00 AM	**Color**	Clear	**ORP (mV)**	258
Total Purge Time (min.)	70	**pH (S.U.)**	5.46	**Salinity**	
		Conductivity (mS/cm)	1.59	**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#
✓	6/4/06	09:40	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-642006-13
✓	6/4/06	09:40	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-642006-13

General Observations and Notes

TD = 22.35 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/3/06	**Modified Date**	6/3/06	**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 #**	13GWT3407
TtNUS Project #	112G00041	**Well ID**	13MWT34
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/3/06	**Static Water Level (ft.)**	4.73	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	20.50	**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?	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)
6/3/06	17:00	4.73	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/3/06	17:10	5.07	100	Clear	5.07	0.418	2.55	0.85	15.2	195	NA	NA	1000

6/3/06	17:20	5.21	130	Clear	5.06	0.415	1.25	0.45	14.9	217			1300
6/3/06	17:30	5.23	130	Clear	5.05	0.416	0.56	0.75	14.7	225			1300
6/3/06	17:40	5.23	130	Clear	5.07	0.413	0.39	1.5	14.9	238			1300
6/3/06	17:50	5.24	130	Clear	5.07	0.415	0.32	1.1	15.1	228			1300
6/3/06	18:00	5.23	130	Clear	5.07	0.415	0.27	1.4	15.0	220			1300
6/3/06	18:10	5.23	130	Clear	5.07	0.416	0.29	1.2	15.0	219			1300

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)
6/3/06	18:20	5.23	130	Clear	5.08	0.418	0.25	1.2	14.5	228			1300
6/3/06	18:30	5.23	130	Clear	5.07	0.414	0.24	0.50	14.6	229			1300

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.24
Total Vo. Purge (L)	11.4	**Waterlevel (ft.)**	5.23	**Turbidity (NTUs)**	0.50
Start Purge (hrs.)	5:00:00 PM	**Flowrate (mL/min)**	130	**Temp (C)**	14.6
End Purge (hrs.)	6:30:00 PM	**Color**	Clear	**ORP (mV)**	229
Total Purge Time (min.)	90	**pH (S.U.)**	5.07	**Salinity**	
		Conductivity (mS/cm)	0.414	**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#
✓	6/3/06	18:35	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-642006-13
✓	6/3/06	18:35	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-642006-13

General Observations and Notes

TD = 22.90 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/21/06	**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 #**	13GWT3707
TtNUS Project #	112G00041	**Well ID**	13MWT37
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/21/06	**Static Water Level (ft.)**	13.29	**Water Quality Meter**	406032
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)
5/21/06	09:00	13.29	120	Clear	4.20	0.275	NA	2.17	12.55	335	NA	NA	0
5/21/06	09:10	13.98	160	Clear	3.80	0.235	NA	1.45	12.35	351	NA	NA	1600

5/21/06	09:20	14.11	140	Clear	3.64	0.203	NA	0.46	12.53	367	NA	NA	1400
5/21/06	09:30	14.19	120	Clear	3.60	0.198	NA	0.22	12.50	371	NA	NA	1200
5/21/06	09:40	14.28	120	Clear	3.56	0.196	NA	0.31	12.53	376	NA	NA	1200
5/21/06	09:50	14.31	120	Clear	3.55	0.197	NA	0.46	12.63	377	NA	NA	1200
5/21/06	10:05	14.38	120	Clear	3.51	0.201	NA	0.75	12.62	381	NA	NA	1800
5/21/06	10:10	14.39	120	Clear	3.50	0.202	NA	0.06	12.69	381	NA	NA	600

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)
5/21/06	10:20	14.40	120	Clear	3.55	0.206	NA	0.39	12.70	379	NA	NA	1200

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)	9	**Waterlevel (ft.)**		**Turbidity (NTUs)**	
Start Purge (hrs.)	9:00:00 AM	**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)	10:10:00 AM	**Color**		**ORP (mV)**	
Total Purge Time (min.)	70	**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#
✓	5/21/06	10:25	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-5222006-10
✓	5/21/06	10:25	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-5222006-10

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	6/1/06	**Modified Date**	6/1/06	**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 #**	13GWT4007
TtNUS Project #	112G00041	**Well ID**	13MWT40
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/1/06	**Static Water Level (ft.)**	17.97	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	25.50	**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)
6/1/06	09:00	17.95	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/1/06	09:10	18.51	150	Clear	5.50	0.390	8.06	1.1	12.8	285	NA	NA	1500

6/1/06	09:20	18.44	100	Clear	5.54	0.390	7.45	0.80	13.5	275			1000
6/1/06	09:30	18.35	100	Clear	5.60	0.391	6.84	1.2	13.4	276			1000
6/1/06	09:40	18.34	100	Clear	5.68	0.392	7.80	1.4	13.9	277			1000
6/1/06	09:50	18.34	100	Clear	5.73	0.394	7.24	0.80	13.8	277			1000
6/1/06	10:00	18.34	100	Clear	5.85	0.396	7.07	0.65	13.5	274			1000
6/1/06	10:10	18.34	100	Clear	5.87	0.396	7.08	2.1	13.6	275			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)
6/1/06	10:20	18.34	100	Clear	5.87	0.397	6.85	1.5	13.6	276			1000

Final Purge / Sample Data

One Casing Volume	0	**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	6.85
Total Vo. Purge (L)	8.5	**Waterlevel (ft.)**	18.34	**Turbidity (NTUs)**	1.5
Start Purge (hrs.)	9:00:00 AM	**Flowrate (mL/min)**	100	**Temp (C)**	13.6
End Purge (hrs.)	10:20:00 AM	**Color**	Clear	**ORP (mV)**	276
Total Purge Time (min.)	80	**pH (S.U.)**	5.87	**Salinity**	
		Conductivity (mS/cm)	0.397	**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#
✓	6/1/06	10:25	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-622006-12
✓	6/1/06	10:25	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-622006-12

General Observations and Notes

TD = 27.75 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/1/06	**Modified Date**	6/2/06	**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 #**	13GWT4507
TtNUS Project #	112G00041	**Well ID**	13MWT45
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/1/06	**Static Water Level (ft.)**	70.75	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	84.00	**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)
6/1/06	14:10	70.75	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/1/06	14:20	73.60	150	Clear	6.55	0.612	1.35	0.75	15.5	125	NA	NA	1500

6/1/06	14:30	74.10	100	Clear	6.53	0.607	0.85	0.05	16.3	127			1000
6/1/06	14:40	74.72	100	Clear	6.53	0.597	1.18	4.3	15.9	141			1000
6/1/06	14:50	75.55	150	Clear	6.52	0.600	1.25	6.3	15.4	142			1500
6/1/06	15:00	76.50	150	Clear	6.53	0.603	1.24	7.0	15.4	134			1500
6/1/06	15:10	77.26	150	Clear	6.57	0.613	1.15	11	15.4	96			1500
6/1/06	15:20	78.11	150	Clear	6.63	0.632	0.73	11	15.4	76			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)
6/1/06	15:30	**	150	Clear	6.86	0.667	0.55	8.6	15.8	18			1500
6/1/06	15:40	**	150	Clear	7.08	0.689	0.54	8.9	16.8	-0.7			1500
6/1/06	15:50	**	120	Clear	7.18	0.697	0.56	8.8	17.8	-29			1200
6/1/06	16:00	**	100	Clear	7.22	0.704	0.59	6.8	18.1	-35			1000
6/1/06	16:05	**	50	Clear	7.23	0.691	0.54	7.7	18.3	-35	DRY	DRY	250

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.54
Total Vo. Purge (L)	14.95	**Waterlevel (ft.)**	**	**Turbidity (NTUs)**	7.7
Start Purge (hrs.)	2:10:00 PM	**Flowrate (mL/min)**	50	**Temp (C)**	18.3
End Purge (hrs.)	4:05:00 PM	**Color**	Clear	**ORP (mV)**	-35
Total Purge Time (min.)	115	**pH (S.U.)**	7.23	**Salinity**	DRY
		Conductivity (mS/cm)	0.691	**Other**	DRY

