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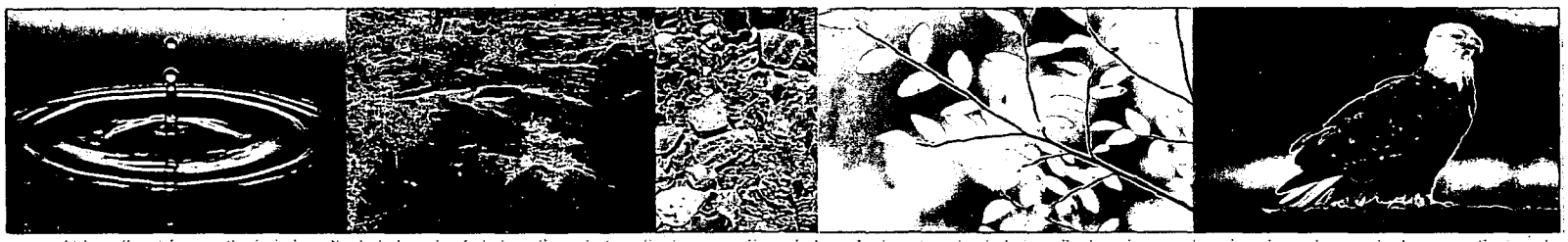

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Monitored Natural Attenuation Report
for
Mine Fill B (SWMU 13)

Rounds No. 5 and 6

Naval Surface Warfare Center Crane
Crane, Indiana

Contract Task Order 0377

April 2006

NAVFAC
Naval Facilities Engineering Command
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

TETRA TECH NUS, Inc.

REVISION 0
APRIL 2006

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

ROUNDS NO. 5 AND 6

NAVAL SURFACE WARFARE CENTER, CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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Southern Division
Naval Facilities Engineering Command
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North Charleston, South Carolina 29406

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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
NSWC	Naval Surface Warfare Center
ORP	oxidation reduction potential
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	polychlorinated biphenyls
Plz	Lower Pennsylvanian Water Bearing Zone
Puz	Upper Pennsylvania Water Bearing Zone (Puz)
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
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 12, 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

productions. Recently, 6 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], 2005). The results for Round 4 sampling have been provided in a separate report (TtNUS, 2005b).

The purpose of this report is to present the results of monitoring activities in Rounds 5 and 6, including field documentation, and to provide the framework for evaluation of data once all nine rounds have been completed. Field documentation associated with Rounds 5 and 6 is provided in Appendices A, B, and C of this report. Analytical results for Rounds 5 and 6 are presented in Appendix D. The final MNA report 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 5 and 6 field operations performed in 2005 for NSWC Crane SWMU 13.

2.1 OVERVIEW

RFI field activities were conducted in May 2005 (Round 5) and August 2005 (Round 6). All work performed was conducted in accordance with the procedures and methodologies described in the U.S. EPA-approved Quality Assurance Project Plan (QAPP) Addendum No. 2 to the approved QAPP (TtNUS, 2004). Standard operating procedures (SOPs) that governed the field work are included in Appendix C of Addendum No. 2 to the approved QAPP. Copies of all field forms, records, field logbooks, and health and safety documentation associated with the field investigations for Rounds 5 and 6 are provided in Appendices A through C of this document.

2.2 SAMPLING OPERATIONS

This section describes the methodology for groundwater, surface water, and sediment sampling activities that were performed at SWMU 13 during Rounds 5 and 6. Table 2-1 contains well construction information and water level/elevation data for Rounds 1 through 6. A listing of all SWMU 13 sample analytical fractions conducted for groundwater and surface water samples in Rounds 5 and 6 is provided in Table 2-2. Further discussion of the specific target analytes for each fraction in Rounds 5 and 6 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 Rounds 5 and 6.

2.2.1 Groundwater Purging and Sampling

During Rounds 5 and 6, the groundwater wells were sampled using 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 YSI Model 600 series 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 on low-flow purge data sheets and groundwater sample log sheets (see Appendix A.1.1 and A.1.2). See Figure 2-1 for all groundwater sampling locations.

Subsequent to the groundwater samples being collected during Round 6, it was decided that total organic carbon (TOC) analysis should also be completed on all samples. TOC was analyzed to assist in monitoring natural attenuation evaluation.

Round 5

All 17 proposed groundwater samples were collected at SWMU 13 during Round 5 (See Table 2-2). As in previous rounds, a minimum volume (1 liter instead of 2) was collected at monitoring well 13MWT28 due to very slow recharge of the well.

Round 6

All 17 proposed groundwater samples were collected at SWMU 13 during Round 6 (See Table 2-2).

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. Surface water samples were collected in accordance with Addendum No. 2 to the approved QAPP (TtNUS, 2004). All pertinent field data, including water quality parameters, sampling methods, and locations were recorded on a surface water sample log sheet (see Appendix A.1.2 and A.2.2). See Figure 2-2A for all surface water sampling locations.

Round 5

Seven of the eight proposed surface water samples were collected at SWMU 13 during Round 5 (See Table 2-2). Surface water sample 13SW1104 was not collected because the location was dry.

Round 6

Six of the eight proposed surface water samples were collected at SWMU 13 during Round 6 (See Table 2-2). Surface water samples 13SW1104 and 13SW2205 were not collected because both locations were dry.

2.2.3 Sediment Sampling

Based on recent results at SWMU 13 regarding potential ecological risk resulting from metals in sediment samples, U.S. EPA Region 5 commented that sediment samples should also be collected at a location of the nearest permanent aquatic habitat. Therefore, 10 additional sediment samples (13SD3601 to 13SD4501) were collected at SWMU 13 in Round 5 for metals analysis. No sediment samples were proposed for collection during Round 6. All pertinent field data, including sapling methods and locations were recorded on a sediment sample log sheet (see Appendix A.3.1). See Figure 2-2B for all sediment sampling locations. The results for these samples will be reported in an updated version of the SWMU 13 RFI.

2.3 QUALITY CONTROL SAMPLES

Quality assurance (QA)/quality control (QC) samples were generated and collected during sampling activities in Rounds 5 and 6 to monitor both field and laboratory procedures. These procedures for collecting these samples are detailed in the approved QAPP Addendum No. 2. QA/QC samples included field duplicates, equipment rinsate blanks, source water blanks, and temperature blanks. Field duplicate results are tabulated in Appendix D (Analytical Data) of this document.

2.4 WATER LEVEL MEASUREMENTS

2.4.1 Groundwater Level Measurements

A complete synoptic round of water levels for all SMWU 13 groundwater wells was taken in Rounds 5 and 6. The synoptic water level measurements were obtained within a 24 to 48 hour time period. Measurements were taken with an electrical water level indicator (M-scope), using the top of the riser pipe

as the reference point to determine water depth for monitoring wells and using a surveyed mark for staff gauge measurements. All measurements were taken in accordance with the specific SOP contained in the QAPP Addendum. A mark was placed at the top of the riser pipe to ensure that measurements were taken from a consistent reference point. Water level measurements and staff gauge measurements were recorded to the nearest 0.01 foot on groundwater level measurement forms, which are provided in Appendix A.5 and A.5.2 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 5 AND 6
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Installation Date	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Top of Riser Elevation (feet amsl)	Total Depth[1] (feet bgs)	Screened Interval				Water-Bearing Zone	May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005	
							Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
MONITORING WELLS																							
13MWT01	3/30/2003	1310541.57	3025015.94	713.10	715.34	15.00	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
13MWT02	3/29/2003	1310776.56	3024743.55	702.10	704.72	27.00	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
13MWT03	3/30/2003	1310240.95	3024891.66	718.34	721.10	15.00	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
13MWT04	3/30/2003	1310383.40	3024546.11	704.37	706.84	15.00	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
13MWT05	3/29/2003	1310758.93	3024380.03	693.61	696.44	16.00	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
13MWT06	4/7/2003	1309916.18	3024495.27	715.30	717.93	15.00	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
13MWT07	3/29/2003	1310539.32	3024094.13	684.38	687.22	15.00	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
13MWT08	3/30/2003	1310247.86	3024337.56	698.42	700.56	15.00	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
13MWT09	4/1/2003	1309662.07	3024049.03	703.29	705.90	20.00	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
13MWT10	3/27/2003	1309979.69	3024001.26	697.77	700.15	25.00	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
13MWT11	3/28/2003	1310233.72	3023750.09	679.76	682.29	15.00	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
13MWT12	3/27/2003	1310080.21	3023574.95	679.96	682.12	20.00	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
13MWT13	4/23/2003	1309441.27	3024163.61	699.28	701.98	19.00	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
13MWT14	3/31/2003	1309142.23	3024110.17	703.15	705.50	23.00	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
13MWT15	3/25/2003	1309565.52	3023717.80	694.27	696.65	25.00	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
13MWT16	3/27/2003	1309854.28	3023341.92	682.13	684.35	15.00	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
13MWT17	3/26/2003	1309605.27	3023123.97	690.68	693.01	18.00	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
13MWT18	3/26/2003	1309326.98	3023293.42	700.05	702.92	30.00	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
13MWT19	3/31/2003	1308893.97	3023834.57	703.10	705.82	19.00	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
13MWT20	4/1/2003	1309066.76	3023527.23	699.33	702.07	20.00	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
13MWT21	3/28/2003	1309391.01	3022916.22	688.37	690.74	15.00	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
13MWT22	3/28/2003	1308936.34	3022785.67	669.53	671.96	15.00	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
13MWT23	4/1/2003	1308708.02	3023245.12	696.66	699.14	22.00	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
13MWT24	4/1/2003	1308397.23	3022916.48	691.33	693.93	22.00	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
13MWT25	3/28/2003	1308625.62	3022677.44	678.87	681.57	15.00	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
13MWT26	3/28/2003	1308232.69	3022690.14	684.86	687.49	20.00	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
13MWT27	11/5/2003	1309786.55	3023829.07	696.09	698.13	21.00	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

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 5 AND 6
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Installation Date	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Top of Riser Elevation (feet amsl)	Total Depth[1] (feet bgs)	Screened Interval				Water-Bearing Zone	May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005	
							Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
13MWT28	11/19/2003	1309678.62	3024066.67	703.54	705.55	88.00	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
13MWT29	11/4/2003	1309538.75	3024290.72	698.10	700.44	20.00	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
13MWT30	11/6/2003	1309174.84	3024237.45	696.57	698.94	25.00	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
13MWT31	11/5/2003	1308631.83	3023583.85	693.56	696.21	20.00	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
13MWT32	10/29/2003	1308214.11	3023162.00	693.62	696.04	25.00	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
13MWT33	11/6/2003	1308749.27	3023868.77	700.14	701.97	20.00	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
13MWT34	11/11/2003	1309304.31	3023084.25	693.35	695.93	20.50	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
13MWT35	11/19/2003	1310254.91	3023773.29	679.51	681.73	69.00	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
13MWT36	11/5/2003	1309053.39	3022677.86	664.91	667.21	26.00	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
13MWT37	10/24/2003	1309402.93	3022617.27	659.96	662.29	25.00	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
13MWT38	11/4/2003	1309376.76	3022619.53	659.03	661.04	80.00	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
13MWT39	11/4/2003	1309804.48	3022589.03	652.42	654.44	25.00	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
13MWT40	10/23/2003	1309622.33	3022833.33	664.93	667.18	25.50	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
13MWT41	11/10/2003	1309645.20	3022819.00	663.65	665.67	66.00	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
13MWT42	10/22/2003	1309862.28	3023113.22	668.05	670.31	25.00	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
13MWT43	11/6/2003	1310558.56	3023939.45	688.88	690.90	21.00	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
13MWT44	11/10/2003	1310621.14	3023530.33	682.11	683.82	88.00	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
13MWT45	11/10/2003	1309373.68	3022901.38	688.76	690.59	84.00	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
13MWT46	11/22/2003	1309812.02	3022565.94	651.64	653.61	68.00	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
13MWT47	11/20/2003	1309389.47	3024437.45	675.41	677.23	21.00	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
13MWT48	7/28/2004	1309618.82	3021409.02	546.20	548.67	10.50	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
13MWT49	7/27/2004	1309795.96	3021713.21	551.05	553.90	9.50	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
13MWT50	7/27/2004	1310002.40	3022085.22	557.77	560.49	26.00	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
13MWT51	7/27/2004	1310206.30	3022381.03	569.28	571.36	16.00	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

STAFF GAUGES

13SG01	3/29/2003	1310836.89	3024771.44	698.35	NA	NA	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
13SG02	3/29/2003	1310746.57	3024854.37	701.95	NA	NA	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
13SG03	3/29/2003	1309585.70	3024436.89	696.24	NA	NA	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

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 5 AND 6
NSWC CRANE
CRANE, INDIANA

Well or Gauge Number	Installation Date	Northing (feet)	Easting (feet)	Ground Elevation (feet amsl)	Top of Riser Elevation (feet amsl)	Total Depth[1] (feet bgs)	Screened Interval				Water-Bearing Zone	May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005	
							Top (feet bgs)	Bottom (feet bgs)	Top (feet amsl)	Bottom (feet amsl)		Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
13SG04	3/29/2003	1309478.26	3024317.86	688.99	NA	NA	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
13SG05	3/29/2003	1309341.46	3024185.40	692.94	NA	NA	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
13SG06	3/29/2003	1308991.98	3023849.68	704.88	NA	NA	NA	NA	NA	NA	(3)	NA	NA	2.37	702.51	2.35	702.53	2.35	702.53	Dry	NA	Dry	NA
13SG07	3/29/2003	1308164.25	3022622.07	680.30	NA	NA	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
13SG08	3/29/2003	1308846.74	3022744.78	665.95	NA	NA	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
13SG09	3/29/2003	1309868.61	3023412.15	675.30	NA	NA	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
13SG10	3/29/2003	1310366.98	3023821.25	676.10	NA	NA	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
13SG11	1/19/2004	1309388.01	3024416.84	675.36	NA	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	2.74	672.62	2.30	673.06	2.51	672.85	Dry	NA
13SG12	10/19/2004	1312371.18	3022662.06	595.28	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	6.87	588.41	6.85	588.43	Dry	NA
13SG13	10/19/2004	1311077.60	3022704.86	572.52	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	5.87	566.65	6.06	566.46	Dry	NA
13SG14	10/19/2004	1310424.91	3022481.79	567.75	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	6.37	561.38	6.41	561.34	Dry	NA
13SG15	10/19/2004	1309660.62	3021524.54	544.18	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	9.97	534.21	5.24	538.94	Washed Away[4]	NA
13SG16	10/19/2004	1309270.46	3021074.88	537.01	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	Dry	Na	Dry	NA	Dry	NA
13SG17	10/19/2004	1309034.25	3020747.93	532.48	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	Dry	Na	Dry	NA	Dry	NA
13SG18	10/19/2004	1308276.51	3019633.62	524.23	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NA	NA	8.16	516.07	8.19	516.04	Dry	NA

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.
4 = Staff gauge washed away due to construction of water line in vicinity.
bgs = Below ground surface.
btor = Below top of riser/reference point.
amsl = Above mean sea level (NAVD88).
NA = Not applicable.
NAVD88 = North American Vertical Datum of 1988.
Puz = Upper Pennsylvanian water-bearing zone.
Plz = Lower Pennsylvanian water-bearing zone.

TABLE 2-2

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 13 - MINE FILL B
ROUNDS 5 AND 6
NSWC CRANE
CRANE, INDIANA

Sample Number	Analytical Fraction					Reasoning Why Sample Was Not Collected
	Explosives		Miscellaneous	Metals	Misc	
	Nitroaromatics and Nitramines SW-846 8330	RDX Degradation Products SW-846 8330, Modified	Nitrate + Nitrite (as N) EPA 353.2	Metals (except Mercury) SW-846-6020	Total Organic Carbon SW-846-9060	
Groundwater (Round 5)						
13GWT0105	X					
13GWT0906	X					
13GWT1105	X					
13GWT1305	X					
13GWT1405	X					
13GWT1505	X					
13GWT1705	X					
13GWT2105	X					
13GWT2804	X					
13GWT3104	X					
13GWT3404	X					
13GWT3704	X					
13GWT4004	X					
13GWT4504	X					
13GWT4604	X					
13GWT4704	X					
13GWT5103	X					
GW TOTALS	**17**	**0**	**0**	**0**	**0**	**0**
Groundwater (Round 6)						
13GWT0106	X	X	X		X	
13GWT0907	X	X	X		X	
13GWT1106	X	X	X		X	
13GWT1306	X	X	X		X	
13GWT1406	X	X	X		X	
13GWT1506	X	X	X		X	
13GWT1706	X	X	X		X	
13GWT2106	X	X	X		X	
13GWT2805	X	X	X		X	
13GWT3105	X	X	X		X	
13GWT3405	X	X	X		X	
13GWT3705	X	X	X		X	
13GWT4005	X	X	X		X	
13GWT4505	X	X	X		X	
13GWT4605	X	X	X		X	
13GWT4705	X	X	X		X	
13GWT5104	X	X	X		X	
GW TOTALS	**17**	**17**	**17**	**0**	**17**	