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#
✓	6/2/06	13:50	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-622006-12
✓	6/2/06	13:50	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-622006-12

General Observations and Notes

WELL HISTORICALLY DRIES OUT - WILL SAMPLE ON 6/02/06.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	David Hickey	**Modified By**	David Hickey	**Printed By**	James Goerdt
Created Date	5/21/06	**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 #**	13GWT4607
TtNUS Project #	112G00041	**Well ID**	13MWT46
Task/Contract #	CTO 377	**Well Type**	-Select-
WBS Code #	TP00050125	**Sampled By**	David Hickey
		Concentration	Low concentration

Well and Sample Data

Date	5/21/06	**Static Water Level (ft.)**	56.23	**Water Quality Meter**	406032
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)
5/21/06	11:40	56.23	120	Clear	6.35	0.9I2	NA	26.6	14.32	90	NA	NA	0
5/21/06	11:50	56.25	120	Clear	6.39	0.90	NA	21.6	13.56	83	NA	NA	1200

5/21/06	12:00	56.26	120	Clear	6.41	0.984	NA	7.45	13.81	77	NA	NA	1200
5/21/06	12:10	56.27	120	Clear	6.44	0.981	NA	5.16	13.56	73	NA	NA	1200
5/21/06	12:20	56.28	120	Clear	6.46	0.971	NA	4.32	13.50	70	NA	NA	1200
5/21/06	12:30	56.29	120	Clear	6.48	0.969	NA	3.65	13.37	67	NA	NA	1200
5/21/06	12:40	56.28	120	Clear	6.49	0.966	NA	2.82	13.32	67	NA	NA	1200

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	NA
Total Vo. Purge (L)	7.2	**Waterlevel (ft.)**	56.28	**Turbidity (NTUs)**	2.82
Start Purge (hrs.)	11:40:00 AM	**Flowrate (mL/min)**	120	**Temp (C)**	13.32
End Purge (hrs.)	12:40:00 PM	**Color**	Clear	**ORP (mV)**	67
Total Purge Time (min.)	60	**pH (S.U.)**	6.49	**Salinity**	NA
		Conductivity (mS/cm)	0.966	**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	12:45	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-5222006-10
✓	5/21/06	12:45	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-5222006-10

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	5/23/06	**Modified Date**	5/23/06	**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 #**	13GWT4707
TtNUS Project #	112G00041	**Well ID**	13MWT47
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	5/23/06	**Static Water Level (ft.)**	7.09	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	21.00	**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)
5/23/06	10:05	7.09	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
5/23/06	10:15	7.55	80	Clear	3.69	1.37	0.77	1.8	12.1	332	NA	NA	800

5/23/06	10:25	7.69	100	Clear	3.72	1.36	0.67	3.7	12.1	326			1000
5/23/06	10:35	7.80	110	Clear	3.72	1.36	0.37	5.4	12.1	322			1100
5/23/06	10:45	7.86	110	Clear	3.73	1.36	0.26	6.3	12.3	320			1100
5/23/06	10:55	7.92	110	Clear	3.74	1.36	0.16	3.8	12.3	318			1100
5/23/06	11:05	7.94	110	Clear	3.74	1.36	0.17	2.7	12.2	317			1100
5/23/06	11:15	7.97	110	Clear	3.75	1.36	0.17	2.0	12.3	314			1100

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)
5/23/06	11:25	7.97	100	Clear	3.76	1.35	0.16	1.5	12.4	313			1000

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	0.16
Total Vo. Purge (L)	8.3	**Waterlevel (ft.)**	7.97	**Turbidity (NTUs)**	1.5
Start Purge (hrs.)	10:05:00 AM	**Flowrate (mL/min)**	100	**Temp (C)**	12.4
End Purge (hrs.)	11:25:00 AM	**Color**	Clear	**ORP (mV)**	313
Total Purge Time (min.)	80	**pH (S.U.)**	3.76	**Salinity**	
		Conductivity (mS/cm)	1.35	**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#
✓	5/23/06	11:30	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-5232006-11
✓	5/23/06	11:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-5232006-11

General Observations and Notes

TD = 20.23

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	James Goerdt
Created Date	6/3/06	**Modified Date**	6/3/06	**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 #**	13GWT5106
TtNUS Project #	112G00041	**Well ID**	13MWT51
Task/Contract #	CTO 377	**Well Type**	CRA
WBS Code #	TP00050125	**Sampled By**	Terry Rojahn
		Concentration	Low concentration

Well and Sample Data

Date	6/3/06	**Static Water Level (ft.)**	13.62	**Water Quality Meter**	928069
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	16.00	**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)
6/3/06	15:05	13.62	0	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
6/3/06	15:15	13.96	110	Clear	6.85	0.415	3.31	12	15.2	171	NA	NA	1100

6/3/06	15:25	14.05	60	Clear	6.84	0.418	1.82	5.1	15.3	163	NA	NA	600
6/3/06	15:35	14.06	60	Clear	6.84	0.418	1.57	2.9	15.1	161			600
6/3/06	15:40	14.07	60	Clear	6.85	0.416	1.60	2.7	15.4	156			300
6/3/06	15:45	14.09	60	Clear	6.84	0.418	1.64	2.8	15.5	153			300

Final Purge / Sample Data

One Casing Volume		**Method**	Low flow - Bladder	**Dissolved Oxygen (mg/L)**	1.64
Total Vo. Purge (L)	2.9	**Waterlevel (ft.)**	14.09	**Turbidity (NTUs)**	2.8
Start Purge (hrs.)	3:05:00 PM	**Flowrate (mL/min)**	60	**Temp (C)**	15.5
End Purge (hrs.)	3:45:00 PM	**Color**	Clear	**ORP (mV)**	153
Total Purge Time (min.)	40	**pH (S.U.)**	6.84	**Salinity**	
		Conductivity (mS/cm)	0.418	**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#
✓	6/3/06	15:50	SW-846-8330	Nitroaromatics and Nitramines	4°C	2	Glass	1L Amber		112G00041-642006-13
✓	6/3/06	15:50	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic	500ml PE		112G00041-642006-13

General Observations and Notes

TD = 17.75 ? CHECK WELL CONSTRUCTION SHEET!

- End of Report -

A.2

SWMU 13

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**	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**	
Sample ID Number	13SW1105			**Printed By**	James Goerdt
Sample Location ID	13SWSD11			**Printed Date**	8/3/06

Sample Collection Records

Date	5/22/06	**Color**	yellowish tint	**Temp (C)**	14.4
Time	12:25	**pH (S.U.)**	8.54	**ORP (mV)**	178
Depth (ft.)	NA	**S.C. (mS/cm)**	2.06	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	9.61		
MS/MSD Collected	N	**Turbidity (NTUs)**	14		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/22/06	12:25	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

Flow ~3oz/min

- 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**	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**	
Sample ID Number	13SW1407			**Printed By**	James Goerdt
Sample Location ID	13SWSD14			**Printed Date**	8/3/06

Sample Collection Records

Date	5/22/06	**Color**	CLEAR	**Temp (C)**	13.2
Time	10:40	**pH (S.U.)**	7.02	**ORP (mV)**	245
Depth (ft.)	SURFACE	**S.C. (mS/cm)**	0.451	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	9.90		
MS/MSD Collected	N	**Turbidity (NTUs)**	19		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/22/06	10:40	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

0.15 X 1.5 0.75FT/SEC

- 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**	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**	
Sample ID Number	13SW1507			**Printed By**	James Goerdt
Sample Location ID	13SWSD15			**Printed Date**	8/3/06

Sample Collection Records

Date	5/22/06	**Color**	Slighty cloudy	**Temp (C)**	12.8
Time	10:54	**pH (S.U.)**	6.96	**ORP (mV)**	237
Depth (ft.)	SURFACE	**S.C. (mS/cm)**	0.222	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	8.70		
MS/MSD Collected	N	**Turbidity (NTUs)**	75		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/22/06	11:00	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

FLOW = <1GPM

- 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**	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**	
Sample ID Number	13SW1607			**Printed By**	James Goerdt
Sample Location ID	13SWSD16			**Printed Date**	8/3/06