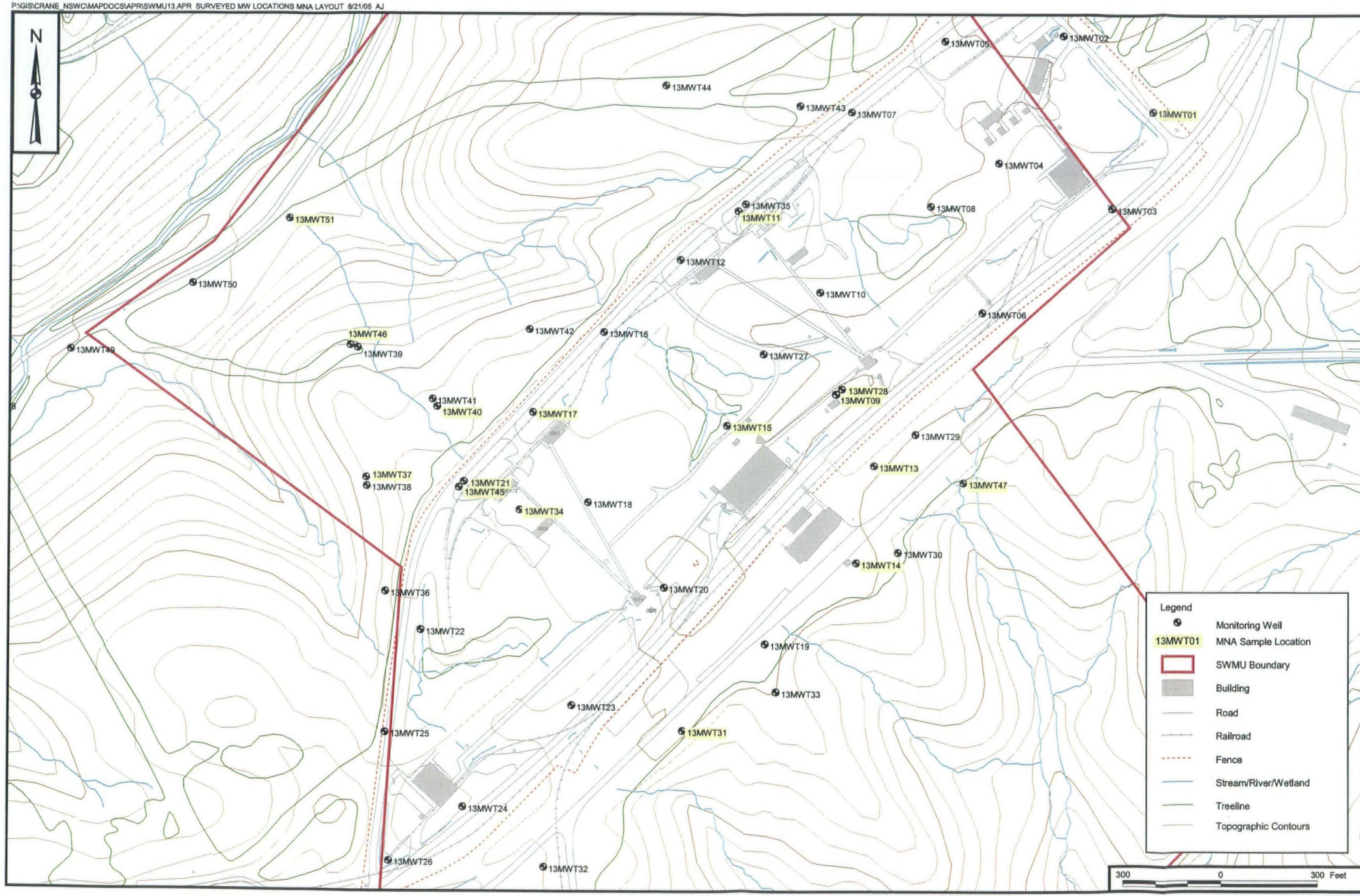
TABLE 2-2

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 13 - MINE FILL B
ROUNDS 5 AND 6
NSWC CRANE
CRANE, INDIANA

Sample Number	Analytical Fraction					Reasoning Why Sample Was Not Collected
	Explosives		Miscellaneous	Metals	Misc	
	Nitroaromatics and Nitramines SW-846 8330	RDX Degradation Products SW-846 8330, Modified	Nitrate + Nitrite (as N) EPA 353.2	Metals (except Mercury) SW-846-6020	Total Organic Carbon SW-846-9060	
Surface Water (Round 5)						
13SW1104	O					Dry
13SW1404	X					
13SW1504	X					
13SW1604	X					
13SW1903	X					
13SW2003	X					
13SW2204	X					
13SW3004	X					
SW TOTALS	**7**	**0**	**0**	**0**	**0**	
Surface Water (Round 6)						
13SW1104	O					Dry
13SW1405	X					
13SW1505	X					
13SW1605	X					
13SW1904	X					
13SW2004	X					
13SW2205	O					Dry
13SW3005	X					
SW TOTALS	**6**	**0**	**0**	**0**	**0**	
Sediment (Round 5)						
13SD3601				X		
13SD3701				X		
13SD3801				X		
13SD3901				X		
13SD4001				X		
13SD4101				X		
13SD4201				X		
13SD4301				X		
13SD4401				X		
13SD4501				X		
SD TOTALS	**0**	**0**	**0**	**10**	**0**	

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

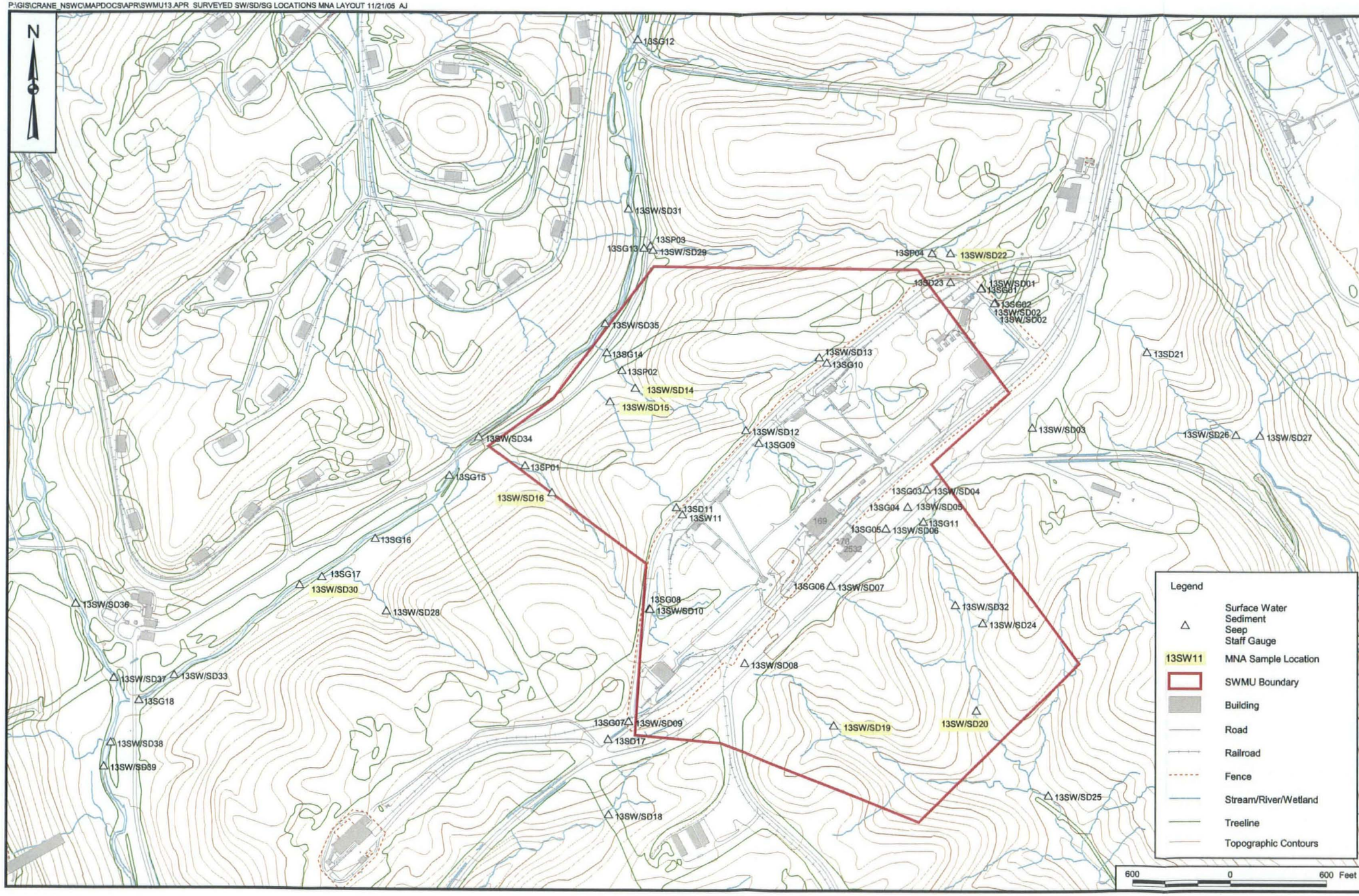
DRAWN BY C. FOSTER DATE 12/29/04

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 11/21/05 AJ



CONTRACT NO.
CTO 0377

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 2 - 2A

REV 0

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

NAVFAC

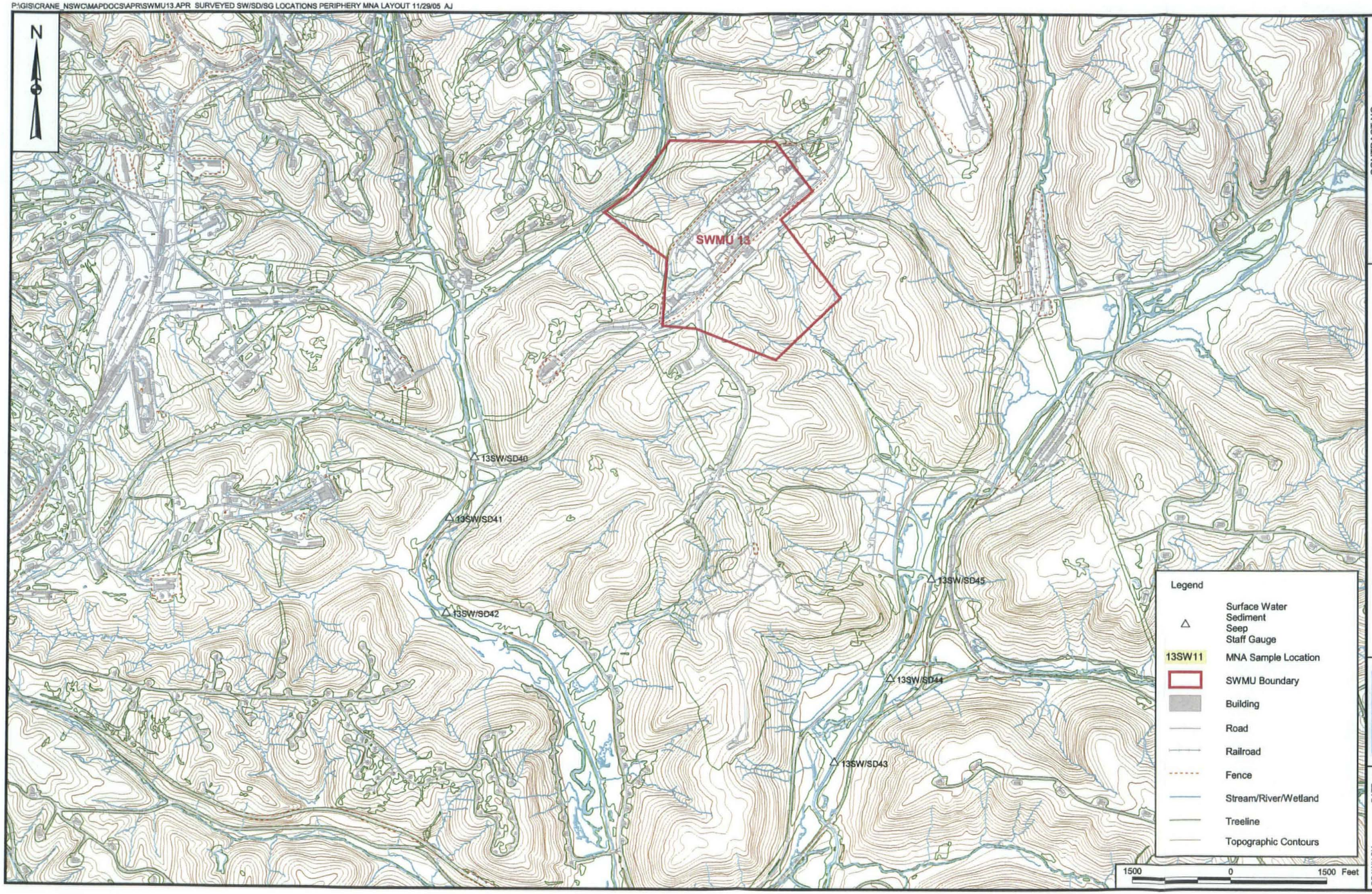
DRAWN BY A. JANOCHA DATE 11/17/05

CHECKED BY J. GOERDT DATE 11/21/05

COST/SCHED-AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU13.APR SURVEYED SW/SD/SG LOCATIONS PERIPHERY MNA LAYOUT 11/29/05 AJ



CONTRACT NO.
CTO 0377

APPROVED BY DATE

APPROVED BY DATE

DRAWING NO. FIGURE 2 - 2B REV 0

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

NAVFAC

DRAWN BY A. JANOCHA DATE 11/21/05

CHECKED BY J. LUCAS DATE 11/29/05

COST/SCHED-AREA

SCALE AS NOTED

3.0 DATA PRESENTATION

This section presents the analytical results for groundwater and surface water sampling conducted in Rounds 5 and 6 at SMWU 13 (see Tables 3-1 to 3-5). The analytical results for Rounds 1 through 4 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 Rounds 5 and 6.

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 water. 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 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 6 in the Upper and Lower Pennsylvanian Water Bearing Zones, respectively. Both tables show summary listings of concentrations for explosives, explosive degradation products, and miscellaneous field parameters. Concentrations are presented in micrograms per liter (µg/L) along with data validation qualifiers, as applicable. Due to the staggered nature of the groundwater sampling, not all wells were sampled in each of the six rounds of sampling.

3.1.1 Upper Pennsylvanian Water Bearing Zone (Puz)

Analytical results for Round 5 and 6 sampling at the Pennsylvanian Upper Water Bearing Zone (Puz) wells are presented in Table 3-1. A summary of descriptive statistics for Rounds 5 and 6 are shown in Tables 3-2 and 3-3, respectively. A discussion of analytical results for each round is presented below.

Round 5

In Round 5, explosives and degradation products were detected at wells 13MWT11, 13MWT34, 13MWT37, and 13MWT40. Only explosives were detected at 13MWT01, 13MWT09, 13MWT13, 13MWT14, 13MWT17, 13MWT21, 13MWT31, and 13MWT51. The most frequently detected explosive in Round 5 was RDX, followed by HMX. No explosives or degradation products were detected at 13MWT15 or 13MWT47, which are upgradient and downgradient, respectively, of the RDX plume.

The highest concentrations of RDX were reported at wells 13MWT21 (4,200 µg/L), 13MWT37 (2,100 µg/L), and 13MWT09 (1,300 µg/L). The highest concentrations of HMX were reported at wells 13MWT21 (430 µg/L), 13MWT37 (160 µg/L), and 13MWT09 (90 µg/L). There was no analysis for RDX degradation products in Round 5.

In addition to RDX and HMX, several additional energetic compounds were detected in Round 5 including 1,3,5-trinitrobenzene, 1,3 dinitrobenzene, 2,4,6-trinitrotoluene, 2,6 dinitrotoluene, 3,5-dinitroaniline, 3-nitrotoluene, 2,4-dintrotoluene, 2-amino-4,6-dinitrotoluene, 2-amino-4,6-dinitrotoluene, and 4-amino-2,6-dintrotoluene. One or more of these explosives were detected at wells 13MWT09, 13MWT11, 13MWT21, 13MWT37, 13MWT40, and 13MWT51.

Round 6

In Round 6, explosives and degradation products were detected at wells 13MWT09, 13MWT11, 13MWT17, 13MWT34, 13MWT37, 13MWT40, and 13MWT51. Only explosives were detected at 13MWT01, 13MWT13, 13MWT14, 13MWT21, and 13MWT31. The most frequently detected explosives in Round 6 were RDX and HMX. No explosives or degradation products were detected at 13MWT15 or 13MWT47.

The highest concentrations of RDX were reported at wells 13MWT21 (4,500 µg/L), 13MWT37 (2,300 µg/L), and 13MWT09 (1,400 µg/L). The highest concentrations of HMX were reported at wells 13MWT21 (560 µg/L), 13MWT37 (160 µg/L), and 13MWT09 (110 µg/L). MNX was detected at wells 13MWT11 (0.75 µg/L), 13MWT17 (6.5 µg/L), 13MWT34 (2.8 µg/L), and 13MWT37 (7.8 µg/L). DNX was detected at RDX degradation products were detected at wells 13MWT17 (0.44 µg/L), 13MWT37 (0.41 µg/L), 13MWT40 (0.33 µg/L), and 13MWT51 (86 µg/L).

Several additional energetic compounds were detected in Round 6 including 1,3,5-trinitrobenzene, 1,3 dinitrobenzene, 2,4,6-trinitrotoluene, 2,6-dinitrotoluene, 3,5-dinitroaniline, 2,4-dintrotoluene, 2-amino-4,6-

dinitrotoluene, and 4-amino-2,6-dintrotoluene. One or more of these explosives were detected at wells 13MWT09, 13MWT11, 13MWT21, 13MWT37, 13MWT40, and 13MWT51.

3.1.2 Lower Pennsylvanian Water Bearing Zone (Plz)

Analytical results for Round 5 and 6 sampling in the Lower Pennsylvanian Water Bearing Zone (Plz) wells are presented in Table 3-4. A summary of descriptive statistics for Rounds 5 and 6 are shown in Tables 3-5 and 3-6, respectively. A discussion of analytical results for each round is presented below.

Round 5

In Round 5, there were no positive detections of explosives or degradation products.

Round 6

In Round 6, there were no positive detections of explosives or degradation products.

3.2 SURFACE WATER DATA

Analytical results for Round 5 and 6 surface water sampling is are presented in Table 3-7. A summary of descriptive statistics for Rounds 5 and 6 are shown in Tables 3-8 and 3-9, respectively. A discussion of analytical results for each round is presented below.

Round 5

In Round 5, only explosives were detected at wells 13SW14, 13SW15, 13SW16, 13SW19, 13SW22, and 13SW30. No explosives were detected at 13SW20. There was no analysis for RDX degradation products in Round 5.

The most frequently detected explosive in Round 5 was RDX, followed by HMX. Surface water concentrations of RDX ranged from 0.33 µg/L at 13SW22 to 100 µg/L at 13SW15. HMX was detected at five locations with concentrations ranging from 0.51 µg/L at 13SW19 to 60 µg/L at 13SW15.

In addition to RDX and HMX, two additional energetic compounds were detected in Round 5 and included 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dintrotoluene. These compounds were detected at 13SW14, 13SW15, and 13SW16.

Round 6

In Round , only explosives were detected at wells 13SW14, 13SW15, 13SW16, and 13SW30. No explosives were detected at 13SW19 and 13SW20. There was no analysis for RDX degradation products in Round 6.

The most frequently detected explosive in Round 5 was RDX, followed by HMX. Surface water concentrations of RDX ranged from 5.3 µg/L at 13SW30 to 200 µg/L at 13SW15. HMX was detected at four locations with concentrations ranging from 2.4 µg/L at 13SW30 to 47 µg/L at 13SW15.

In addition to RDX and HMX, two additional energetic compounds were detected in Round 6 and included 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dintrotoluene. These compounds were only detected at 13SW14 and 13SW16.

TABLE 3-1
SWMU 13 MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS THROUGH ROUND 6
IN THE UPPER PENNSYLVANIA WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Location	13MWT01						13MWT09							13MWT11					
Round	1	2	3	4	5	6	1		2	3	4	5	6	1	2	3	4	5	6
Date	4/26/2003	11/23/2003	8/1/2004	1/23/2005	5/3/2005	8/15/2005	4/28/2003	5/9/2003	12/4/2003	7/31/2004	2/1/2005	5/3/2005	8/27/2005	4/27/2003	11/20/2003	7/23/2004	1/23/2005	5/4/2005	8/11/2005
Parameter																			
Energetics																			
1,3,5-TRINITROBENZENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.215 U		1.3	1.1	0.94	0.94	1.2	0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U
1,3-DINITROBENZENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	1.4 J		2.4	2.1	2.2	2.1	2.2	0.83 J	0.258 U	0.46 J	1.2	0.248 U	0.55
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.526 U							0.505 U						0.515 U				
2,4,6-TRINITROTOLUENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	19		25	24	22	21	23	31	9.5	11	44	47	16
2,4-DIAMINO-6-NITROTOLUENE		0.263 U		0.264 U		0.27 U			3.9		2.5 R		2.6 R		1.4 J		1.6 R		0.77 J
2,4-DINITROTOLUENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.215 U		0.253 U	1.4 J	0.25 U	0.288 U	0.26 U	0.43 U	1.2	1.6	4	4.3	1.9
2,6-DIAMINO-4-NITROTOLUENE		0.263 U		0.264 U		0.27 U			0.253 U		0.25 U		0.26 U		1.8 J		0.269 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	0.215 U		9.9	8.8 J	0.25 U	8.3	8.9	0.43 U	1.2 J	2.1 J	5.7 J	6.5	3.2
2-AMINO-4,6-DINITROTOLUENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	8.6 J		13	15 J	13 J	15	18 J	6 J	4.4 J	6.6 J	12 J	20	11 J
2-NITROTOLUENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U
3,5-DINITROANILINE		0.263 U		0.264 U		0.27 U			0.253 U		2.2 J		2.1 J		0.258 U		0.269 U		0.26 U
3-NITROTOLUENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.43 U	0.258 U	0.58 J	0.45 R	0.47 J	0.26 U
4,4'-TN-AZOXY				0.528 U		0.54 U					0.5 U		0.52 U				0.538 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	18		18	19	18	17	19	19	9.8	14	27	29	18
4-NITROTOLUENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U
DNX		0.263 U		0.264 U		0.27 U			4 J		0.27 R		0.27 R		0.258 U		0.269 U		0.26 U
HMX	1	1	1.3	0.88	0.84	1	84		130	140	99	91	110	34	44	45	68	70	66
MNX		0.263 U		0.264 U		0.27 U			7.1 J		4.2		2.8 J		1.2		0.74 J		0.75 J
NITROBENZENE	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U
RDX	0.44 U	0.35 J	0.3 J	0.37 J	0.278 U	0.27 U	1100		1700	1500	1200	1300	1400	560	520	490	830	830	620
TETRYL	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.215 U		0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U
TNX		0.263 U		0.264 U		0.27 U			1.5 J		1.3 J		0.26 U		0.258 U		0.269 U		0.26 U
Field Parameters																			
DISSOLVED OXYGEN			4.2	0.81					1.5	0.2	0.74				1.5	4.95	0.71		
ALKALINITY									0						10 U				
CARBON DIOXIDE									48						165				
DISSOLVED OXYGEN - METER	1.28	1.4			0.96	0.73	1.69	1.21	1.14			1.5	0.065	0.85	3.49			0.73	0.39
OXIDATION REDUCTION POTENTIAL	220	385.4	461.2	295	403.8		205.6	148	251	88.1	29.9	250.1		265	355	127	284	401	
PH	4.68	4.17	3.57	3.98	4.45	3.56	5.36	5.38	5.32	6.27	5.49	5.29	4.73	3.64	3.93	3.85	3.8	3.2	4.09
SPECIFIC CONDUCTANCE	0.229	0.233	0.255	0.192	0.17	188	0.829	0.725	0.64	0.773	0.57	0.576	0.427	0.251	0.238	0.262	0.222	0.224	0.253
TEMPERATURE	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	15.73	16.35	21.2	10.8	15.27	23
TURBIDITY	3.8	4.39	9.5	3	1	0.73	3	0.1	4.07	3.8	1.6	0.15	1.1	10	4.52	2.5	10	6.1	6.3
Miscellaneous Parameters																			
AMMONIA-N	0.01 U	0.005 UJ					3.3		3.4					0.1	0.1 J				
NITRITE/NITRATE-N	0.07	0.15 J		0.1 J		0.025 U	92		54 J		77 J			0.02 U	0.19 J		0.1 J		0.025 U
TOTAL ORGANIC CARBON						1 U													1.7

TABLE 3-1
SWMU 13 MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS THROUGH ROUND 6
IN THE UPPER PENNSYLVANIA WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Location	13MWT13						13MWT14						13MWT15					
Round	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Date	5/7/2003	11/25/2003	8/1/2004	2/2/2005	5/5/2005	8/15/2005	4/29/2003	11/24/2003	7/27/2004	1/25/2005	5/5/2005	8/16/2005	5/6/2003	11/25/2003	7/29/2004	2/3/2005	5/5/2005	8/11/2005
Parameter																		
Energetics																		
1,3,5-TRINITROBENZENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
1,3-DINITROBENZENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.515 U						0.5 U						0.515 U				
2,4,6-TRINITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
2,4-DIAMINO-6-NITROTOLUENE		0.258 U		0.245 U		0.26 U		0.25 U		0.242 U		0.24 U		0.258 U		0.238 U		0.27 U
2,4-DINITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
2,6-DIAMINO-4-NITROTOLUENE		0.258 U		0.245 U		0.26 U		0.25 U		0.242 U		0.24 U		0.258 U		0.238 U		0.27 U
2,6-DINITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
2-AMINO-4,6-DINITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
2-NITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
3,5-DINITROANILINE		0.258 U		0.245 U		0.26 U		0.25 U		0.242 U		0.24 U		0.258 U		0.238 U		0.27 U
3-NITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
4,4'-TN-AZOXY				0.49 U		0.52 U				0.485 U		0.48 U				0.475 U		0.53 U
4-AMINO-2,6-DINITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
4-NITROTOLUENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
DNX		0.258 U		0.245 U		0.26 U		0.25 U		0.242 U		0.24 U		0.258 U		0.238 U		0.27 U
HMX	9.5	12	12	8.4	8.8	11	0.345 U	0.89 J	0.34 J	0.54 J	0.38 J	0.52	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
MNX		0.258 U		0.245 U		0.26 U		0.25 U		0.242 U		0.24 U		0.258 U		0.238 U		0.27 U
NITROBENZENE	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
RDX	12	20	17	18	15	21	1.6	4.7	2	2.8	2.2	2.7	0.46 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
TETRYL	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U
TNX		0.258 U		0.245 U		0.26 U		0.25 U		0.242 U		0.24 U		0.258 U		0.238 U		0.27 U
Field Parameters																		
DISSOLVED OXYGEN		11	0.73	5.31					6.74	0.91				0.07	0.53	1.57		
ALKALINITY		10 U												10 U				
CARBON DIOXIDE		120												137				
DISSOLVED OXYGEN - METER	3.37	3.26			3.67	3.3	1.2	0.52			1.69	0.54	0.53	7.79			1	0.91
OXIDATION REDUCTION POTENTIAL	268.2	385.1	132	392.7	421.6		23.2	100.5	71	62.4	134.8		286.8	322	6.85	373.3	401	
PH	4.2	3.56	4.31	3.94	4.52	3.58	5.5	5.48	6.86	5.58	5.84	5.48	3.74	3.98	3.26	3.65	3.02	3.14
SPECIFIC CONDUCTANCE	0.106	0.113	0.131	1.01	0.085	97	0.885	0.623	0.714	0.595	0.704	586	0.391	0.34	0.352	0.314	0.313	0.309
TEMPERATURE	13.82	12.33	20.61	9.87	13.3	19.47	14.34	10.77	17.41	14.39	15.29	19.15	15.89	12.28	15.66	13.29	13.95	18.4
TURBIDITY	5.8	0.38	0.7	7.2	1	0	1.6	0	3	3.3	2.6	0.8	7.3	45.4	10	8.31	15	4.4
Miscellaneous Parameters																		
AMMONIA-N	0.03	0.01					0.08	0.06 J					1	1.3				
NITRITE/NITRATE-N	1.1	1 J		1.1 J		0.025 U	0.13	0.05 J		0.025 UJ		0.025 U	0.02 U	0.05 U		0.025 U		0.025 U
TOTAL ORGANIC CARBON						1 U						4.2		1.1				1.1

TABLE 3-1
SWMU 13 MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS THROUGH ROUND 6
IN THE UPPER PENNSYLVANIA WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Location	13MWT17						13MWT21						13MWT31					
Round	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Date	5/7/2003	11/5/2003	7/29/2004	1/23/2005	5/4/2005	8/11/2005	4/25/2003	11/5/2003	7/28/2004	1/22/2005	5/4/2005	8/10/2005	No Data	11/24/2003	7/26/2004	2/1/2005	5/5/2005	8/29/2005
Parameter																		
Energetics																		
1,3,5-TRINITROBENZENE	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.28 U	1.3 J	0.4 J	0.36 J	0.41 J	0.47 J		0.291 U	0.27 U	0.242 U	0.248 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	0.28 U	1.8 J	0.8	0.78	0.26 U	0.96		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.5 U						0.481 U						0.581 U				
2,4,6-TRINITROTOLUENE	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	26 J	69 J	26	24	29	30		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
2,4-DIAMINO-6-NITROTOLUENE		0.25 U		0.248 U		0.26 U		0.77 J		0.29 R		0.3 J		0.291 U		0.242 U		0.25 U
2,4-DINITROTOLUENE	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.28 U	1.4 J	0.65 J	0.238 U	0.26 U	0.28 U		0.291 U	0.27 U	0.242 U	0.248 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		0.291 U		0.242 U		0.25 U
2,6-DINITROTOLUENE	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.28 U	5.8 J	2.8	2.6 J	2.9	2.8		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE	0.43 U	0.28 J	0.37 J	0.27 J	0.271 U	0.31 J	0.28 U	0.24 UJ	3.8 J	1.9 J	0.26 U	8.1 J		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
2-NITROTOLUENE	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.28 U	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U		0.291 U	0.37 J	0.242 U	0.248 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		0.291 U		0.242 U		0.25 U
3-NITROTOLUENE	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.28 U	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
4,4'-TN-AZOXY				0.495 U		0.51 U				0.475 U		0.56 U				0.485 U		0.5 U
4-AMINO-2,6-DINITROTOLUENE	0.6 J	0.71	0.84	0.54	0.44 J	0.56	0.28 U	0.24 U	2.9 J	3.2	3 J	5		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
4-NITROTOLUENE	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.5 J	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
DNX		2.2 J		0.41 J		0.44 J		50 J		0.238 U		0.28 U		0.291 U		0.242 U		0.25 U
HMX	92 J	140	120	100	80	110	390	640	460	410	430	560		4.5	8.1	7.5	7.5	7.9
MNX		11		6.2		6.5		9.3 J		3.3 R		0.28 U		0.291 U		0.242 U		0.25 U
NITROBENZENE	0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.28 U	0.24 U	0.24 U	0.238 U	0.26 U	0.28 U		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
RDX	430	580	490	480	390	560	2700	7700	4000	3200	4500	4200		9.3	22	19	18	14
TETRYL	0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.28 U	0.24 U	0.24 U	0.238 U	0.26 U	0.28 U		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U
TNX		1.2		0.248 U		0.3 J		1.4 J		0.238 U		0.28 U		0.291 U		0.242 U		0.25 U
Field Parameters																		
DISSOLVED OXYGEN	y	0.9	2.01	0.35				1	2.94	1.56					23.4	1.52		
ALKALINITY		10 U						10 U										
CARBON DIOXIDE		170						125										
DISSOLVED OXYGEN - METER	0.53	0.84			0.18	0.96	1.45	2.09			0.42	0.65		5.66			2.39	0.98
OXIDATION REDUCTION POTENTIAL	112	338	129.4	4	289.6		193.6	247.2	107.3	56.1	283.7			246.7	518.6	51.9	271.8	
PH	5.35	5.38	5.28	5.4	5.16	4.43	5.46	5.59	7.32	5.71	5.42	5		5.67	5.39	5.42	5.74	5.5 U
SPECIFIC CONDUCTANCE	0.17	0.153	0.159	0.118	0.135	0.233	0.212	0.195	0.298	0.148	0.176	171		0.793	1.444	1228	1.119	0.749
TEMPERATURE	15.7	15.97	18.57	11.51	13.52	21.81	13.01	15.17	20.07	9.15	13.1	22.3		10.09	15.98	11.08	13.77	19.09
TURBIDITY	10	3.74	4.1	15	0.4	0	8.2	2.61	4	4	2.8	4.2		4.69	6.1	5.2	3.4	4.4
Miscellaneous Parameters																		
AMMONIA-N	0.01	0.005 U					0.05	0.02						0.005 UJ				
NITRITE/NITRATE-N	0.86	0.65		1.7 J		0.22	0.64	1.2		0.81 J		0.45		0.13 J		0.06 J		
TOTAL ORGANIC CARBON						3.4						2.3						

TABLE 3-1
SWMU 13 MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS THROUGH ROUND 6
IN THE UPPER PENNSYLVANIA WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Location	13MWT34						13MWT37						13MWT40					
Round	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Date	No Data	12/4/2003	7/29/2004	1/23/2005	5/5/2005	8/11/2005	No Data	11/6/2003	7/30/2004	2/2/2005	5/4/2005	8/11/2005	No Data	11/5/2003	7/30/2004	2/2/2005	5/4/2005	8/11/2005
Parameter																		
Energetics																		
1,3,5-TRINITROBENZENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 U	0.24 U	0.24 U	0.248 U	0.26 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U
1,3-DINITROBENZENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 U	0.24 U	0.24 U	0.248 U	0.26 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.5 U						0.52 U						0.51 UJ				
2,4,6-TRINITROTOLUENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U
2,4-DIAMINO-6-NITROTOLUENE		0.25 U		0.242 U		0.26 U		0.26 U		0.24 U		0.26 J		0.26 U		0.264 U		0.28 U
2,4-DINITROTOLUENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U
2,6-DIAMINO-4-NITROTOLUENE		0.25 U		0.242 U		0.26 U		0.26 U		0.24 U		0.26 U		0.26 U		0.264 U		0.28 U
2,6-DINITROTOLUENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U
2-AMINO-4,6-DINITROTOLUENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 U	0.24 U	0.24 U	0.248 U	0.26 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U
2-NITROTOLUENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U
3,5-DINITROANILINE		0.25 U		0.242 U		0.26 U		0.26 U		0.24 U		0.26 U		0.26 U		0.264 U		0.28 U
3-NITROTOLUENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U
4,4'-TN-AZOXY				0.485 U		0.52 U				0.48 U		0.52 U				0.528 U		0.56 U
4-AMINO-2,6-DINITROTOLUENE		0.29 J	0.26 J	0.242 U	0.245 U	0.26 U		0.04 U	0.5	0.31 J	0.58	0.51 J		0.52 J	1.1	0.39 J	0.81	1.1
4-NITROTOLUENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U
DNX		1		0.242 U		0.26 U		1.5 J		0.47 J		0.41 J		0.9 J		0.264 U		0.33 J
HMX		29	28	29	24	28		25	140	110	160	160		14	22	270	100	31
MNX		4.5		3.3		2.8		5.2		6.9		7.8		3.3		3.2		3.6
NITROBENZENE		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 U	0.24 U	0.24 U	0.248 U	0.26 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U
RDX		460	400	440	340	380		650	2100	1500	2300	2100		140	230	110	200	250
TETRYL		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U		0.04 U	0.24 U	0.24 U	0.248 U	0.26 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U
TNX		0.25 U		0.242 U		0.26 U		0.73		0.24 U		0.26 U		0.26 U		0.264 U		0.28 U
Field Parameters																		
DISSOLVED OXYGEN		1	13.42	1.3					2.9	4.2					0.39	13.39		
ALKALINITY		10 U																
CARBON DIOXIDE		32																
DISSOLVED OXYGEN - METER		2.35			0.62	0.36		4.82			4.64	4.39		6.28			8.41	7.84
OXIDATION REDUCTION POTENTIAL		276	149.6	99.9	640			-144.9	133.5	64.2	300.8			100.3	538	168.9	256.7	
PH		4.97	5.06	5.05	3.87	4.49		5.75	6.26	5.65	5.37	5		5.53	5.04	6.51	6.1	6
SPECIFIC CONDUCTANCE		0.312	0.347	0.271	0.311	0.289		0.307	0.174	0.24	0.127	127		0.273	0.329	0.314	0.287	248
TEMPERATURE		10.94	18.58	12.06	15.29	16.85		13.32	17.35	10.9	13.5	16.53		13.28	15.02	11.71	11.87	15.03
TURBIDITY		6.07	21	5.5	28	1.1		3.2	5	1.3	2.8	1.6		6.2	1.28	6.5	2.3	1.4
Miscellaneous Parameters																		
AMMONIA-N		0.04						0.005 U						0.11 J				
NITRITE/NITRATE-N		0.3 J		0.24 J		0.19		0.28		0.25 J		0.22		0.28		0.33 J		0.37
TOTAL ORGANIC CARBON						1 U						1 U						1 U