Sample Collection Records

Date	5/22/06	**Color**	CLEAR	**Temp (C)**	12.6
Time	11:25	**pH (S.U.)**	7.21	**ORP (mV)**	224
Depth (ft.)	SURFACE	**S.C. (mS/cm)**	0.257	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	9.83		
MS/MSD Collected	N	**Turbidity (NTUs)**	19		
Duplicate Collected	Y				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/22/06	11:25	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

0.05' X 1.2' & 1FT/SEC

- 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**	David Hickey
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/21/06
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	13SW1906			**Printed By**	James Goerdt
Sample Location ID	13SWSD19			**Printed Date**	8/3/06

Sample Collection Records

Date	5/21/06	**Color**	Clear	**Temp (C)**	14.43
Time	16:53	**pH (S.U.)**	5.57	**ORP (mV)**	260
Depth (ft.)	0.10	**S.C. (mS/cm)**	0.474	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	NA		
MS/MSD Collected	N	**Turbidity (NTUs)**	3.83		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/21/06	16:53	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

3.0 sec/ft

- 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**	David Hickey
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	5/21/06
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	13SW2006			**Printed By**	James Goerdt
Sample Location ID	13SWSD20			**Printed Date**	8/3/06

Sample Collection Records

Date	5/21/06	**Color**	Clear	**Temp (C)**	14.36
Time	16:40	**pH (S.U.)**	5.84	**ORP (mV)**	245
Depth (ft.)	0.11	**S.C. (mS/cm)**	0.296	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	NA		
MS/MSD Collected	N	**Turbidity (NTUs)**	11.1		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/21/06	16:40	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

2 sec/ft

- 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**	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**	
Sample ID Number	13SW2206			**Printed By**	James Goerdt
Sample Location ID	13SWSD22			**Printed Date**	8/3/06

Sample Collection Records

Date	5/22/06	**Color**	CLEAR	**Temp (C)**	13.0
Time	13:00	**pH (S.U.)**	7.88	**ORP (mV)**	164
Depth (ft.)	SURFACE	**S.C. (mS/cm)**	0.406	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	7.95		
MS/MSD Collected	N	**Turbidity (NTUs)**	5.6		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/22/06	13:00	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

FLOW = 1-2 GPM

- 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**	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**	
Sample ID Number	13SW3007			**Printed By**	James Goerdt
Sample Location ID	13SWSD30			**Printed Date**	8/3/06

Sample Collection Records

Date	5/22/06	**Color**	CLEAR	**Temp (C)**	14.1
Time	11:55	**pH (S.U.)**	8.11	**ORP (mV)**	181
Depth (ft.)	SURFACE	**S.C. (mS/cm)**	0.371	**Salinity (%)**	NA
Method	Direct bottle	**DO (mg/L)**	11.11		
MS/MSD Collected	N	**Turbidity (NTUs)**	4.2		
Duplicate Collected	N				
Duplicate ID					

Laboratory Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Count	Type	Requirements	Preservative	Comments	Chain of Custody #
✓	5/22/06	11:55	Nitroaromatics and Nitramines	SW-846-8330	2	Glass	1L Amber	4° C		112G00041-5222006-10

General Observations and Notes

0.25 X 10 5 & 2SEC/FT

- End of Report -

A.3

SWMU 13

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**	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**	5/23/06
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	112G00041-5232006-11	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	8494 1921 7390	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-5232006-11**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	Terry Rojahn
				Date	05/23/2006
Carrier	Federal Express	**Address**	940 South Harney Street	**Time**	18:00
Carrier/Waybill No.	8494 1921 7390	**City, State, Zip**	Seattle, WA 98108	**Received By:**	Federal Express
		Lab Contact	Hugh Prentice/Elaine Walker	**Date**	5/23/06
		Lab Telephone	206-767-5060 x1028	**Time**	18:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/23/06	13GWT1308	14:05	SW-846-8330	Nitroaromatics and Nitramines	13MWT13	GW	4°C	2	Glass	1L Amber	
5/23/06	13GWT1408	15:00	SW-846-8330	Nitroaromatics and Nitramines	13MWT14	GW	4°C	2	Glass	1L Amber	
5/23/06	13GWT1408	15:00	EPA 353.2	Nitrate + Nitrite (as N)	13MWT14	GW	4°C/H2SO4	1	Plastic	500ml PE	

5/23/06	13GWT4707	11:30	SW-846-8330	Nitroaromatics and Nitramines	13MWT47	GW	4°C	2	Glass	1L Amber	
5/23/06	13GWT4707	11:30	EPA 353.2	Nitrate + Nitrite (as N)	13MWT47	GW	4°C/H2SO4	1	Plastic	500ml PE	
5/23/06		14:05	EPA 353.2	Nitrate + Nitrite (as N)		GW	4°C/H2SO4	1	Plastic	500ml PE	

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**	6/2/06
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	112G00041-622006-12	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	8494 1921 7389	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-622006-12**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	Terry Rojahn
Carrier	Federal Express			**Date**	06/02/2006
Carrier/Waybill No.	8494 1921 7389	**Address**	940 South Harney Street	**Time**	18:00
		City, State, Zip	Seattle, WA 98108	**Received By:**	Federal Express
		Lab Contact	Hugh Prentice/Elaine Walker	**Date**	6/2/06
		Lab Telephone	206-767-5060 x1028	**Time**	18:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
6/1/06	13GWT2108	13:20	SW-846-8330	Nitroaromatics and Nitramines	13MWT21	GW	4°C	2	Glass	1L Amber	
6/1/06	13GWT2108	13:20	EPA 353.2	Nitrate + Nitrite (as N)	13MWT21	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/1/06	13GWT4007	10:25	EPA 353.2	Nitrate + Nitrite (as N)	13MWT40	GW	4°C/H2SO4	1	Plastic	500ml PE	

6/1/06	13GWT4007	10:25	SW-846-8330	Nitroaromatics and Nitramines	13MWT40	GW	4°C	2	Glass	1L Amber	
6/2/06	13GWT0108	11:30	SW-846-8330	Nitroaromatics and Nitramines	13MWT01	GW	4°C	2	Glass	1L Amber	
6/2/06	13GWT0108	11:30	EPA 353.2	Nitrate + Nitrite (as N)	13MWT01	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/2/06	13GWT1108	13:15	EPA 353.2	Nitrate + Nitrite (as N)	13MWT11	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/2/06	13GWT1108	13:15	SW-846-8330	Nitroaromatics and Nitramines	13MWT11	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
6/2/06	13GWT4507	13:50	EPA 353.2	Nitrate + Nitrite (as N)	13MWT45	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/2/06	13GWT4507	13:50	SW-846-8330	Nitroaromatics and Nitramines	13MWT45	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**	Terry Rojahn
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	6/4/06
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	112G00041-642006-13	**Carrier**	Federal Express	**Printed By**	James Goerdt
		Carrier/Waybill No.	8494 1921 7378	**Printed Date**	7/19/06

Chain of Custody Information

Chain of Custody #	**112G00041-642006-13**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	Terry Rojahn
Carrier	Federal Express	**Address**	940 South Harney Street	**Date**	06/05/2006
Carrier/Waybill No.	8494 1921 7378	**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**	6/5/06
				Time	18:30

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
6/3/06	13GWT0909	10:00	EPA 353.2	Nitrate + Nitrite (as N)	13MWT09	GW	4°C/H2SO4	3	Plastic	500ml PE	DO MS/MSD
6/3/06	13GWT0909	10:00	SW-846-8330	Nitroaromatics and Nitramines	13MWT09	GW	4°C	4	Glass	1L Amber	DO MS/MSD
6/3/06	13GWT3407	18:35	SW-846-8330	Nitroaromatics and Nitramines	13MWT34	GW	4°C	2	Glass	1L Amber	