TABLE 3-1
SWMU 13 MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS THROUGH ROUND 6
IN THE UPPER PENNSYLVANIA WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Location	13MWT47						13MWT51					
Round	1	2	3	4	5	6	1	2	3	4	5	6
Date	No Data	12/9/2003	8/1/2004	1/25/2005	5/5/2005	8/15/2005	No Data	No Data	8/1/2004	2/3/2005	5/5/2005	8/11/2005
Parameter												
Energetics												
1,3,5-TRINITROBENZENE		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U			0.27 U	0.264 U	0.269 U	0.26 UJ
1,3-DINITROBENZENE		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U			0.27 U	0.264 U	0.269 U	0.26 UJ
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			0.27 U	0.264 U	0.269 U	0.26 UJ
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			0.27 U	0.264 U	0.269 U	0.26 UJ
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			0.27 U	0.264 U	0.269 U	0.26 UJ
2-AMINO-4,6-DINITROTOLUENE		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U			0.39 J	0.264 U	0.39 J	0.26 UJ
2-NITROTOLUENE		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U			0.27 U	0.264 U	0.269 U	0.26 UJ
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			0.27 U	0.264 U	0.269 U	0.26 UJ
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			0.27 U	0.5 J	0.72	0.26 UJ
4-NITROTOLUENE		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U			0.27 U	0.264 U	0.269 U	0.26 UJ
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			120	69	80	86 J
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			0.27 U	0.264 U	0.269 U	0.26 UJ
RDX		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U			250	320	230	27 J
TETRYL		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U			0.27 U	0.264 U	0.269 U	0.26 UJ
TNX		0.26 U		0.242 U		0.27 U				0.91 J		0.26 UJ
Field Parameters												
DISSOLVED OXYGEN			0.51	0.81					8.32	10.19		
ALKALINITY												
CARBON DIOXIDE												
DISSOLVED OXYGEN - METER		1.5			0.07						0.17	0.52
OXIDATION REDUCTION POTENTIAL		409.9	181.2	353.3	320.1				299	254.4	249.6	
PH		3.46	3.4	3.63	3.41	3.38			5.94	6.2	5.93	6
SPECIFIC CONDUCTANCE		1634	1.056	0.673	0.075	0.793			0.278	0.14	0.131	344
TEMPERATURE		12.42	18.41	8.87	11.59	19.16			20.57	5.07	11.07	17.78
TURBIDITY		5.4	7	10	0.18	10			33	9.7	8.3	110
Miscellaneous Parameters												
AMMONIA-N		0.44										
NITRITE/NITRATE-N		0.05 U		0.025 UJ		0.025 U				1.5		0.025 U
TOTAL ORGANIC CARBON						2.1						5.4

An empty cell indicates no analysis was conducted for that 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 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 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.

TABLE 3-2

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 DOWNGRADIENT GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SWMU 13 (MINE FILL B)
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	2/12	0.41 J	0.94	0.245 - 0.291	0.221	0.675	13GWT0906
1,3-DINITROBENZENE	1/12	2.1	2.1	0.245 - 0.291	0.294	2.10	13GWT0906
2,4,6-TRINITROTOLUENE	3/12	21	47	0.245 - 0.291	8.18	32.3	13GWT1105
2,4-DINITROTOLUENE	1/12	4.3	4.3	0.245 - 0.291	0.479	4.30	13GWT1105
2,6-DINITROTOLUENE	3/12	2.9	8.3	0.245 - 0.291	1.57	5.90	13GWT0906
2-AMINO-4,6-DINITROTOLUENE	3/12	0.39 J	20	0.245 - 0.291	3.05	11.8	13GWT1105
3-NITROTOLUENE	1/12	0.47 J	0.47 J	0.245 - 0.291	0.160	0.470	13GWT1105
4-AMINO-2,6-DINITROTOLUENE	7/12	0.44 J	29	0.245 - 0.291	4.35	7.36	13GWT1105
HMX	11/12	0.38 J	430	0.291	87.7	95.6	13GWT2105
RDX	11/12	2.2	4500	0.291	844	920	13GWT2105
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	12/12	0.07	8.41	---	2.04	2.04	13GWT4004
OXIDATION REDUCTION POTENTIAL (MV)	12/12	134.8	640	---	318	318	13GWT3404
PH (S.U.)	12/12	3.2	6.1	---	4.99	4.99	13GWT4004
SPECIFIC CONDUCTANCE (MS/CM)	12/12	0.075	1.119	---	0.329	0.329	13GWT3104
TEMPERATURE (C)	12/12	11.07	15.29	---	13.3	13.3	13GWT1405, 13GWT3404
TURBIDITY (NTU)	12/12	0.15	28	---	4.84	4.84	13GWT3404

TABLE 3-3

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 6 DOWNGRADIENT GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detection
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	2/12	0.47 J	1.2	0.24 - 0.28	0.248	0.835	13GWT0907
1,3-DINITROBENZENE	3/12	0.55	2.2	0.24 - 0.28	0.407	1.24	13GWT0907
2,4,6-TRINITROTOLUENE	3/12	16	30	0.24 - 0.28	5.85	23.0	13GWT2106
2,4-DIAMINO-6-NITROTOLUENE	4/11	0.26 J	0.77 J	0.24 - 0.28	0.238	0.428	13GWT1106
2,4-DINITROTOLUENE	1/12	1.9	1.9	0.24 - 0.28	0.278	1.90	13GWT1106
2,6-DINITROTOLUENE	3/12	2.8	8.9	0.24 - 0.28	1.34	4.97	13GWT0907
2-AMINO-4,6-DINITROTOLUENE	4/12	0.31 J	18 J	0.24 - 0.28	3.20	9.35	13GWT0907
3,5-DINITROANILINE	2/12	0.31 J	2.1 J	0.24 - 0.28	0.309	1.21	13GWT0907
4-AMINO-2,6-DINITROTOLUENE	6/12	0.51 J	19	0.24 - 0.27	3.75	7.36	13GWT0907
DNX	4/11	0.33 J	0.44 J	0.24 - 0.28	0.230	0.405	13GWT5104, 13GWT1706
HMX	11/12	0.52	560	0.27	97.5	106	13GWT2106
MNX	6/12	0.75 J	7.8	0.24 - 0.28	2.09	4.04	13GWT3705
RDX	11/12	2.7	4200	0.27	798	870	13GWT2106
TNX	1/12	0.3 J	0.3 J	0.24 - 0.28	0.145	0.300	13GWT1706
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	11/11	0.065	7.84	---	1.82	1.82	13GWT4005
PH (S.U.)	12/12	3.38	6	---	4.81	4.81	13GWT5104, 13GWT4005
SPECIFIC CONDUCTANCE (MS/CM)	12/12	0.233	586	---	131	131	13GWT1406
TEMPERATURE (C)	12/12	15.03	23	---	19.0	19.0	13GWT1106
TURBIDITY (NTU)	12/12	0	110	---	11.7	11.7	13GWT5104
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	6/12	0.19	59	0.025	5.04	10.1	13GWT0907
TOTAL ORGANIC CARBON	7/12	1.7	5.4	1	1.99	3.06	13GWT5104

TABLE 3-4

EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS THROUGH ROUND 6
IN THE LOWER PENNYSLVANIA WATER BEARING ZONE
NSWC CRANE,
CRANE, INDIANA

Location	13MWT28						13MWT45					
Round	1	2	3	4	5	6	1	2	3	4	5	6
Date	No Data	12/7/2003	7/31/2004	2/1/2005	5/3/2005	8/9/2005	No Data	12/8/2003	7/29/2004	1/23/2005	5/5/2005	8/10/2005
Parameter												
Energetics												
1,3,5-TRINITROBENZENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
1,3-DINITROBENZENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.515 U						0.515 U				
2,4,6-TRINITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
2,4-DIAMINO-6-NITROTOLUENE		0.258 U		0.275 U		0.27 U		0.258 U		0.24 U		0.27 U
2,4-DINITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
2,6-DIAMINO-4-NITROTOLUENE		0.258 U		0.275 U		0.27 U		0.258 U		0.24 U		0.27 U
2,6-DINITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
2-AMINO-4,6-DINITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
2-NITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
3,5-DINITROANILINE		0.258 U		0.275 U		0.27 U		0.258 U		0.24 U		0.27 U
3-NITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.34 J	0.24 U	0.24 U	0.252 U	0.27 U
4,4'-TN-AZOXY				0.55 U		0.54 U				0.48 U		0.54 U
4-AMINO-2,6-DINITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
4-NITROTOLUENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
DNX		0.258 U		0.275 U		0.27 U		0.258 U		0.24 U		0.27 U
HMX		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
MNX		0.258 U		0.275 U		0.27 U		0.258 U		0.24 U		0.27 U
NITROBENZENE		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
RDX		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 U	0.27 U
TETRYL		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U		0.258 U	0.24 U	0.24 U	0.252 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												
ALKALINITY		150										
CARBON DIOXIDE		10 U										
DISSOLVED OXYGEN		0.5	0.26	8.87					7.97	0.56		
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										
OXIDATION REDUCTION POTENTIAL		-34.1	73.5	144.6	191.3			55.5	116.5	-48	71	
PH		9.15	8.08	7.78	7.58	4.14		8.19	6.78	7.08	6.7	4.76
SPECIFIC CONDUCTANCE		0.495	1.217	0.918	0.771	808		0.357	0.703	0.491	0.518	505
SULFIDE		0										
TEMPERATURE		13.59	17.98	13.87	14.09	16.4		13.36	25.29	10.13	16.63	17.09
TURBIDITY		260	65	50	42	11		75	19	14	13	34
Miscellaneous Parameters												
AMMONIA-N		0.46 J						0.26				
NITRITE/NITRATE-N		0.66 J		0.15 J		0.77		0.05 U		0.06 J		0.025 U
TOTAL ORGANIC CARBON						1 U						1 U

TABLE 3-4

EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS THROUGH ROUND 6
IN THE LOWER PENNYSLVANIA WATER BEARING ZONE
NSWC CRANE,
CRANE, INDIANA

Location	13MWT46					
Round	1	2	3	4	5	6
Date	No Data	12/9/2003	7/30/2004	2/2/2005	5/4/2005	8/10/2005
Parameter						
Energetics						
1,3,5-TRINITROBENZENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
1,3-DINITROBENZENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.556 U				
2,4,6-TRINITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
2,4-DIAMINO-6-NITROTOLUENE		0.278 U		0.245 U		0.28 U
2,4-DINITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
2,6-DIAMINO-4-NITROTOLUENE		0.278 U		0.245 U		0.28 U
2,6-DINITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
2-AMINO-4,6-DINITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
2-NITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
3,5-DINITROANILINE		0.278 U		0.245 U		0.28 U
3-NITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
4,4'-TN-AZOXY				0.49 U		0.55 U
4-AMINO-2,6-DINITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
4-NITROTOLUENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
DNX		0.278 U		0.245 U		0.28 U
HMX		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
MNX		0.278 U		0.245 U		0.28 U
NITROBENZENE		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
RDX		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
TETRYL		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U
TNX		0.278 U		0.245 U		0.28 U
Field Parameters						
ALKALINITY						
CARBON DIOXIDE						
DISSOLVED OXYGEN			0.05	1.3		
DISSOLVED OXYGEN - METER		0.99			0.92	0.84
HYDROGEN SULFIDE (H2S)						
IRON(+2)						
MANGANESE(+2)						
NITRITE-N						
OXIDATION REDUCTION POTENTIAL		-32.5	131	-21.4	64.7	
PH		6.6	6.25	6.45	6.44	0
SPECIFIC CONDUCTANCE		1.021	0.786	0.731	0.596	554
SULFIDE						
TEMPERATURE		12.45	14.1	10.45	13.64	15.05
TURBIDITY		8.72	2.81	1.65	3.5	0.35
Miscellaneous Parameters						
AMMONIA-N		0.12				
NITRITE/NITRATE-N		0.05 U		0.025 UJ		0.025 U
TOTAL ORGANIC CARBON						1 U

An empty cell indicates no analysis was conducted for that parameter.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) note
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 representatior
of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be
of the true concentration.

TABLE 3-5

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	3/3	0.59	0.92	---	0.807	0.807	13GWT4604
OXIDATION REDUCTION POTENTIAL (MV)	3/3	64.7	191.3	---	109	109	13GWT2804
PH (S.U.)	3/3	6.44	7.58	---	6.91	6.91	13GWT2804
SPECIFIC CONDUCTANCE (MS/CM)	3/3	0.518	0.771	---	0.628	0.628	13GWT2804
TEMPERATURE (C)	3/3	13.64	16.63	---	14.8	14.8	13GWT4504
TURBIDITY (NTU)	3/3	3.5	42	---	19.5	19.5	13GWT2804

TABLE 3-6

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detection
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	3/3	0.49	0.84	---	0.683	0.683	13GWT4605
PH (S.U.)	3/3	0	4.76	---	2.97	2.97	13GWT4505
SPECIFIC CONDUCTANCE (MS/CM)	3/3	505	808	---	622	622	13GWT2805
TEMPERATURE (C)	3/3	15.05	17.09	---	16.2	16.2	13GWT4505
TURBIDITY (NTU)	3/3	0.35	34	---	15.1	15.1	13GWT4505
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	1/3	0.77	0.77	0.025	0.265	0.770	13GWT2805

TABLE 3-7

SWMU 13 - MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER FOR ROUNDS 1 THROUGH ROUND 6
NSWC CRANE, CRANE, INDIANA

Location	13SW11						13SW/SD14					
Round	1	2	3	4	5	6	1	2	3	4	5	6
Date	5/8/2003	11/18/2003	No Sample	2/2/2005	No Sample	No Sample	No Sample	10/22/2003	10/27/2004	2/2/2005	5/8/2005	8/16/2005
Parameter												
Energetics (µg/L)												
1,3,5-TRINITROBENZENE	0.21 U	0.287 U		0.242 U				0.24 U	0.248 U	0.252 U	0.25 U	0.24 U
1,3-DINITROBENZENE	0.21 U	0.287 U		0.242 U				0.24 U	0.248 U	0.252 U	0.25 U	0.24 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				0.24 U	0.42 J	0.252 U	0.25 U	0.24 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				0.24 U	0.248 U	0.252 U	0.25 U	0.24 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				0.24 U	0.248 U	0.252 U	0.25 U	0.24 U
2-AMINO-4,6-DINITROTOLUENE	0.25 R	0.9 J		0.242 U				1.3	1 J	0.252 U	0.82 J	0.89 J
2-NITROTOLUENE	0.21 U	0.287 U		0.242 U				0.24 U	0.248 U	0.252 U	0.25 U	0.24 U
3,5-DINITROANILINE		0.287 U						0.24 U	0.248 U			
3-NITROTOLUENE	0.21 U	0.287 U		0.242 U				0.24 U	0.248 U	0.252 U	0.25 U	0.24 U
4,4'-TN-AZOXY									0.495 U			
4-AMINO-2,6-DINITROTOLUENE	1 J	4.5 J		0.34 J				2.9	2.5	1.3	1.9	2.2
4-NITROTOLUENE	0.21 U	0.287 U		0.242 U				0.24 U	0.248 U	0.252 U	0.25 U	0.24 U
DNX		35						2.7 J	1			
HMX	93	730		1				20	18	21	13	18
MNX		72						3.8 J	1.9			
NITROBENZENE	0.21 U	0.287 U		0.242 U				0.24 U	0.248 U	0.252 U	0.25 U	0.24 U
RDX	610	5500		1100				77	97	60	46	47
TNX		4						0.62 J	0.248 U			
Field Parameters												
TEMPERATURE	16.45	15.2		2.72				12.14	14.69	2.88	15.05	21.68
DISSOLVED OXYGEN				12.46					10.3	13.8		
DISSOLVED OXYGEN - METER	4.35	4.99						5.93			11.85	7.78
SPECIFIC CONDUCTANCE	2.743	1.024		1.439				0.365	0.702	0.278	0.223	0.323
OXIDATION REDUCTION POTENTIAL	152.9	216		282				224.7	81.7	178	208	
TURBIDITY	85	242		7.6				4.4	12.8	4.1	10 U	9.1
PH	7.67	6.9		7.76				7.33	7.45	7.91	7.51	8.23
Miscellaneous Parameters												
AMMONIA-N	3.4	0.26 J						0.005 UJ				
NITRITE/NITRATE-N	23	8.5 J						0.54 J	7.4			

TABLE 3-7

SWMU 13 - MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER FOR ROUNDS 1 THROUGH ROUND 6
NSWC CRANE, CRANE, INDIANA

Location	13SW/SD15						13SW/SD16					
Round	1	2	3	4	5	6	1	2	3	4	5	6
Date	No Sample	10/27/2003	10/27/2004	2/2/2005	5/8/2005	8/16/2005	No Sample	10/22/2003	10/27/2004	2/2/2005	5/8/2005	8/16/2005
Parameter												
Energetics (µg/L)												
1,3,5-TRINITROBENZENE		0.24 U	0.25 U	0.24 U	0.25 U	0.29 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U
1,3-DINITROBENZENE		0.24 U	0.25 U	0.24 U	0.25 U	0.29 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 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	0.24 U	0.24 U	0.29 UJ	0.29 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	0.24 U	0.24 U	0.29 UJ	0.29 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	0.24 U	0.24 U	0.29 UJ	0.29 U
2-AMINO-4,6-DINITROTOLUENE		0.24 U	0.26 J	0.24 U	0.25 U	0.29 U		0.8 J	0.35 J	0.24 U	0.36 J	1 J
2-NITROTOLUENE		0.24 U	0.25 U	0.24 U	0.25 U	0.29 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 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		0.29 J	0.24 U	0.24 U	0.29 UJ	0.29 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		1.6	0.83	0.37 J	0.87 J	2.2
4-NITROTOLUENE		0.24 U	0.25 U	0.24 U	0.25 U	0.29 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U
DNX		23 J	1.8 J					3.6 J	0.24 U			
HMX		210	160	81	60	47		21	15	13	22 J	23
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	0.24 U	0.24 U	0.29 UJ	0.29 U
RDX		1500	1000	390	100	200		50	43	29	37 J	41
TNX		4	0.74 J					0.48 J	0.24 U			
Field Parameters												
TEMPERATURE		8.93	14.22	2.44	16.88	21.47		12.18	14.56	1.43	14.24	21.08
DISSOLVED OXYGEN			11.97	13.38					11.63	13.88		
DISSOLVED OXYGEN - METER		10.59			10.43	8.56		8.48			11.35	5.4
SPECIFIC CONDUCTANCE		0.251	0.361	0.132	0.14	0.181		0.254	0.297	0.106	0.134	0.215
OXIDATION REDUCTION POTENTIAL		290.5	101.4	195	194			213.7	71.5	188	173	
TURBIDITY		10.4	23.8	85	10 U	655		6.5	12.7	10	10 U	24.5
PH		7.43	7.41	8.13	7.4	8.6		7.17	7.61	8.29	7.53	7.91
Miscellaneous Parameters												
AMMONIA-N		0.01						0.005 UJ				
NITRITE/NITRATE-N		0.14	3.4					0.66 J	1.3			

TABLE 3-7

SWMU 13 - MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER FOR ROUNDS 1 THROUGH ROUND 6
NSWC CRANE, CRANE, INDIANA

Location	13SW/SD19						13SW/SD20					
Round	1	2	3	4	5	6	1	2	3	4	5	6
Date	No Sample	10/23/2003	No Sample	2/2/2005	5/8/2005	8/16/2005	No Sample	10/23/2003	No Sample	2/2/2005	5/8/2005	8/16/2005
Parameter												
Energetics (µg/L)												
1,3,5-TRINITROBENZENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
1,3-DINITROBENZENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 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		0.27 U		0.24 U	0.26 U	0.29 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		0.27 U		0.24 U	0.26 U	0.29 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		0.27 U		0.24 U	0.26 U	0.29 U
2-AMINO-4,6-DINITROTOLUENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
2-NITROTOLUENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
3,5-DINITROANILINE		0.24 U						0.27 U				
3-NITROTOLUENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
4,4'-TN-AZOXY												
4-AMINO-2,6-DINITROTOLUENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
4-NITROTOLUENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
DNX		0.24 U						0.27 U				
HMX		0.24 U		0.54	0.51	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
MNX		0.24 U						0.27 U				
NITROBENZENE		0.24 U		0.264 U	0.25 U	0.29 U		0.27 U		0.24 U	0.26 U	0.29 U
RDX		0.24 U		0.92	0.41 J	0.29 U		0.46 J		0.38 J	0.26 U	0.29 U
TNX		0.24 U						0.27 U				
Field Parameters												
TEMPERATURE		11.69		2.64	15.03	21.35		13.22		2.24	14.94	21.73
DISSOLVED OXYGEN				13.12						13.25		
DISSOLVED OXYGEN - METER		6.03			11.58	12.02		4.39			11.18	2.54
SPECIFIC CONDUCTANCE		0.566		0.236	0.316	0.376		0.3		0.154	0.174	0.231
OXIDATION REDUCTION POTENTIAL		203.5		220	213			158.3		205	214	
TURBIDITY		1.93		36	10 U	12		6.25		6.1	10 U	3.71
PH		7.25		7.9	7.13	8.51		7.75		8.17	7.21	7.58
Miscellaneous Parameters												
AMMONIA-N		0.04 J						0.005 UJ				
NITRITE/NITRATE-N		0.13 U						0.11 U				

TABLE 3-7

SWMU 13 - MINE FILL A
EXPLOSIVE AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER FOR ROUNDS 1 THROUGH ROUND 6
NSWC CRANE, CRANE, INDIANA

Location	13SW/SD22						13SW/SD30					
Round	1	2	3	4	5	6	1	2	3	4	5	6
Date	No Sample	10/22/2003	10/27/2004	2/2/2005	5/8/2005	No Sample	No Sample	10/22/2003	10/26/2004	2/2/2005	5/8/2005	8/16/2005
Parameter												
Energetics (µg/L)												
1,3,5-TRINITROBENZENE		0.26 U		0.266 U	0.27 U			0.25 U	0.24 U	0.252 U	0.25 U	0.25 U
1,3-DINITROBENZENE		0.26 U		0.266 U	0.27 U			0.25 U	0.24 U	0.252 U	0.25 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			0.25 U	0.24 U	0.252 U	0.25 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			0.25 U	0.24 U	0.252 U	0.25 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			0.25 U	0.24 U	0.252 U	0.25 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE		0.26 U		0.266 U	0.27 U			0.25 U	0.24 U	0.252 U	0.25 U	0.25 U
2-NITROTOLUENE		0.26 U		0.266 U	0.27 U			0.25 U	0.24 U	0.252 U	0.25 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			0.25 U	0.24 U	0.252 U	0.25 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			0.25 U	0.24 U	0.252 U	0.25 U	0.25 U
4-NITROTOLUENE		0.26 U		0.266 U	0.27 U			0.25 U	0.24 U	0.252 U	0.25 U	0.25 U
DNX		0.26 U						0.25 U	0.24 U			
HMX		0.26 U		0.36 J	0.27 U			3.2 J	2.9	2	2.6	2.4
MNX		0.26 U						0.28 J	0.31 J			
NITROBENZENE		0.26 U		0.266 U	0.27 U			0.25 U	0.24 U	0.252 U	0.25 U	0.25 U
RDX		1.6		1.1	0.33 J			6.2	9.9	6	4.9	5.3
TNX		0.26 U						0.25 U	0.24 U			
Field Parameters												
TEMPERATURE		13.65	15.14	2.02	13.53			13.09	14.39	1.63	19.29	22.52
DISSOLVED OXYGEN			10.84	8.25					9.44	14.1		
DISSOLVED OXYGEN - METER		3.71			6.86			9.63			11.3	10.21
SPECIFIC CONDUCTANCE		0.434	0.205	0.151	0.184			0.395	0.359	0.168	0.234	0.364
OXIDATION REDUCTION POTENTIAL		264.7	74.1	139	199			222.1	39.6	201	165	
TURBIDITY		1.5	21.3	3.1	10 U			2.6	5.69	4.5	3.5	2.18
PH		7.02	7.7	8.18	7.03			7.84	7.52	8.07	8.06	8.59
Miscellaneous Parameters												
AMMONIA-N		0.005 UJ						0.005 UJ				
NITRITE/NITRATE-N		0.025 U						0.025 U	0.26			

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 of the true concentration.
ND - No Sample collected in this round.

TABLE 3-8

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 SURFACE WATER SAMPLES
SWMU 13 (MINE FILL B)
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	2/7	0.36 J	0.82 J	0.25 - 0.27	0.260	0.590	13SW1404
4-AMINO-2,6-DINITROTOLUENE	3/7	0.32 J	1.9	0.25 - 0.27	0.515	1.03	13SW1404
HMX	5/7	0.51	60	0.26 - 0.27	16.5	23.0	13SW1504
RDX	6/7	0.33 J	100	0.26	27.0	31.4	13SW1504
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	7/7	6.86	11.85	---	10.7	10.7	13SW1404
OXIDATION REDUCTION POTENTIAL (MV)	7/7	165	214	---	195	195	13SW2003
PH (S.U.)	7/7	7.03	8.06	---	7.41	7.41	13SW3004
SPECIFIC CONDUCTANCE (MS/CM)	7/7	0.134	0.316	---	0.201	0.201	13SW1903
TEMPERATURE (C)	7/7	13.53	19.29	---	15.6	15.6	13SW3004
TURBIDITY (NTU)	1/7	3.5	3.5	10	4.79	3.50	13SW3004

TABLE 3-9

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 6 SURFACE WATER SAMPLES
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detection
Energetics (ug/L)							
2-AMINO-4,6-DINITROTOLUENE	2/6	0.89 J	1 J	0.25 - 0.29	0.408	0.945	13SW1605
4-AMINO-2,6-DINITROTOLUENE	2/6	2.2	2.2	0.25 - 0.29	0.827	2.20	13SW1405, 13SW1605
HMX	4/6	2.4	47	0.29	15.1	22.6	13SW1505
RDX	4/6	5.3	200	0.29	48.9	73.3	13SW1505
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	6/6	2.54	12.02	---	7.75	7.75	13SW1904
PH (S.U.)	6/6	7.58	8.6	---	8.24	8.24	13SW1505
SPECIFIC CONDUCTANCE (MS/CM)	6/6	0.181	0.376	---	0.282	0.282	13SW1904
TEMPERATURE (C)	6/6	21.08	22.52	---	21.6	21.6	13SW3005
TURBIDITY (NTU)	6/6	2.18	655	---	118	118	13SW1505

4.0 DATA EVALUATION

Section 4 presents groundwater and surface monitoring data for Rounds 1 through 6. The information presented includes temporal plots of RDX and degradation 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 Rounds 5 and 6. 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 along with 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 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 explosives degradation productions. To date, six rounds of groundwater sampling events have been conducted April-May 2003, October-December 2003, July-August 2004, January-February 2005, May 2005, and August 2005. The remaining three rounds of sampling will be completed in 2006.

- **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 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 Upper and Lower Pennsylvanian 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.** The ninth round of sampling is expected to be completed in May 2006. A final report evaluating the MNA program through nine rounds of sampling is expected to be issued in August 2006. As a result, the most recent analytical data will be no more than two years old.

- **Demonstration of a trend of decreasing contamination concentration must be clear and meaningful and be based on statistical tests which indicate a high degree of confidence in the apparent trend line.** The SWMU 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 along with 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 upper Pennsylvanian aquifer but not the lower Pennsylvanian aquifer at SWMU 13. The long term monitoring program includes monitoring wells located in the Upper and Lower Pennsylvanian 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 monitoring program is providing analytical results for RDX and the degradation 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 product concentrations and routine indicator parameters by season. The final MNA report will include the presentation of temporal plots to discern seasonal trends of RDX and degradation 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:

Upper Pennsylvanian Water Bearing Zone Wells

- 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 plumes (13MWT14, 13MWT31, and 13MWT51)
- One laterally downgradient well that is clean (13MWT47)

Lower Pennsylvanian Water Bearing Zone Wells

- 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 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 ROUNDS 5 AND 6 POTENTIOMETRIC SURFACES

Groundwater elevations were measured at all Puz and Plz monitoring wells in Rounds 5 and 6. The potentiometric surface maps for both rounds of monitoring are shown in Figures 4-1 through 4-4. Groundwater measurements for each round are shown in Table 2-1.

Round 5

On May 3, 2005, water level elevations were measured in the Puz monitoring wells. The lowest groundwater elevation was 641.08 feet above mean sea level (amsl) in well 13MWT39, and the highest elevation was 711.38 feet amsl at well 13MWT03. The potentiometric surface for Puz wells in Round 5 is shown in Figure 4-1. In general, groundwater elevations measured on May 3, 2005 were 0 to 2 feet lower in elevation than the measurements made during Round 4, with the exception of well 13MWT 42, which experienced a 9 foot drop in elevation from Round 4. Otherwise, Puz groundwater flow directions were nearly the same in Rounds 4 and 5.

Figure 4-3 presents the potentiometric surface map for groundwater elevations measured in Plz wells in Round 5. Groundwater elevations measured in the seven Plz monitoring wells in Round 5 ranged from 597.00 feet amsl in well 13MWT46 to 627.67 feet amsl in monitoring well 13MWT28. Groundwater elevations in the Plz in Round 5 were +/-1 foot as compared to Round 4 and flow directions were essentially the same.

Round 6

In Round 6, groundwater elevations were measured in Puz wells on August 9, 2005. The potentiometric surface for Puz wells in Round 5 is shown in Figure 4-3. The lowest groundwater elevation was 638.13 feet amsl in well 13MWT39, and the highest elevation was 709.92 feet amsl in well 13MWT03. In most cases, groundwater elevations measured were about 0 to 4 feet lower than the measurements made in Round 5. The remaining wells had essentially the same elevation as in Round 5, with the

exception of well 13MWT47, which had a 3.2 foot rise in groundwater elevation. Groundwater flow directions were generally the same as reported in Round 4.

The potentiometric surface for the Plz wells in Round 6 is given in Figure 4-4. The lowest Plz groundwater elevation was 596.49 feet amsl in well 13MWT46, and the highest elevation was 633.79 in 13MWT28. With the exception of well 13MWT28, groundwater elevations were +/- 1.0 foot as compared to measurements made in Round 5. At 13MWT28, the groundwater elevation was more than 6 feet higher in Round 6 than in Round 5.

4.4 GROUNDWATER TEMPORAL PLOT TREND ANALYSIS

The section presents temporal plots of RDX and degradation product concentrations by round for groundwater and surface water. The temporal plots are arranged in columns by monitoring well location showing the concentration trend for RDX followed by the trend for each degradation products. The data points shown in each plot show the parameter concentration by round and the data validation qualifier abbreviation, as needed. A description of each data qualifier is presented in Table 3-1. 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 4-5 shows temporal plots of RDX and degradation product (DNX, MNX, and TNX) concentrations for Rounds 1 through 6 in the Puz wells. A review of analytical results for Rounds 1 through 6 indicates very little evidence of concentration trends for RDX or degradation products. In the case of RDX, monitoring results are generally available for six consecutive rounds. During this time, concentrations have varied, but the changes in most cases are relatively small and do not represent significant increases or decreases in concentrations over time. A possible indication of a decreasing trend in RDX is shown at well 13MWT51. However, this trend is only based on 4 samples. All three RDX degradation products were detected at this well in Round 4, but only DNX was detected in Round 6.

Plz Aquifer

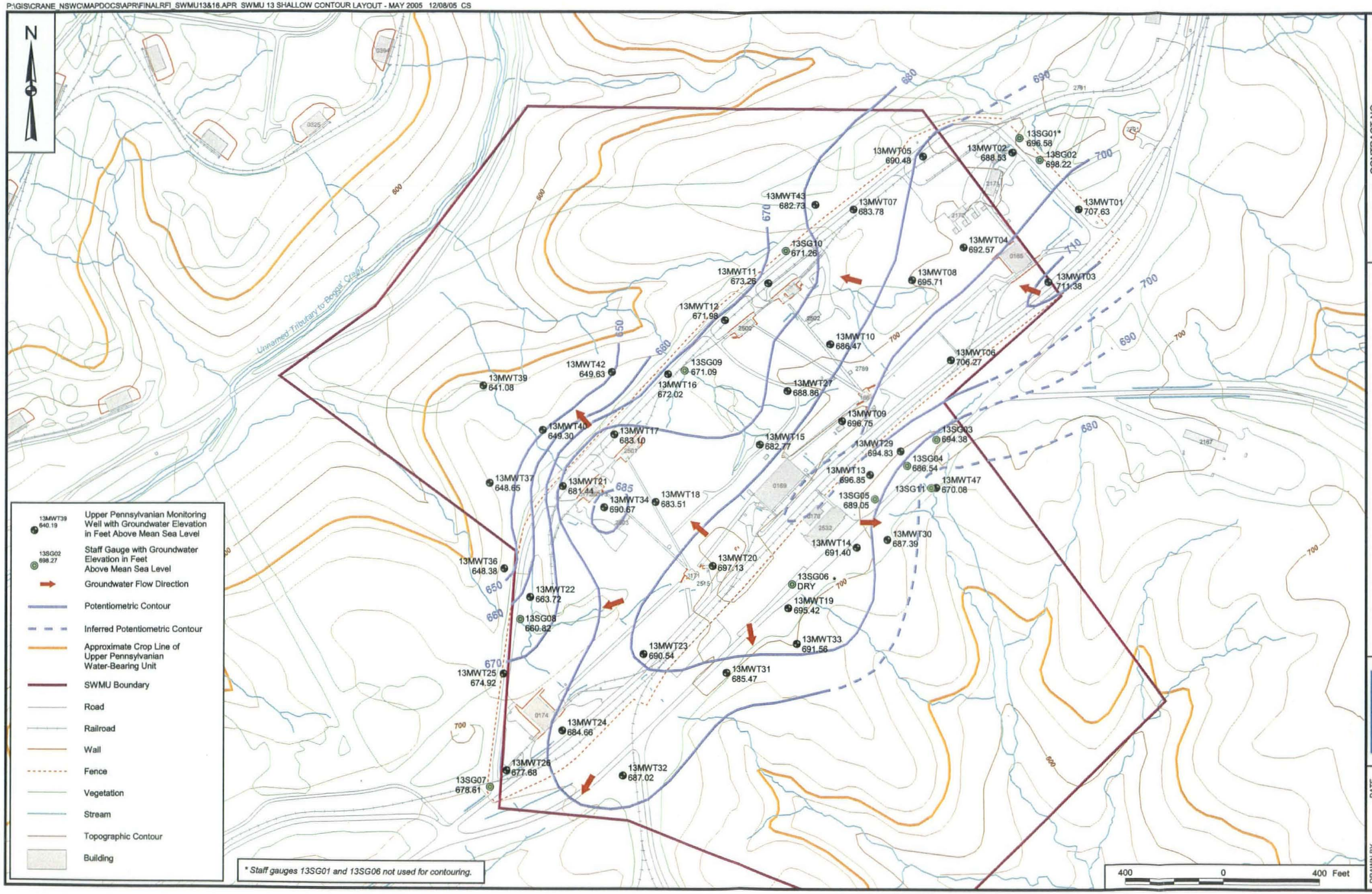
Figure 4-6 shows temporal plots of RDX and degradation products for Rounds 1 through 6 at Plz well locations. Through Round 6, there have been no positive detections of RDX or degradation products in the Plz monitoring wells (13MWT28, 13MWT45, and 13MWT46).