6/3/06	13GWT3407	18:35	EPA 353.2	Nitrate + Nitrite (as N)	13MWT34	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/3/06	13GWT5106	15:50	SW-846-8330	Nitroaromatics and Nitramines	13MWT51	GW	4°C	2	Glass	1L Amber	
6/3/06	13GWT5106	15:50	EPA 353.2	Nitrate + Nitrite (as N)	13MWT51	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/3/06	FD06030601	00:00	SW-846-8330	Nitroaromatics and Nitramines	QC	GW	4°C	2	Glass	1L Amber	
6/3/06	FD06030601	00:00	EPA 353.2	Nitrate + Nitrite (as N)	QC	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
6/4/06	13GWT1508	15:15	EPA 353.2	Nitrate + Nitrite (as N)	13MWT15	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/4/06	13GWT1508	15:15	SW-846-8330	Nitroaromatics and Nitramines	13MWT15	GW	4°C	2	Glass	1L Amber	
6/4/06	13GWT1708	12:30	SW-846-8330	Nitroaromatics and Nitramines	13MWT17	GW	4°C	2	Glass	1L Amber	
6/4/06	13GWT1708	12:30	EPA 353.2	Nitrate + Nitrite (as N)	13MWT17	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/4/06	13GWT2807	10:30	EPA 353.2	Nitrate + Nitrite (as N)	13MWT28	GW	4°C/H2SO4	1	Plastic	500ml PE	
6/4/06	13GWT2807	10:30	SW-846-8330	Nitroaromatics and Nitramines	13MWT28	GW	4°C	2	Glass	1L Amber	
6/4/06	13GWT3107	09:40	SW-846-8330	Nitroaromatics and Nitramines	13MWT31	GW	4°C	2	Glass	1L Amber	
6/4/06	13GWT3107	09:40	EPA 353.2	Nitrate + Nitrite (as N)	13MWT31	GW	4°C/H2SO4	1	Plastic	500ml PE	

General Observations and Notes

No Notes

- End of Report -

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SWMU 13

WATER LEVEL MEASUREMENTS

ROUND 8

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMU 13 and 16 Round ~~6~~ 8 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Site**	SWMU 13	**Created By**	Terry Rojahn
TtNUS Project #	112G00041	**Measuring Device**	Water Level Indicator	**Created Date**	5/21/06
Task/Contract #	CTO 0377	**Sampled By**	Terry Rojahn	**Modified By**	Michael Quaill
WBS Code #	0000	**Weather**	Mostly sunny and 60s	**Modified Date**	6/5/06
				Printed By	James Goerdt
				Printed Date	8/3/06

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
13MWT01	5/21/06	12:18	6.70		NA	NA		calc	N
13MWT02	5/21/06	12:00	16.91		NA	NA		calc	N
13MWT03	5/21/06	12:21	8.45		NA	NA		calc	N
13MWT04	5/21/06	14:22	13.82		NA	NA		e	N
13MWT05	5/21/06	13:58	5.06		NA	NA		calc	N
13MWT06	5/21/06	12:24	11.20		NA	NA		calc	N
13MWT07	5/21/06	13:55	3.02		NA	NA		calc	N
13MWT08	5/21/06	14:27	3.81		NA	NA		calc	N

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMU 13 and 16 Round ~~0~~ 8 Sampling - 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
13MWT09	5/21/06	12:26	7.96		NA	NA		calc	N
13MWT10	5/21/06	13:51	13.00		NA	NA		calc	N
13MWT11	5/21/06	13:39	8.56		NA	NA		calc	N
13MWT12	5/21/06	13:36	9.87		NA	NA		calc	N
13MWT13	5/21/06	10:50	3.91		NA	NA		calc	N
13MWT14	5/21/06	10:39	13.46		NA	NA		calc	N
13MWT15	5/21/06	13:31	13.22		NA	NA		calc	N
13MWT16	5/21/06	13:17	9.72		NA	NA		calc	N
13MWT17	5/21/06	13:14	8.52		NA	NA		calc	N
13MWT18	5/21/06	13:28	18.76		NA	NA		e	N
13MWT19	5/21/06	10:27	9.14		NA	NA		calc	N
13MWT20	5/21/06	12:35	4.34		NA	NA		calc	N
13MWT21	5/21/06	13:08	8.02		NA	NA		calc	N
13MWT22	5/21/06	13:00	7.84		NA	NA		calc	N
13MWT23	5/21/06	12:38	8.06		NA	NA		calc	N
13MWT24	5/21/06	12:41	8.68		NA	NA		calc	N
13MWT25	5/21/06	12:49	5.80		NA	NA		calc	N
13MWT26	5/21/06	12:47	9.44		NA	NA		calc	N
13MWT27	5/21/06	13:34	8.35		NA	NA		calc	N
13MWT28	5/21/06	12:32	77.29		NA	NA		calc	N

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMU 13 and 16 Round ~~6~~ 8 Sampling - 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
13MWT29	5/21/06	10:56	5.06		NA	NA		calc	N
13MWT30	5/21/06	10:41	11.02		NA	NA		calc	N
13MWT31	5/21/06	10:22	9.98		NA	NA		calc	N
13MWT32	5/21/06	10:18	8.30		NA	NA		calc	N
13MWT33	5/21/06	10:29	9.60		NA	NA		calc	N
13MWT34	5/21/06	13:04	4.86		NA	NA		calc	N
13MWT35	5/21/06	13:42	63.65		NA	NA		calc	N
13MWT36	5/21/06	08:57	18.55		NA	NA		calc	N
13MWT37	5/21/06	09:43	13.29		NA	NA		e	N
13MWT38	5/21/06	09:46	61.58		NA	NA		e	N
13MWT39	5/21/06	12:22	12.88		NA	NA		e	N
13MWT40	5/21/06	15:48	17.96		NA	NA		calc	N
13MWT41	5/21/06	15:45	66.28		NA	NA		calc	N
13MWT42	5/21/06	15:53	20.23		NA	NA		calc	N
13MWT43	5/21/06	14:07	7.85		NA	NA		calc	N
13MWT44	5/21/06	14:12	64.06		NA	NA		calc	N
13MWT45	5/21/06	13:11	70.85		NA	NA		calc	N
13MWT46	5/21/06	12:25	56.23		NA	NA		calc	N
13MWT47	5/21/06	11:06	6.84		NA	NA		calc	N
13MWT48	5/21/06	09:47	9.88		NA	NA		calc	N

Tetra Tech NUS, Inc.

GROUNDWATER MEASUREMENT LOG

SWMU 13 and 16 Round ~~0~~ 8 Sampling - 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
13MWT49	5/21/06	09:39	7.20		NA	NA		calc	N
13MWT50	5/21/06	09:37	7.33		NA	NA		calc	N
13MWT51	5/21/06	09:34	5.62		NA	NA		calc	N

General Observations and Notes

WELLS 13MWT08 & 18 REPLACED J-PLUG W/ NITRIL GLOVE.;D. HICKEY MEASURED WELLS 13MWT36-42 AND 46 - TR MEASURED OTHERS.

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER MEASUREMENT 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**	5/30/06
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		**Carrier**		**Printed By**	John Wright
		Carrier/Waybill No.		**Printed Date**	9/1/06

Surface Water Measurements

Location ID	Date	Time	Flow Rate (est.)	Type	Measurement	Flow Width	Flow Depth	Flow Velocity
13SG01	5/21/06	12:07	<1gpm	Estimated	1.77			
13SG02	5/21/06	12:15	1-3gpm	Estimated	3.69			
13SG03	5/21/06	10:59	<1gpm	Estimated	1.94			
13SG04	5/21/06	10:55	1.5gpm	Measured	2.43			
13SG05	5/21/06	10:47	1-2gpm	Estimated	3.89			
13SG06	5/21/06	10:35	<0.5gpm	Estimated	2.34			
13SG07	5/21/06	12:44	0gpm	Stagnant	1.56			
13SG08	5/21/06	12:58	3-5gpm	Estimated	5.08			

Tetra Tech NUS, Inc.