4.5 SURFACE WATER TEMPORAL PLOT TREND ANALYSIS

Figure 4-7 shows temporal plots of explosives and degradation product surface water concentrations for Rounds 1 through 6. RDX has been detected at all surface water monitoring locations. However, only three locations show a possible trend in RDX concentrations. Most notably, RDX concentrations at 13SW15 show a significant decrease from Round 2 to Round 6. Other locations showing possible decreasing treads in RDX concentrations include 13SW14 and 13SW22. All other surface water locations show no trend in RDX concentrations.

Analysis of surface water samples for RDX degradation products has only been conducted in Rounds 2 and 3. In these rounds, degradation products were detected at both 13SW14 and 13SW15 and concentrations decreased from Round 2 to Round 3. All other surface water locations generally show no trend or no detections of degradation products in Rounds 2 and 3.

P:\GIS\CRANE_NSWC\MAPDOCS\APR\FINALRFI_SWMU13&16.APR SWMU 13 SHALLOW CONTOUR LAYOUT - MAY 2005 12/08/05 CS



CONTRACT NO. 00041

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4 - 1

REV 0

POTENTIOMETRIC SURFACE ELEVATION MAP
FOR THE UPPER PENNSYLVANIAN
WATER-BEARING ZONE - MAY 3, 2005
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

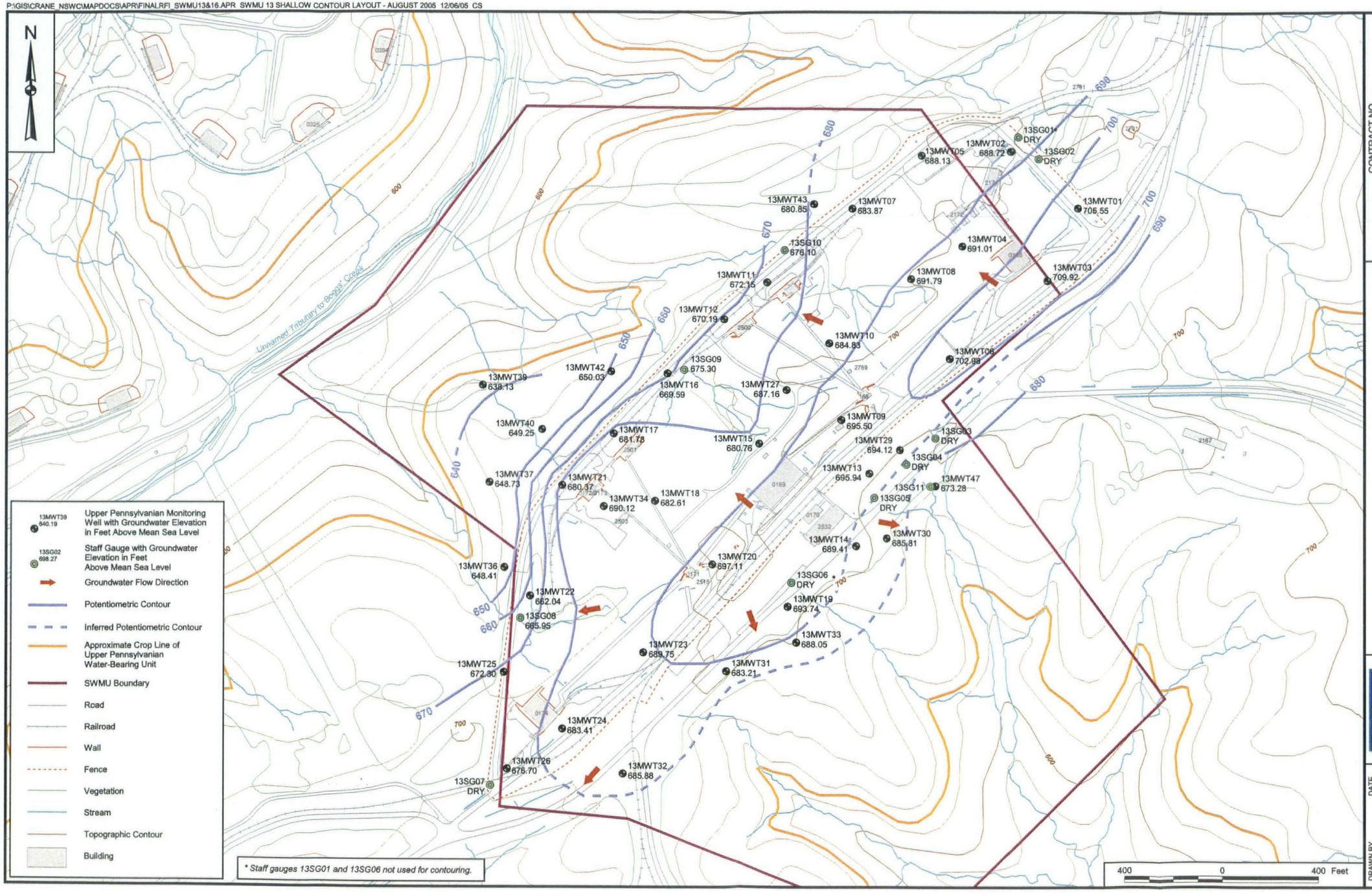
DRAWN BY C. SPEHAR DATE 12/06/05

CHECKED BY J. LUCAS DATE 12/06/05

COST/SCHED-AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\FINALRFI_SWMU13&16.APR SWMU 13 SHALLOW CONTOUR LAYOUT - AUGUST 2005 12/06/05 CS



CONTRACT NO. 00041

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4 - 2

REV 0

POTENTIOMETRIC SURFACE ELEVATION MAP
FOR THE UPPER PENNSYLVANIAN
WATER-BEARING ZONE - AUGUST 9, 2005
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY C. SPEHAR DATE 12/06/05

CHECKED BY J. LUCAS DATE 12/06/05

COST/SCHED-AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\FINALRFI_SWMU13&16.APR SWMU 13 DEEP CONTOUR LAYOUT - MAY 2005 12/08/05 CS

CONTRACT NO. 00041

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4 - 3

REV 0

POTENTIOMETRIC SURFACE ELEVATION MAP
FOR THE LOWER PENNSYLVANIAN
WATER-BEARING ZONE - MAY 3, 2005
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY C. SPEHAR DATE 12/06/05

CHECKED BY J. LUCAS DATE 12/06/05

COST/SCHED-AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\FINALRFI_SWMU13&16.APR SWMU 13 DEEP CONTOUR LAYOUT - AUGUST 2005 12/08/05 CS

CONTRACT NO. 00041

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4 - 4

REV 0

POTENTIOMETRIC SURFACE ELEVATION MAP
FOR THE LOWER PENNSYLVANIAN
WATER-BEARING ZONE - AUGUST 9, 2005
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY C. SPEHAR DATE 12/06/05

CHECKED BY J. LUCAS DATE 12/06/05

COST/SCHED-AREA

SCALE AS NOTED

FIGURE 4-5

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE UPPER PENNSYLVANIAN WATER BEARING ZONE AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA
PAGE 1 OF 5

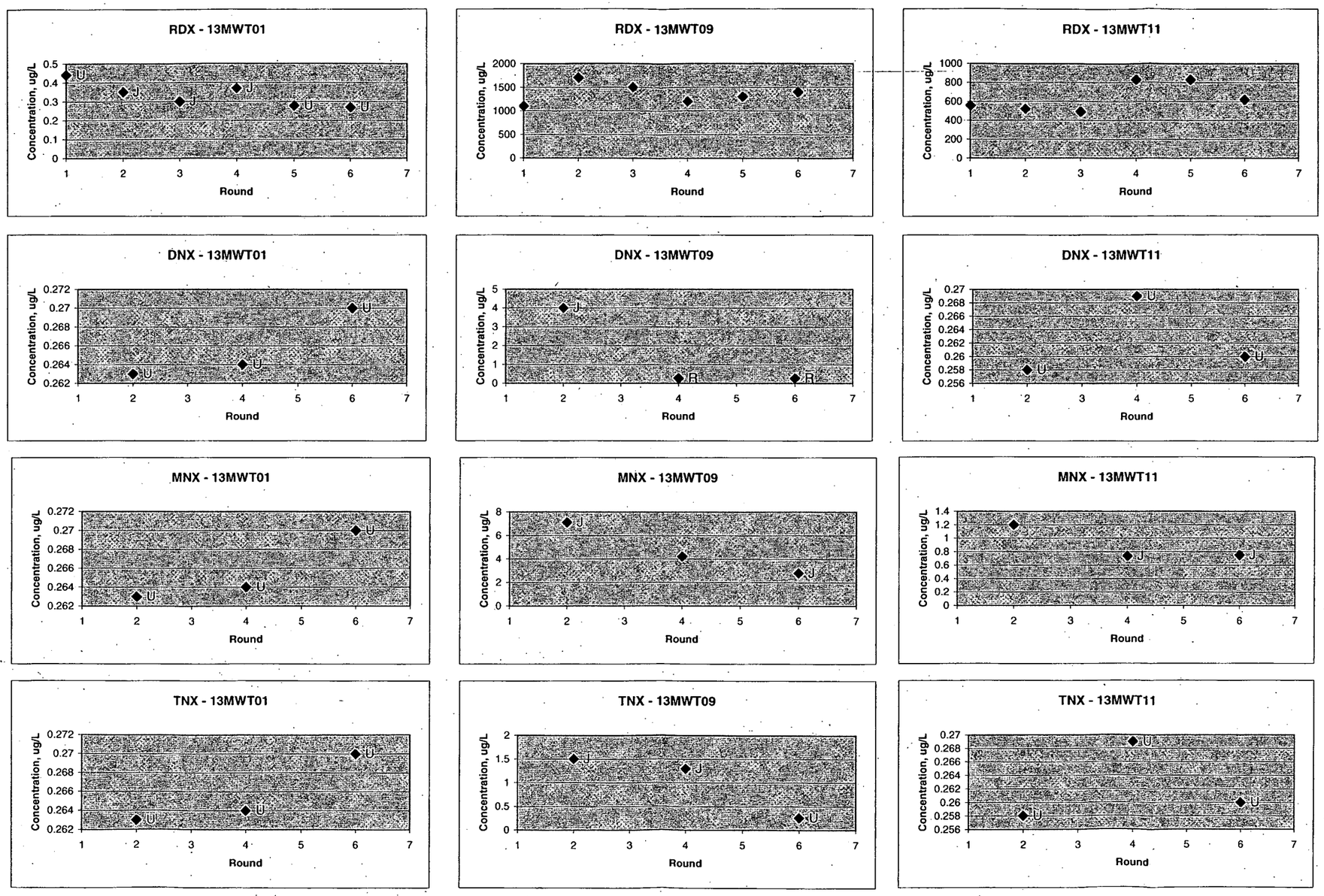


FIGURE 4-5

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE UPPER PENNSYLVANIAN WATER BEARING ZONE AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA
PAGE 2 OF 5

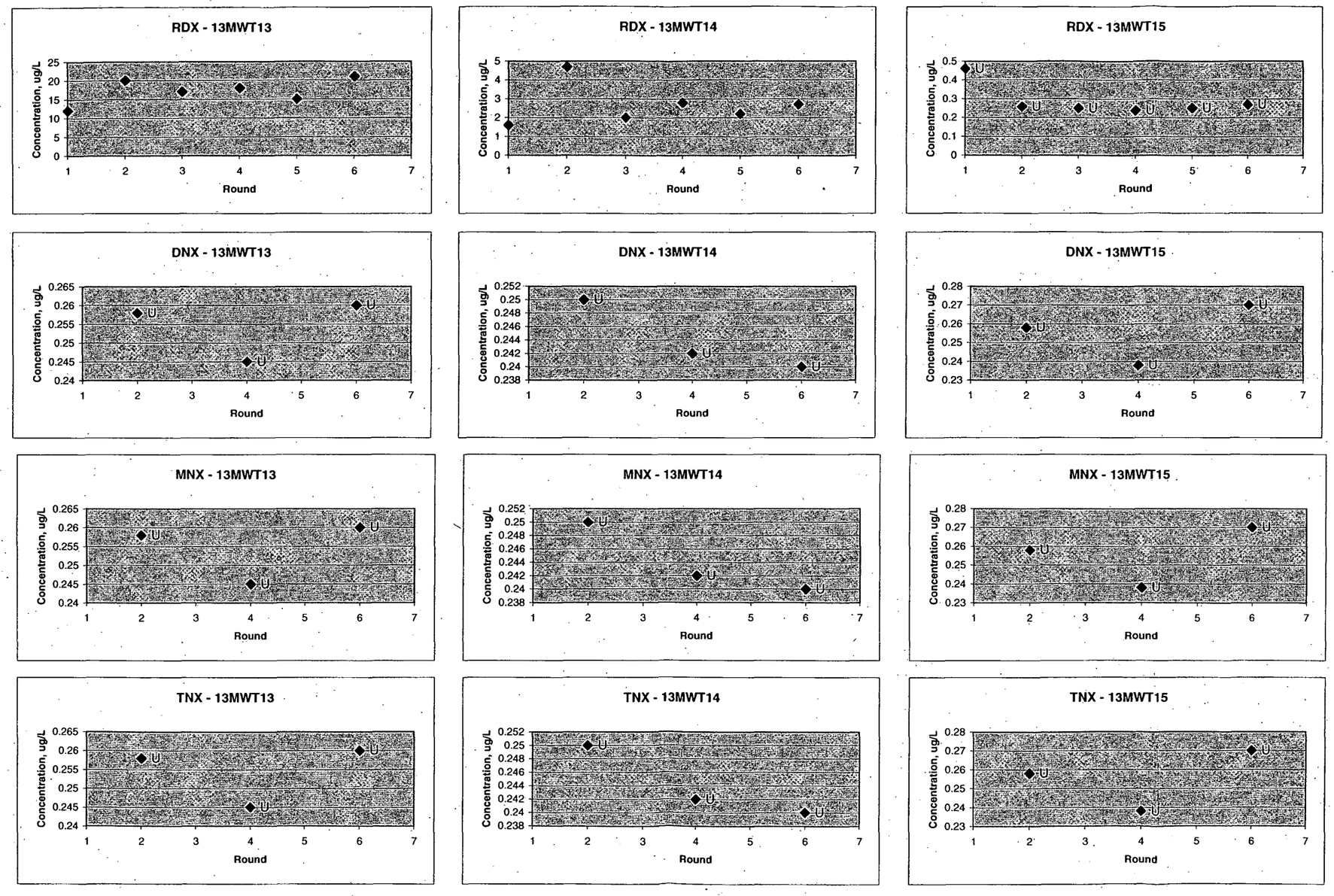


FIGURE 4-5

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE UPPER PENNSYLVANIAN WATER BEARING ZONE AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA
PAGE 3 OF 5

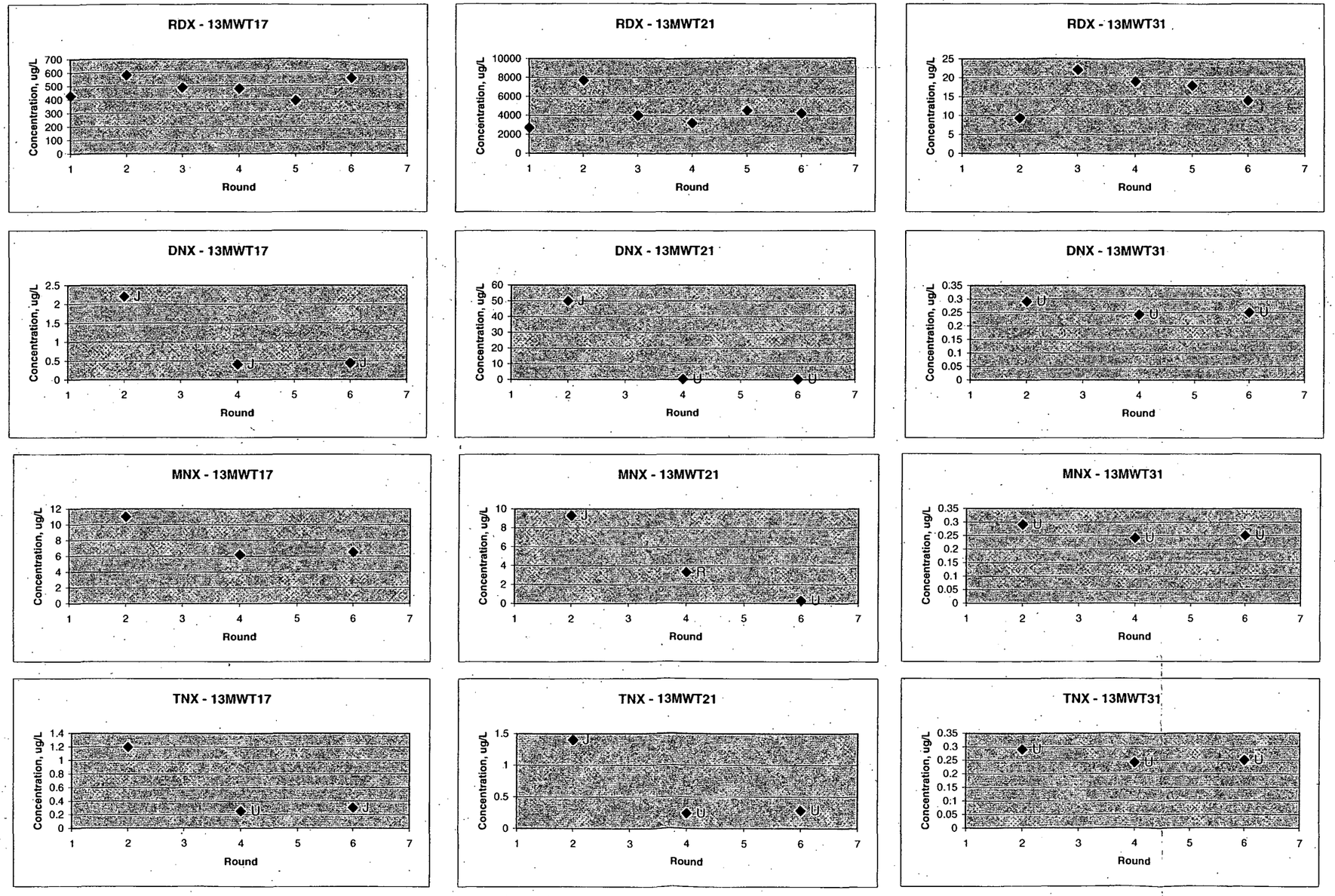


FIGURE 4-5

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE UPPER PENNSYLVANIAN WATER BEARING ZONE AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA
PAGE 4 OF 5