SURFACE WATER MEASUREMENT LOG

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

Surface Water Measurements

Location ID	Date	Time	Flow Rate (est.)	Type	Measurement	Flow Width	Flow Depth	Flow Velocity
13SG09	5/21/06	13:23	12.1gpm	Measured	4.14	0.9	0.03	1
13SG10	5/21/06	13:45	14.8gpm	Measured	4.93	1.1	0.03	1
13SG11	5/21/06	11:12	1.5gpm	Measured	2.24			
13SG12	5/21/06	08:50	606.2gpm	Measured	6.88	15	0.09	1
13SG13	5/21/06	09:10	60gpm	Measured	4.83			
13SG14	5/21/06	09:30	50gpm	Measured	6.35			
13SG15	5/21/06	09:45	673.5gpm	Measured	Destroyed	15	0.10	1
13SG16	5/21/06	09:58	0gpm		Dry	Dry	Dry	Dry
13SG17	5/21/06	09:53	0gpm		Dry	Dry	Dry	Dry
13SG18	5/21/06	10:00	727.4gpm	Measured	8.14	18	0.09	1

General Observations and Notes

No Notes

- End of Report -

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SWMU 13

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
				Printed Date	8/3/06

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-	Pre: 4.46 Post: 4.49 Std: 5216 Exp: 03-	Conductivity standard = 4.49 mS/cm

		20-2008	20-2008	
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
5/18/06 1:00:00 AM	David Hickey	Pre: 4.00 Post: 4.00 Std: 5216 Exp: 03-20-2008	Pre: 4.32 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.

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**	LaMotte 2020 Turbidity Meter (DH)	**Created By**	David Hickey
TtNUS Project #	112G00041			**Created Date**	5/7/06
Task/Contract #	CTO 377	**Manufacturer**	LaMotte	**Modified By**	
WBS Code #	TP00050125	**Serial Number**	3327-2402	**Modified Date**	
Client				**Printed By**	James Goerdt
				Printed Date	8/3/06

Calibration Records

Date	Calibrator	Turbidity (0 NTU)	Turbidity (10 NTU)	Comments
5/3/06	David Hickey	Pre: 0.0 Post: 0.0 Std: 4771 Exp: 06/2007	Pre: 9.7 Post: 10.0 Std: P568485 Exp: 06/2007	Standards provided with instrument by US Environmental. 0 NTU - AMCO Clear Turbidity Standard. 10 NTU - LaMotte AMCO Primary Turbidity Standard.
5/6/06	David Hickey	Pre: 0.25 Post: 0.0 Std: 4771 Exp: 06/2007	Pre: 10.0 Post: 10.0 Std: P568485 Exp: 06/2007	
5/7/06	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.04 Post: 10.00 Std: P568485 Exp: 06/2007	
5/8/06	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.76 Post: 9.99 Std: P568485 Exp: 06/2007	
5/9/06	David Hickey	Pre: 0.19 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.95 Post: 10.01 Std: P568485 Exp: 06/2007	
		Pre: 0.00	Pre: 8.41	

5/16/06	David Hickey	Post: 0.00 Std: 4771 Exp: 06/2007	Post: 9.94 Std: P568485 Exp: 06/2007	Standards provided with instrument by US Environmental. 0 NTU - AMCO Clear Turbidity Standard. 10 NTU - LaMotte AMCO Primary Turbidity Standard.
5/18/06 1:00:00 AM	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.71 Post: 10.02 Std: P568485 Exp: 06/2007	
5/19/06 1:00:00 AM	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.14 Post: 10.03 Std: P568485 Exp: 06/2007	
5/20/06 1:00:00 AM	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.00 Post: 10.00 Std: P568485 Exp: 06/2007	
5/21/06 1:00:00 AM	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.12 Post: 9.99 Std: P568485 Exp: 06/2007	Standards provided with instrument by US Environmental. 0 NTU - AMCO Clear Turbidity Standard. 10 NTU - LaMotte AMCO Primary Turbidity Standard.
5/22/06 1:00:00 AM	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.81 Post: 10.00 Std: P568485 Exp: 06/2007	Standards provided with instrument by US Environmental. 0 NTU - AMCO Clear Turbidity Standard. 10 NTU - LaMotte AMCO Primary Turbidity Standard.
5/23/06 1:00:00 AM	David Hickey	Pre: 0.09 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.98 Post: 10.00 Std: P568485 Exp: 06/2007	Standards provided with instrument by US Environmental. 0 NTU - AMCO Clear Turbidity Standard. 10 NTU - LaMotte AMCO Primary Turbidity Standard.

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**	LaMotte 2020 Turbidity Meter (JG)	**Created By**	David Hickey
TtNUS Project #	112G00041			**Created Date**	5/7/06
Task/Contract #	CTO 377	**Manufacturer**	LaMotte	**Modified By**	
WBS Code #	TP00050125	**Serial Number**	3254-1902	**Modified Date**	
Client				**Printed By**	James Goerdt
				Printed Date	8/3/06

Calibration Records

Date	Calibrator	Turbidity (0 NTU)	Turbidity (10 NTU)	Comments
5/3/06	David Hickey	Pre: 0.35 Post: 0.0 Std: 4771 Exp: 06/2007	Pre: 8.4 Post: 9.8 Std: P568485 Exp: 06/2007	
5/4/06	David Hickey	Pre: 0.0 Post: 0.0 Std: 4771 Exp: 06/2007	Pre: 9.7 Post: 10.0 Std: P568485 Exp: 06/2007	
5/6/06	David Hickey	Pre: 0.0 Post: 0.0 Std: 4771 Exp: 06/2007	Pre: 10.0 Post: 10.0 Std: P568485 Exp: 06/2007	
5/7/06	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.61 Post: 9.97 Std: P568485 Exp: 06/2007	
5/8/06	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.1 Post: 10.0 Std: P568485 Exp: 06/2007	
5/9/06	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.13 Post: 10.00 Std: P568485 Exp: 06/2007	
5/16/06	T. Rojahn	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.98 Post: 10.00 Std: P568485 Exp: 06/2007	
5/17/06	David Hickey	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 5.5 Post: 10.0 Std: P568485 Exp: 06/2007	

5/18/06	T. Rojahn	Pre: 0.20 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.90 Post: 10.00 Std: P568485 Exp: 06/2007	
5/19/06	T. Rojahn	Pre: 0.04 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.183 Post: 10.00 Std: P568485 Exp: 06/2007	Turbidity standard manufacture = AMCO
5/20/06	T. Rojahn	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.98 Post: 10.00 Std: P568485 Exp: 06/2007	
5/22/06	T. Rojahn	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.11 Post: 10.00 Std: P568485 Exp: 06/2007	
5/23/06	T. Rojahn	Pre: 0.03 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.90 Post: 10.00 Std: P568485 Exp: 06/2007	
6/1/06	T. Rojahn	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.12 Post: 10.00 Std: P568485 Exp: 06/2007	
6/2/06	T. Rojahn	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 10.09 Post: 10.00 Std: P568485 Exp: 06/2007	Turbidity standard manufacture = AMCO
6/3/06	T. Rojahn	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.45 Post: 10.00 Std: P568485 Exp: 06/2007	
6/4/06	T. Rojahn	Pre: 0.00 Post: 0.00 Std: 4771 Exp: 06/2007	Pre: 9.99 Post: 10.00 Std: P568485 Exp: 06/2007	Turbidity standard manufacture = AMCO

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 (DH)	**Created By**	David Hickey
TtNUS Project #	112G00041	**Manufacturer**	Horiba	**Created Date**	5/7/06
Task/Contract #	CTO 377	**Serial Number**	928069	**Modified By**	James Goerdt
WBS Code #	TP00050125			**Modified Date**	7/7/06
Client				**Printed By**	James Goerdt
				Printed Date	8/3/06

Calibration Records

Date	Calibrator	pH (4 SU)	Conductivity (mS/cm)	Comments
5/4/06	David Hickey	Pre: 4.36 Post: 3.99 Std: 4951 Exp: 06/23/07	Pre: 5.1 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/6/06	David Hickey	Pre: 4.03 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.47 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/7/06	David Hickey	Pre: 3.97 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.52 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/8/06	David Hickey	Pre: 4.12 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.60 Post: 4.47 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/9/06	David Hickey	Pre: 4.03 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.40 Post: 4.47 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/16/06	T. Rojahn	Pre: 3.94 Post: 4.00 Std: 4920 Exp: 5/10/07	Pre: 4.91 Post: 4.49 Std: 4920 Exp: 5/10/07	Conductivity standard = 4.49 mS/cm
5/17/06	David Hickey	Pre: 4.01 Post: 3.99 Std: 4951 Exp: 06/23/07	Pre: 4.07 Post: 4.50 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/18/06	T. Rojahn	Pre: 4.00 Post: 4.00 Std: 4951	Pre: 4.71 Post: 4.49 Std: 4951	Conductivity standard = 4.49 mS/cm

		Exp: 06/23/07	Exp: 06/23/07	
5/19/06	T. Rojahn	Pre: 4.03 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.20 Post: 4.48 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/20/06	T. Rojahn	Pre: 4.02 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.73 Post: 4.49 Std: 4951 Exp: 06/23/07	
5/22/06	T. Rojahn	Pre: 3.99 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.50 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
5/23/06	T. Rojahn	Pre: 4.03 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.92 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
6/1/06	-Select-	Pre: 4.00 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.98 Post: 4.48 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
6/2/06	T. Rojahn	Pre: 4.00 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.04 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
6/3/06	T. Rojahn	Pre: 4.02 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.42 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm
6/4/06	T. Rojahn	Pre: 4.00 Post: 4.00 Std: 4951 Exp: 06/23/07	Pre: 4.48 Post: 4.49 Std: 4951 Exp: 06/23/07	Conductivity standard = 4.49 mS/cm

APPENDIX B

SMWU 13

MISCELLANEOUS FIELD DOCUMENTATION

ROUND 8

B.1

SWMU 13

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	**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
5/8/06	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	**TtNUS Personnel**	T.Rojahn;D. Hickey	**Created Date**	5/16/06
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	TP00050125	**Visitors**		**Modified Date**	5/16/06
WBS Code #	TP00050125			**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.

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
5/16/06	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.

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
5/19/06	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.

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
5/21/06	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.

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.

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
6/1/06	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 - voll of any sediment material. Also, collect surface soil sample at location 13SB76 inside inclosed transport corridor w/ concrete floor.

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
6/5/06	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 13

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

NUS CORPORATION

Certificate of Training

THIS CERTIFIES THAT

TERRY ROJAHN

has successfully completed a course of instruction on

SUPERFUND TRAINING CLASS

prepared and conducted by the
NUS Corporation, Pittsburgh, Pennsylvania

SEPT. 30 - OCT. 4, 1985
Date of Award

Gary F. Smith, C.S.P.
Director; Health, Safety Training

E. Dennis Escher, P.E.
Vice President

Basinski, Ralph

From: Soltis, Matthew
Sent: Tuesday, August 31, 2004 3:18 PM
To: Basinski, Ralph
Cc: Rojahn, Terry; Diano, Linda
Subject: Training Certificate

Ralph:

As I mentioned earlier, one of the action items from my recent H&S audit at NSWC Crane was to follow up on the matter of an 8-hour training certificate for Management/Supervisor H&S training for our FOL on this field effort (Terry Rojahn). This was the only mandatory training element that I could not find documentation for during my audit.

In checking our corporate training database, I have confirmed that Terry did satisfactorily complete this training with us on March 31, 1988. We do not maintain copies of every training certificate that we issue. Please have Terry use this message as interim confirmation of his satisfying this training requirement. The next time that we prepare training certificates, Linda Diano will prepare a replacement certificate for Terry and provide it to him for his records/use.

If there are any questions, let me know.

Matt

Matthew M. Soltis, CIH, CSP.
Corporate Health and Safety Manager
Tetra Tech NUS, Inc.
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, PA 15220-2745
Telephone: (412) 921-8912
FAX: (412) 921-4040
soltism@ttnus.com
http://www.ttnus.com
http://www.tetratech.com

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WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Rojahn, Terry	COMPANY:	TT/NUS
SSN:	XXX-XX-8670	POSITION:	Environmental Sampling
DATE OF EXAM:	11/05/2004	LOCATION:	TT/NUS-Pittsburgh
EXPIRATION DATE:	11/05/2006	SITE:	Pittsburgh

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☑	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☑	☐

STATUS

1. ☑ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 11/10/04

Signature: Peter P. Greaney MD

WorkCare
333 S. Anita Drive, Suite 630, Orange, CA 92868
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

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

A LIED EDUCATIONAL SERIES

James D. Goerdt

APP ED ASSOCIATES INTERNATIONAL IN

CERTIFICATE

OSHA, 1910.120
Hazardous Waste Operations and Emergency Response 40 Hour Course

ISSUE DATE: December 13, 1991

EXPIRATION: December 13, 1992

CERTIFICATE: HAZ9112001058

STEVEN L. WILLIAMS
President

THOMAS O. MURRAY
Certified Industrial Hygenist

P. O. Box 300068
Fern Park, Florida 32730-0068

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE: Goerdt, James
SSN: XXX-XX-2691
DATE OF EXAM: 11/22/2005
EXPIRATION DATE: 11/22/2007

COMPANY: TT/NUS
POSITION: Environmental Scientist
LOCATION: TT/NUS-Pittsburgh
SITE: Pittsburgh

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ QUALIFIED — The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ QUALIFIED - WITH LIMITATIONS — The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ NOT QUALIFIED

4. ☐ DEFERRED — The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 11/29/05

Signature: Peter P. Greaney, MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

Date Completed:

1/20/2006

Receipt # 97789

International Union of Operating Engineers
Hazmat Training Program

Local DOE

This is to certify that

David Hickey, Jr

has successfully completed the required annual 8-hour refresher class specifically designed for workers in accordance with OSHA at 29 CFR 1910.120.

Jeff Henderson
Certified Instructor

American Red Cross

Together, we can save a life

This recognizes that

David Hickey Jr

has completed the requirements for

Preventing Disease Transmission

conducted by

Appalachian Chapter

Date completed 1/19/06

The American Red Cross recognizes this certificate as valid for NA year(s) from completion date.

American Red Cross

Together, we can save a life

This recognizes that

David Hickey Jr

has completed the requirements for

First Aid Basics

conducted by

Appalachian Chapter

Date completed 1/19/06

The American Red Cross recognizes this certificate as valid for 3 year(s) from completion date.

American Red Cross

Together, we can save a life

This recognizes that

David Hickey Jr

has completed the requirements for

Adult CPR

conducted by

Appalachian Chapter

Date completed 1/19/06

The American Red Cross recognizes this certificate as valid for 1 year(s) from completion date.

Chairman, American Red Cross

Instructor's Signature

Chapter

Appalachian Chapter

(865) 483-5641

Holder's Signature

Cert. 653998 (Rev. Oct. 2001)

Chairman, American Red Cross

Instructor's Signature

Chapter

Appalachian Chapter

(865) 483-5641

Holder's Signature

Cert. 653999 (Rev. Oct. 2001)

Chairman, American Red Cross

Instructor's Signature

Chapter

Appalachian Chapter

(865) 483-5641

Holder's Signature

Cert. 653998 (Rev. Oct. 2001)

Mar-08-01 13:34 From-TETRA TECH NUS +18654818334 T-683 P.02/02 F-719

GERAGHTY & MILLER, INC.
Environmental Services

Certificate of Completion

Presented To

David A. Hickey Jr.

In Recognition of Having Successfully Completed
the Prescribed Course of Study for

Hazardous Waste Site Activities
40-Hour Initial Health and Safety Training

Orlando, Florida

January 7-11, 1991

Richard M. Miller
President
American Ecology Services, Inc.