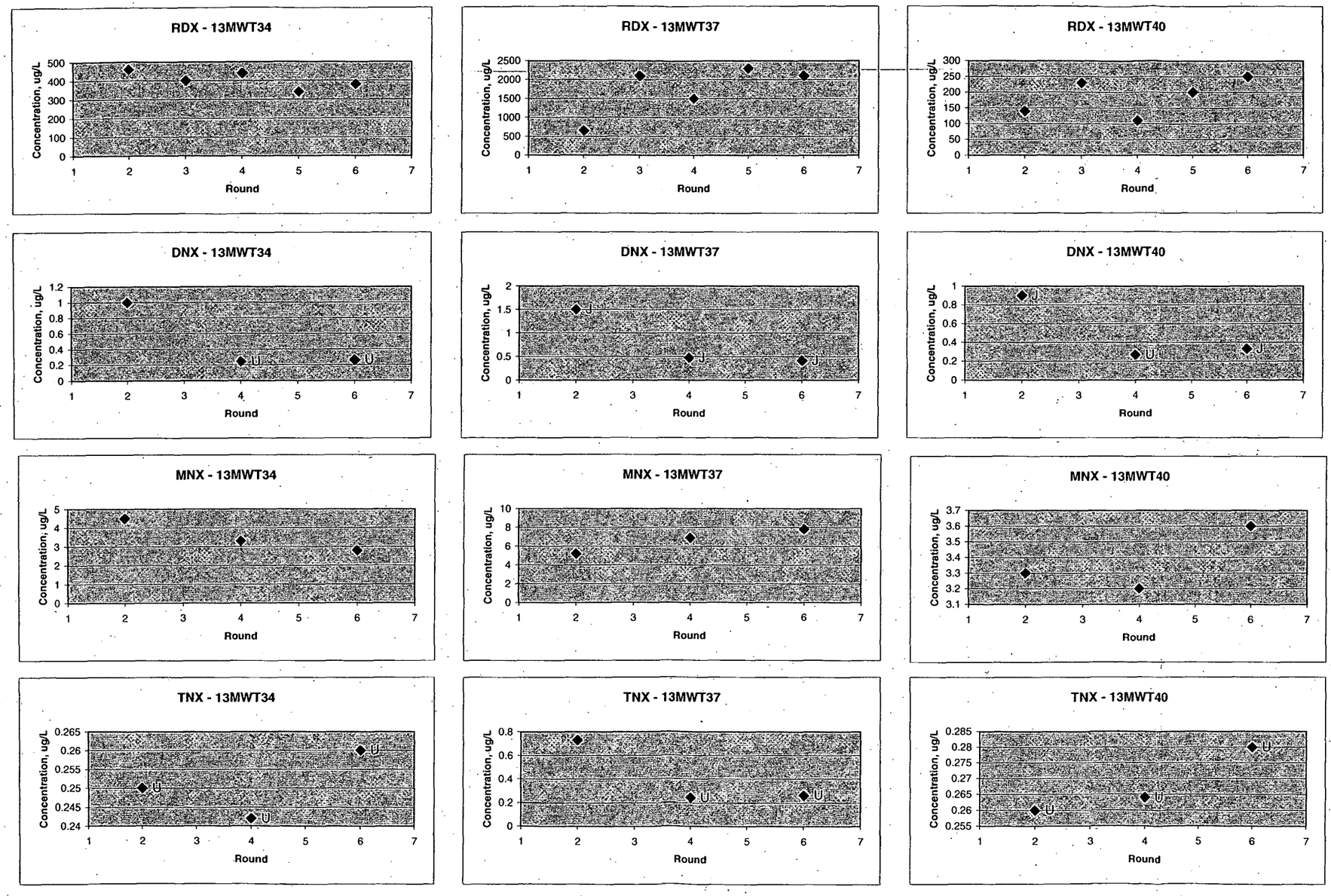
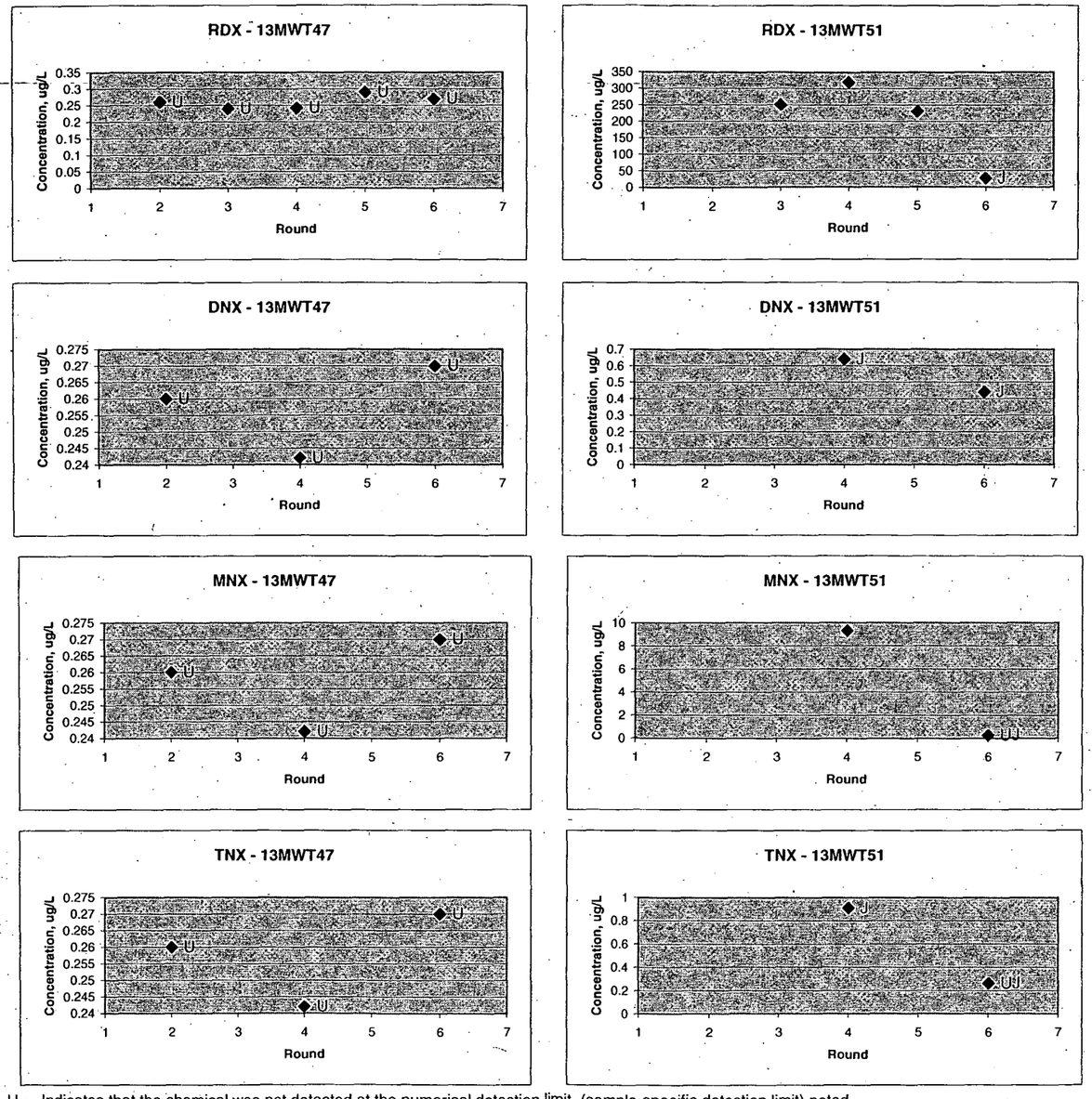


FIGURE 4-5

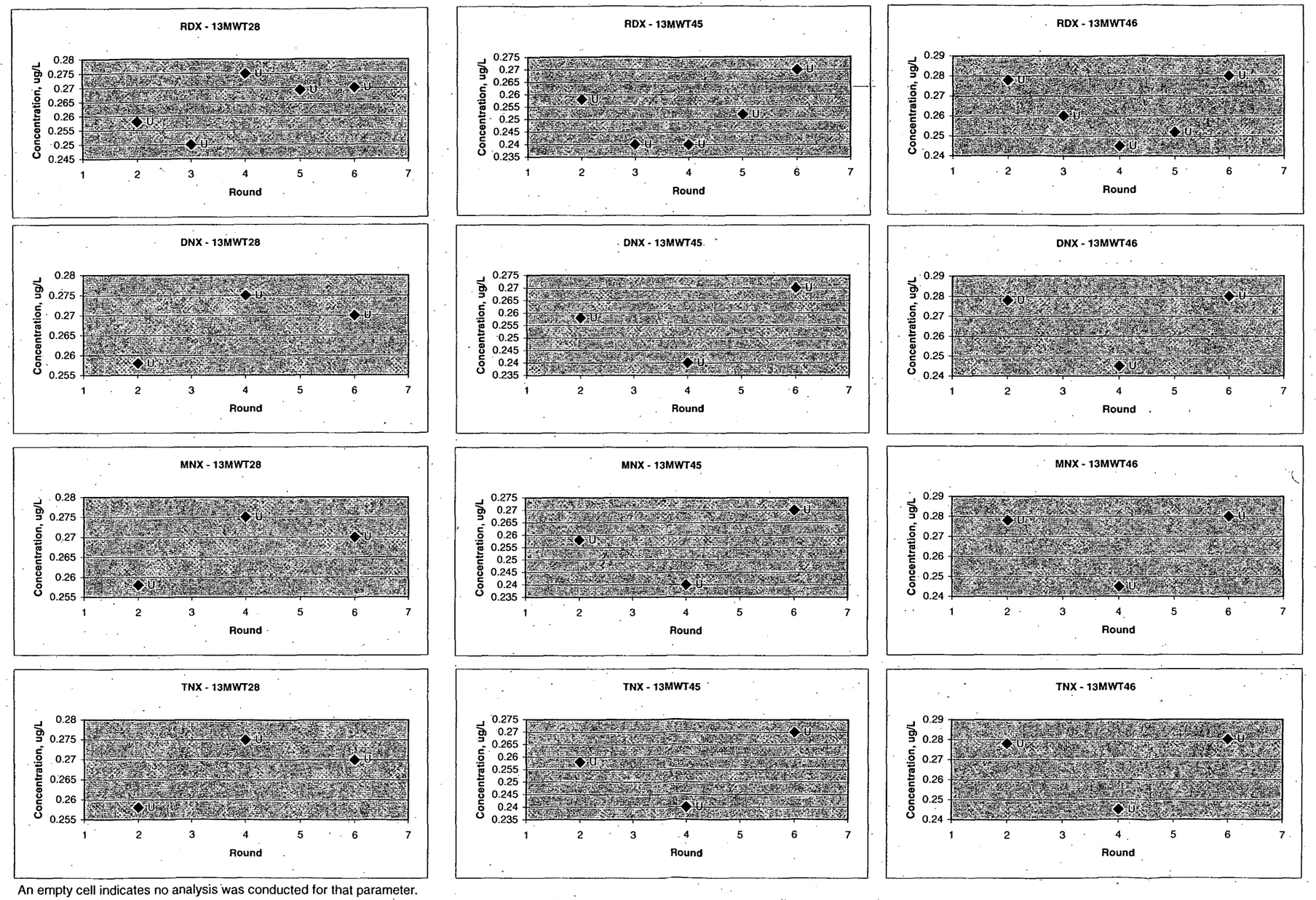
TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE UPPER PENNSYLVANIAN WATER BEARING ZONE AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA



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.
J - Indicates the chemical was detected; however, the value is considered to be an estimate of the true concentration.
R - Indicates that the chemcial may or may not be present. The non-detected analytical result is considered to be unreliable and unusable.

FIGURE 4-6.

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE LOWER PENNSYLVANIAN WATER BEARING ZONE AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA



An empty cell indicates no analysis was conducted for that 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.

FIGURE 4-7

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA
PAGE 1 OF 3

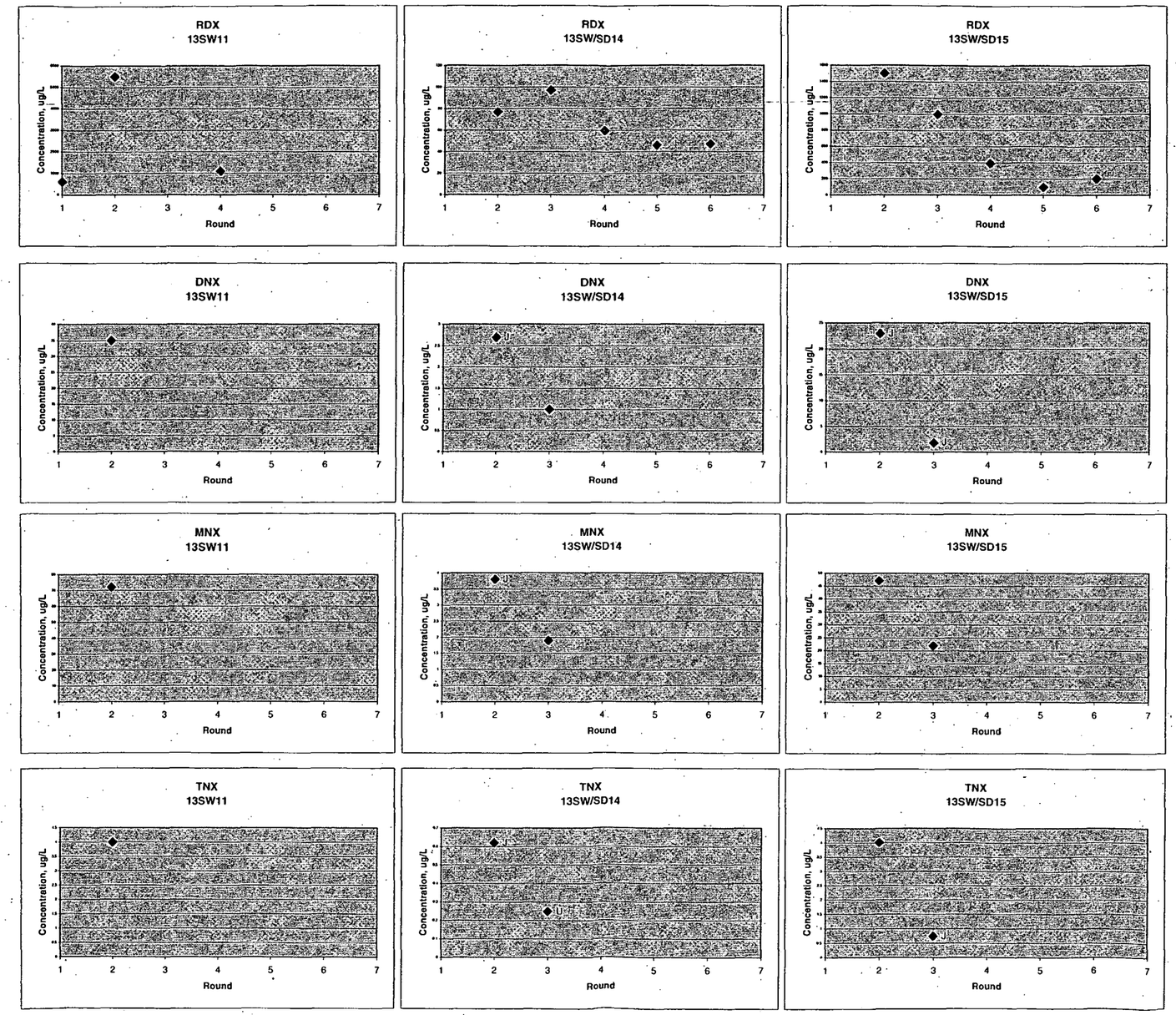


FIGURE 4-7

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13 FOR ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA
PAGE 2 OF 3