Kevin J. Doherty
Course Director
Geraghty & Miller, Inc

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Hickey, David	COMPANY:	TT/NUS
SSN:	XXX-XX-9715	POSITION:	Geologist
DATE OF EXAM:	11/22/2005	LOCATION:	TT/NUS-Oak Ridge
EXPIRATION DATE:	11/22/2006	SITE:	Oak Ridge

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 11/29/05

Signature: Peter P. Greaney, MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

APPENDIX D

SWMU 13

ANALYTICAL DATA

ROUND 8

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 13 (MINE FILL B)

SITE	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B
AOC	PUZ-UPGRAD	PUZ	PUZ	PUZ	PUZ	PUZ-UPGRAD	PUZ	PUZ
SWMU	13	13	13	13	13	13	13	13
PHASE	08	08	08	08	08	08	08	08
LOCATION	13MWT01	13MWT09	13MWT11	13MWT13	13MWT14	13MWT15	13MWT17	13MWT21
NSAMPLE	13GWT0108	13GWT0909	13GWT1108	13GWT1308	13GWT1408	13GWT1508	13GWT1708	13GWT2108
MATRIX	GW	GW	GW	GW	GW	GW	GW	GW
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SAMPLE DATE	20060602	20060603	20060602	20060523	20060523	20060604	20060604	20060601
Explosives (ug/L)								
1,3,5-Trinitrobenzene		1	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,3-Dinitrobenzene		1.7	0.89	0.25 U	0.25 U	0.25 U	0.25 U	0.6
2,4,6-Trinitrotoluene		17	30	0.25 U	0.25 U	0.25 U	0.25 U	15
2,4-Dinitrotoluene		1.2 J	3.3	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-Dinitrotoluene		7	4.5 J	0.25 U	0.25 U	0.25 U	0.25 U	2
2-Amino-4,6-Dinitrotoluene		12 J	12 J	0.25 U	0.25 U	0.25 U	0.25 U	2.1 J
2-Nitrotoluene		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3-Nitrotoluene		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Amino-2,6-Dinitrotoluene		19	21	0.25 U	0.25 U	0.25 U	0.25 U	3.4
4-Nitrotoluene		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX		120	84	10	0.57	0.25 U	100	540
Nitrobenzene		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
RDX		1400	740	16	2.5	0.25 U	560	3800
Tetryl		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Field Parameters								
Dissolved Oxygen (mg/L)	0.67	0.53	0.64					
Nitrite/Nitrate-N (mg/L)		62	0.11	0.51	0.079	0.14	0.52	0.49
Oxidation Reduction Potential (mV)	427	254	288					
pH	4.21	5.67	4.16					
Specific Conductance (MS/CM)	0.255	0.818	0.286					
Temperature (C)	14.1	14.5	15.3					
Turbidity (NTU)	0	0	1.7					

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 8
PENNSYLVANIA UPPER WATER BEARING ZONE
SWMU 13 (MINE FILL B)

SITE	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B
AOC	PUZ	PUZ	PUZ	PUZ	PUZ	PUZ	VALLEY
SWMU	13	13	13	13	13	13	13
PHASE	08	08	08	08	08	08	08
LOCATION	13MWT31	13MWT34	13MWT34	13MWT37	13MWT40	13MWT47	13MWT51
NSAMPLE	13GWT3107	13GWT3407	13GWT3407-D	13GWT3707	13GWT4007	13GWT4707	13GWT5106
MATRIX	GW	GW	GW	GW	GW	GW	GW
SACODE	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL	NORMAL
SAMPLE DATE	20060604	20060603	20060603	20060521	20060601	20060523	20060603
Explosives (ug/L)							
1,3,5-Trinitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,3-Dinitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4,6-Trinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Amino-4,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Amino-2,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.61	1	0.25 U	0.25 U
4-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	11	26	28	210	43	0.25 U	95
Nitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
RDX	24	340	360	2500	240	0.25 U	350
Tetryl	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Field Parameters							
Dissolved Oxygen (mg/L)							
Nitrite/Nitrate-N (mg/L)	0.22	0.27	0.22	0.29	0.53	0.079	0.51
Oxidation Reduction Potential (mV)							
pH							
Specific Conductance (MS/CM)							
Temperature (C)							
Turbidity (NTU)							

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - SURFACE WATER ROUND 8
SWMU 13 (MINE FILL B)

SITE	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B
AOC	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SWMU	13	13	13	13	13	13	13
PHASE	08	08	08	08	08	08	08
LOCATION	13SW11	13SW/SD14	13SW/SD15	13SW/SD16	13SW/SD16	13SW/SD19	13SW/SD20
SAMPLE	13SW1105	13SW1407	13SW1507	13SW1607	13SW1607-D	13SW1906	13SW2006
MATRIX	SW	SW	SW	SW	SW	SW	SW
SACODE	NORMAL	NORMAL	NORMAL	NORMAL	DUP	NORMAL	NORMAL
SAMPLE DATE	20060522	20060522	20060522	20060522	20060522	20060521	20060521
Explosives (ug/L)							
1,3,5-Trinitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,3-Dinitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4,6-Trinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,6-Dinitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Amino-4,6-Dinitrotoluene	0.25 U	0.25 U	0.74	0.25 U	0.25 U	0.25 U	0.25 U
2-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Amino-2,6-Dinitrotoluene	0.25 U	0.25 U	1.8	0.61	0.64	0.25 U	0.25 U
4-Nitrotoluene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
HMX	210	62	30	19	20	0.77	0.25 U
Nitrobenzene	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
RDX	220	120	50	32	34	0.83	0.25 U
Tetryl	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Field Parameters							
Dissolved Oxygen (mg/L)	9.61	9.9	8.7	9.83		-9999	-9999
Oxidation Reduction Potential (mV)	-9999	-9999	-9999	-9999		-9999	-9999
pH	8.54	7.02	6.96	7.21		5.57	5.84
Specific Conductance (MS/CM)	2.06	0.451	0.222	0.257		0.474	0.296
Temperature (C)	14.4	13.2	12.8	12.6		14.43	14.36
Turbidity (NTU)	14	19	75	19		3.83	11.1

NSWC CRANE
SUMMARY OF ANALYTIC RESULTS - SURFACE WATER ROUND 8
SWMU 13 (MINE FILL B)

SITE	MINE FILL B	MINE FILL B
AOC	GULLY	GULLY
SWMU	13	13
PHASE	08	08
LOCATION	13SW/SD22	13SW/SD30
SAMPLE	13SW2206	13SW3007
MATRIX	SW	SW
SACODE	NORMAL	NORMAL
SAMPLE DATE	20060522	20060522
Explosives (ug/L)		
1,3,5-Trinitrobenzene	0.25 U	0.25 U
1,3-Dinitrobenzene	0.25 U	0.25 U
2,4,6-Trinitrotoluene	0.25 U	0.25 U
2,4-Dinitrotoluene	0.25 U	0.25 U
2,6-Dinitrotoluene	0.25 U	0.25 U
2-Amino-4,6-Dinitrotoluene	0.25 U	0.25 U
2-Nitrotoluene	0.25 U	0.25 U
3-Nitrotoluene	0.25 U	0.25 U
4-Amino-2,6-Dinitrotoluene	0.25 U	0.25 U
4-Nitrotoluene	0.25 U	0.25 U
HMX	0.25 U	3.3
Nitrobenzene	0.25 U	0.25 U
RDX	0.78	5.8
Tetryl	0.25 U	0.25 U
Field Parameters		
Dissolved Oxygen (mg/L)	7.95	11.11
Oxidation Reduction Potential (mV)	-9999	-9999
pH	7.88	8.11
Specific Conductance (MS/CM)	0.406	0.371
Temperature (C)	13	14.1
Turbidity (NTU)	5.6	4.2

APPENDIX E

SWMU 13

POTENTIOMETRIC FIGURES

ROUND 7

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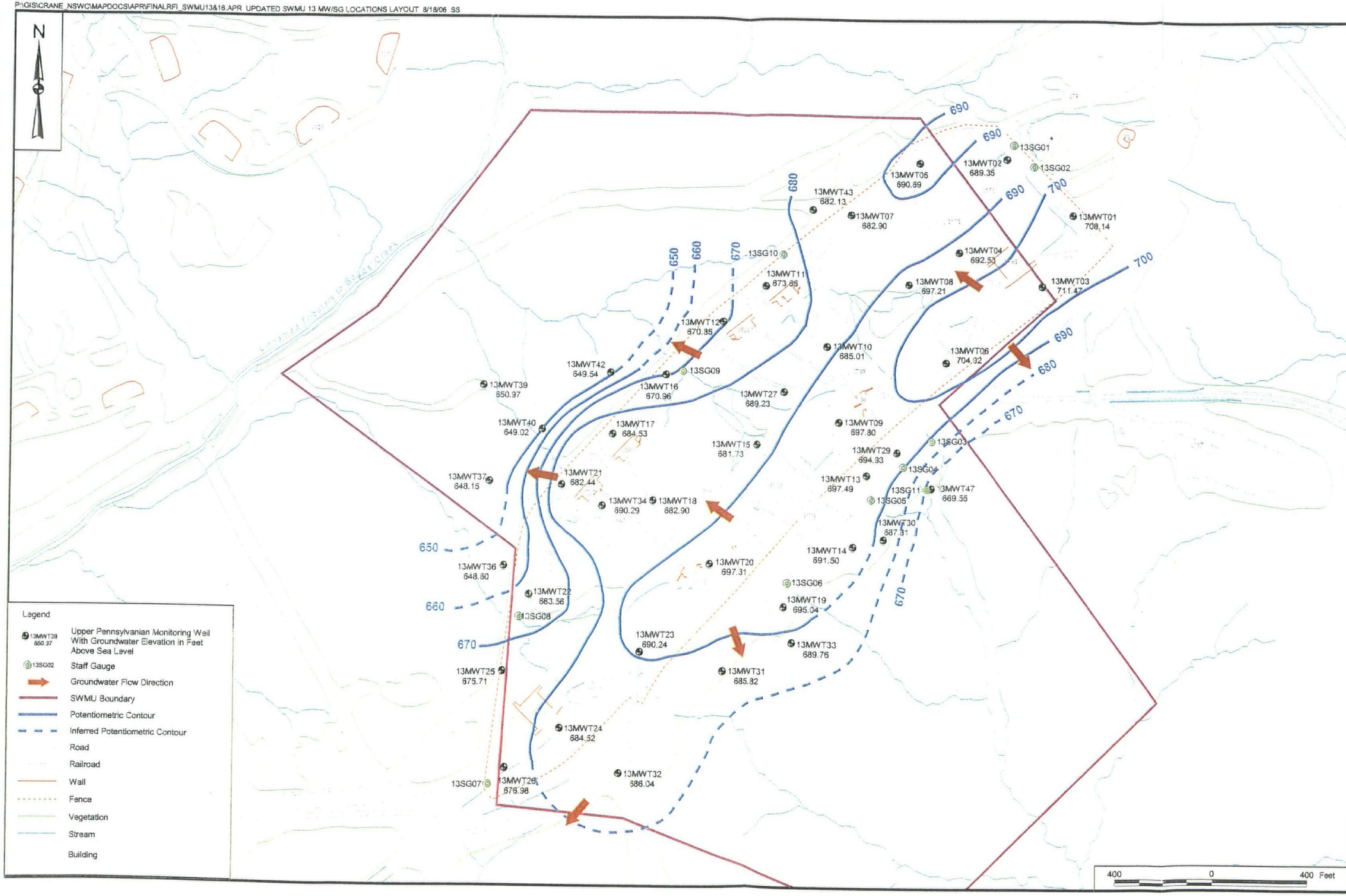

CONTRACT NO. CTO 0377

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO. FIGURE 4 - 1

REV 0

MONITORING WELL AND STAFF GAUGE LOCATION MAP
FOR THE UPPER PENNSYLVANIAN
WATER-BEARING ZONE - JANUARY 4, 2006
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY S. STROZ DATE 8/17/06

CHECKED BY J. LUCAS DATE 8/18/06

COST/SCHED-AREA

SCALE AS NOTED

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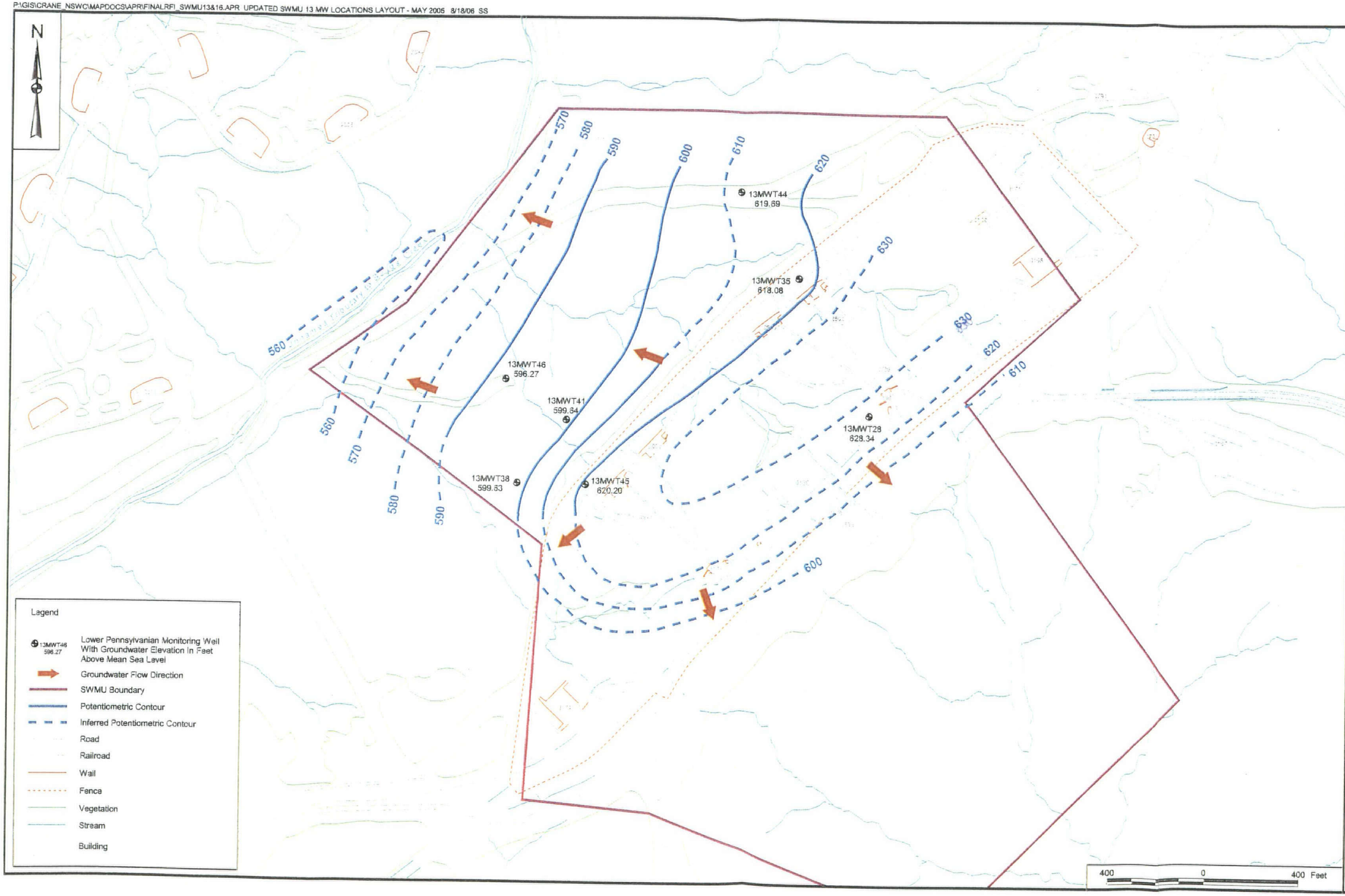

CONTRACT NO.
CTO 0377

APPROVED BY — DATE —

APPROVED BY — DATE —

DRAWING NO. FIGURE 4 - 2

REV 0

MONITORING WELL LOCATION MAP
FOR THE LOWER PENNSYLVANIAN
WATER-BEARING ZONE - JANUARY 4, 2006
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY S. STROZ — DATE 8/18/06

CHECKED BY J. LUCAS — DATE 8/18/06

COST/SCHED-AREA —

SCALE AS NOTED