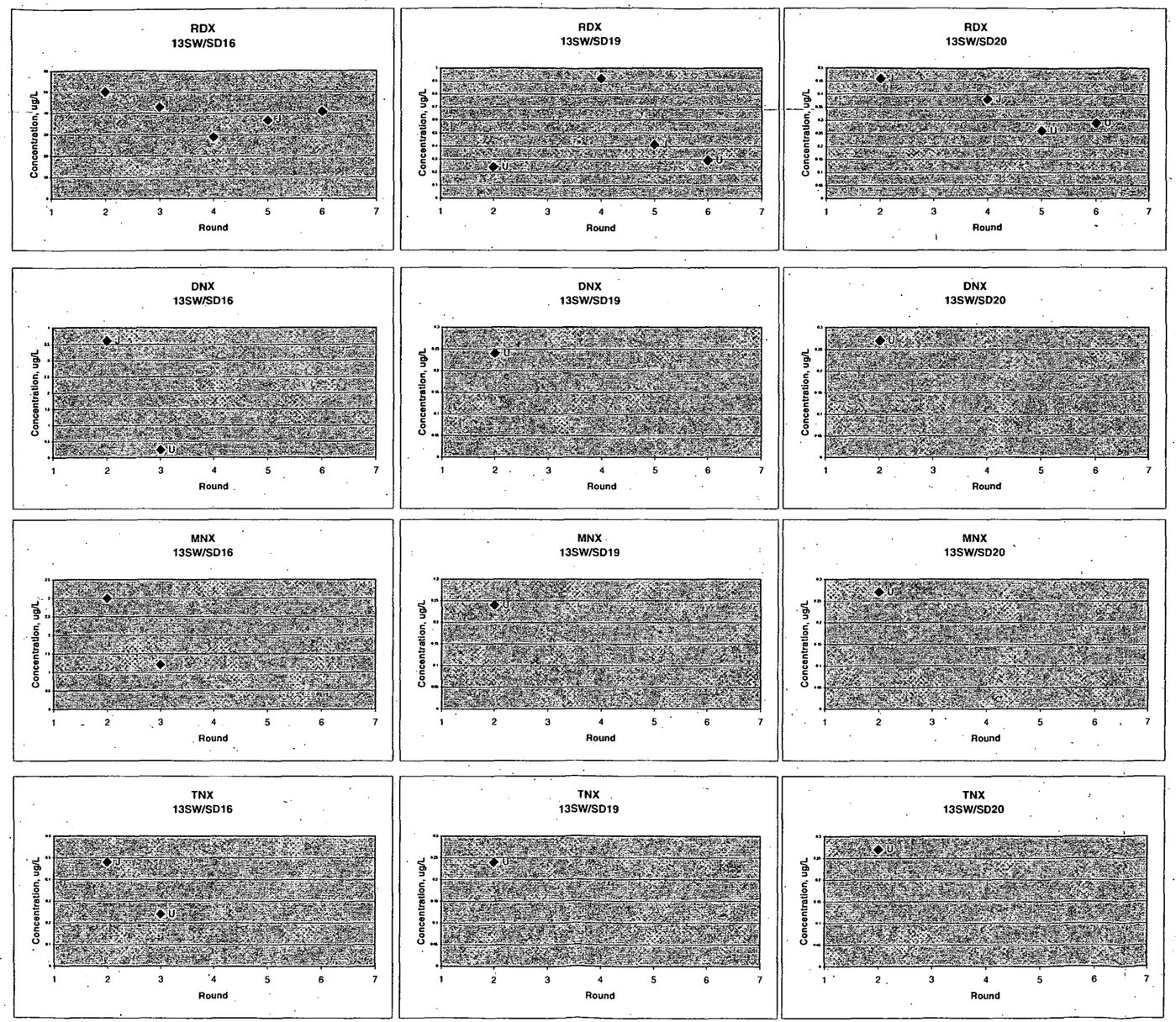
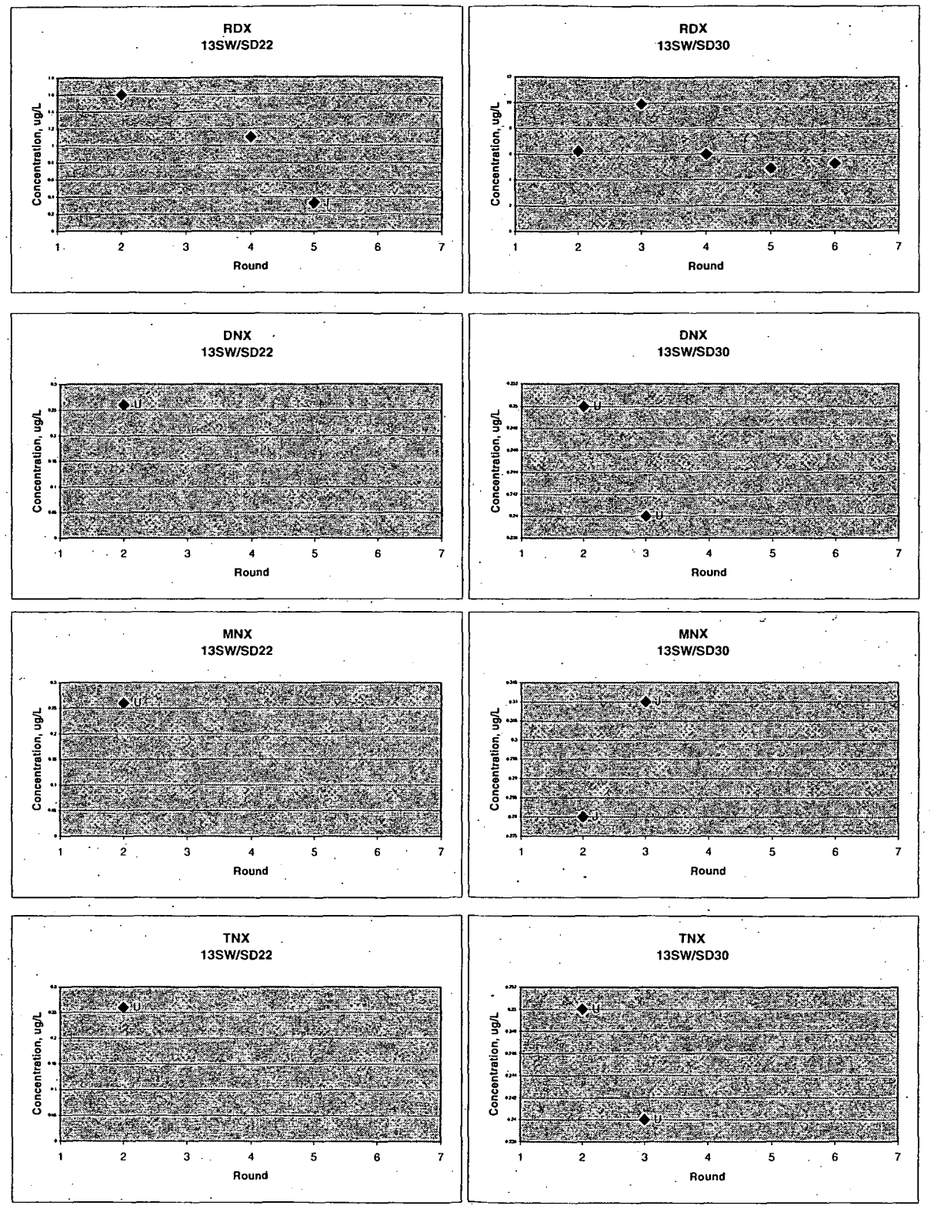


FIGURE 4-7

TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13 FOR ROUNDS 1 THROUGH 6
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.
J - Indicates the chemical was detected; however, the value is considered to be an estimate of the true concentration.

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APPENDIX A

SWMU 13

SAMPLE LOG SHEETS AND OTHER FIELD FORMS

ROUNDS 5 AND 6

A.1.1

SWMU 13

GROUNDWATER SAMPLE LOG SHEETS

ROUND 5

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 0105
Sample Location: 13MWT 01
Sampled By: Goerdt
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-3-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1750	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Ded. Bladder	Clear	4.45	.170	11.12	1.0	0.96	403.8	---

PURGE DATA:

Date: 5-3-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded. Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 17.91								
Static Water Level (WL): 7.74								
One Casing Volume(gal/L): 6.13								
Start Purge (hrs): 1545								
End Purge (hrs): 1745								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 12.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ 12'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT01
DATE: 5-3-05

Time (Hrs)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1545	7.74	—	—	—	—	—	—	—	—	start purge
1555	8.12	1.5	150	4.52	0.161	—	1.13	11.32	327.4	clear
1605	8.43	3.0	150	4.47	0.167	—	0.97	11.46	348.0	"
1615	8.98	4.5	180	4.42	0.174	—	0.71	11.65	369.8	"
1625	9.04	6.5	170	4.46	0.171	7.8	0.76	11.90	382.1	"
1635	8.70	7.1	60	4.40	0.177	6.3	0.65	12.05	386.6	"
1645	8.72	7.7	60	4.36	0.184	5.1	0.59	11.85	389.8	"
1655	8.78	8.3	60	4.40	0.175	3.4	0.76	11.60	391.6	"
1705	8.81	9.1	80	4.42	0.171	1.7	0.81	11.54	397.8	"
1715	8.82	9.9	80	4.40	0.174	1.2	0.65	11.27	401.6	"
1725	8.80	10.7	80	4.44	0.168	1.1	0.90	11.19	402.6	"
1735	8.81	11.5	80	4.46	0.169	1.3	0.94	11.14	403.1	"
1745	8.81	12.3	80	4.45	0.170	1.0	0.96	11.12	403.8	end

Water Quality Meter (SN) 04<3884 AB
Control Box type (SN) MP10 1600
Turbidity Meter (SN) 0359 4197

Pump Intake 12'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT0906
Sample Location: 13MWT09
Sampled By: JSW
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/3/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: ~~10:25~~ 12:00	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: BLADDER PUMP	CLEAR	5.29	0.576	12.47	0.15	1.50	250.1	---

PURGE DATA:

Date: 5/3/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: LOW FLOW BLADDER PUMP								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 22.~~85~~ 96 (M)								
Static Water Level (WL): 9.15'								
One Casing Volume(gal/L): 8.32								
Start Purge (hrs): 10:25								
End Purge (hrs): 11:55								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 13.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	(Yes) No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] ~~13GWT F~~

Dedicated pump intake @ 17.6' BTOC
DEDICATED BLADDER PUMP

WELL VOLUME: 22.96'
- 9.15'
13.81' * (0.163) = 2.25 G
= 8.32 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWTØ9
DATE: 5/3/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
10:25	9.15	Ø	150	5.31	0.531	0.10	3.85	13.37	229.8	CLEAR - LOWEST POSS PUMP SETTING
10:35	10.00	1.5	150	5.32	0.510	0.24	1.46	12.40	246.7	
10:45	10.15	3.0	150	5.34	0.508	0.18	1.48	12.56	237.6	
10:55	10.20	4.5	150	5.29	0.515	0.15	2.33	12.37	252.5	
11:05	10.29	6.0	150	5.31	0.532	0.15	1.50	12.39	251.3	
11:15	10.29	7.5	150	5.29	0.551	0.15	1.40	12.41	252.6	
11:25	10.38	9.0	150	5.34	0.563	0.20	1.52	12.37	253.0	
11:35	10.39	10.5	150	5.31	0.566	0.18	1.51	12.38	252.7	
11:45	10.41	12.0	150	5.30	0.575	0.20	1.46	12.42	249.8	
11:55	10.41	13.5	150	5.29	0.576	0.15	1.50	12.47	250.1	
12:00	START SAMPLING		150	→					→	START SAMPLING

Water Quality Meter (SN) 03E0443 AB
Control Box type (SN) MP10-1334
Turbidity Meter (SN) 1728-1600

Pump Intake 17.6' BTOC

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 1105
Sample Location: 13MWT 11
Sampled By: T. ROJAHN
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/4/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1405	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: SAME	CLEAR	3.20	0.224	15.27	6.1	0.73	+ 401	---

PURGE DATA:

Date: 5-04-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Bladder Pump								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 17.75								
Static Water Level (WL): 9.80								
One Casing Volume(gal/L): 4.9								
Start Purge (hrs): 1305								
End Purge (hrs): 1400								
Total Purge Time (min): 55								
Total Vol. Purged (gal/L): 5.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	(Yes) / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT NA -F 7.95' x .163 = 1.3 gal or 4.9

Dedicated pump intake @ 13.5

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT 11
DATE: 5-04-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1305	9.21	—	—	—	—	—	—	—	—	START PURGE
1315	9.80	1600	160	3.23	0.219	17	1.31	14.25	+422	CLEAR
1325	9.84	2500	90	3.30	0.226	12	1.25	15.08	417	CLEAR
1335	9.86	3300	80	3.21	0.228	11	0.92	15.25	408	CLEAR
1345	9.91	4100	80	3.13	0.224	9.3	0.78	15.32	408	CLEAR
1355	9.91	4900	80	3.16	0.225	7.6	0.69	15.28	405	CLEAR
1400	9.92	5300	80	3.20	0.224	6.1	0.73	15.27	401	CLEAR
1405	—	—	—	—	—	—	—	—	—	START PURGE

Water Quality Meter (SN): 99E0049 AA
Control Box type (SN): 16789 QED 400
Turbidity Meter (SN): 0359 4/97

Pump Intake: 13.5'

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 1305
Sample Location: 13MWT 13
Sampled By: Gockat
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-5-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1630	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Del Bladder	Clear	4.52	.085	13.30	1.0	3.67	421.6	---

PURGE DATA:

Date: 5-5-03	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Del. Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 21.44								
Static Water Level (WL): 5.36								
One Casing Volume(gal/L): 9.7								
Start Purge (hrs): 1445								
End Purge (hrs): 1625								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L) 14.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ ~19'

Circle if Applicable:		Signature(s):
MS/MSD —	Duplicate ID No.: —	[signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13 MWT 13
DATE: 5-5-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1445	5.36	-	-	-	-	-	-	-	-	start purge
1455	5.46	.80	80	4.41	.080	2.8	4.38	13.41	386.5	clear
1505	5.62	2.3	150	4.54	.080	2.2	4.20	13.69	395.9	"
1515	5.62	3.8	150	4.51	.084	2.1	4.04	13.43	405.5	"
1525	5.65	5.3	150	4.53	.082	1.8	4.00	13.57	410.4	"
1535	5.68	6.8	150	4.60	.084	1.4	3.90	13.39	413.1	"
1545	5.68	8.3	150	4.69	.083	1.3	3.88	12.79	413.4	"
1555	5.69	9.8	150	4.52	.084	1.4	3.74	13.16	413.4	"
1605	5.69	11.3	150	4.50	.087	1.2	3.69	13.44	418.2	"
1615	5.68	12.8	150	4.51	.087	1.3	3.70	13.21	419.7	"
1625	5.68	14.3	150	4.52	.085	1.0	3.67	13.30	421.6	end purge

Water Quality Meter (SN) 04C3884 AB
Control Box type (SN) MP10 - 1.6 GC
Turbidity Meter (SN) 2843-4501

Pump Intake 19'

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 1405
Sample Location: 13MWT 14
Sampled By: Goerdt
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-5-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1018	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Sed Bladder	Clear	5.84	.704	15.29	2.6	1.69	134.8	---

PURGE DATA:

Date: 5-5-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Sed Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 25.60								
Static Water Level (WL): 14.27								
One Casing Volume(gal/L): 6.8								
Start Purge (hrs): 0830								
End Purge (hrs): 1015								
Total Purge Time (min): 105								
Total Vol. Purged (gal/L): 10.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ 20'

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	
—	—	

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13 MWT 14
DATE: 5-5-05

Time (Hrs.)	Water Level (Ft below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
0830	14.27	-	-	-	-	-	-	-	-	Start purge
0840	14.37	0.5	50	5.84	.792	12	2.63	13.17	220.3	clear
0850	14.49	1.75	125	5.85	.798	9.7	1.83	13.39	199.5	"
0900	14.52	2.75	100	5.89	.760	6.1	2.13	13.66	148.1	"
0910	14.51	3.75	100	5.88	.743	5.4	1.64	13.75	141.9	"
0920	14.49	4.75	100	5.88	.731	4.8	1.71	14.21	137.2	"
0930	14.49	5.75	100	5.86	.713	3.9	1.85	14.50	134.4	"
0940	14.49	6.75	100	5.85	.713	2.7	1.73	14.75	134.3	"
0950	14.48	7.75	100	5.84	.713	2.6	1.35	15.13	134.4	"
1000	14.46	8.75	100	5.84	.708	2.8	2.36	15.16	134.2	"
1005	14.46	9.25	100	5.84	.707	3.2	1.66	15.20	134.5	"
1010	14.47	9.75	100	5.85	.707	3.0	1.72	15.22	135.2	"
1015	14.45	10.25	100	5.84	.704	2.6	1.69	15.29	134.8	End purge

Water Quality Meter (SN) 04-3884 AB
Control Box type (SN) MP10 16000
Turbidity Meter (SN) 2843-4501

Pump Intake 20'

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 1505
Sample Location: 13MWT 15
Sampled By: T. ROJAHN
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 5-05-05								
Time: 1625								
Method: SAME	CLEAR	3.02	0.313	13.95	15	1.00	+401	--

PURGE DATA:

Date: 05-05-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: DED. BLADDER								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Φ PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 27.87								
Static Water Level (WL): 14.00								
One Casing Volume(gal/L): 8.6								
Start Purge (hrs): 1440								
End Purge (hrs): 1620								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L): 9.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	(Yes) / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT —-F 13.87 X 0.163 = 2.3 gal or 8.6 L

Dedicated pump intake @ ~22.38'

All parameter stable except turb. on the increase.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Terry Rojah

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT15
DATE: 5-05-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1440	14.00	0	—	—	—	—	—	—	—	START PURGE
1450	14.90	1200	120	2.90	0.351	5.0	1.22	14.00	429	CLEAR
1500	15.09	2300	110	2.95	0.338	4.7	0.92	13.89	412	CLEAR
1510	15.20	3400	110	2.99	0.326	6.0	0.75	13.70	402	CLEAR
1520	15.03	4200	80	2.96	0.323	6.2	0.97	14.10	401	CLEAR
1530	15.97	5000	80	2.99	0.319	7.1	1.61	14.06	399	CLEAR
1540	15.95	5800	80	2.98	0.319	7.5	1.64	14.13	400	CLEAR
1550	15.93	6600	80	2.98	0.320	8.9	0.95	14.01	402	CLEAR
1600	15.91	7400	80	2.99	0.317	10	1.00	14.15	401	CLEAR
1610	15.91	8200	80	3.01	0.316	12	1.04	14.19	401	CLEAR
1620	15.90	9000	80	3.02	0.313	15	1.00	13.95	401	CLEAR
1625	—	—	—	—	—	—	—	—	—	START SAMPLING
1650	—	—	—	—	—	18	—	—	—	FINISH "

Water Quality Meter (SN) 99E0049 AA
Control Box type (SN) 16789 QED 400
Turbidity Meter (SN) 0359-4197

Pump Intake ~ 22.38'

SIGNATURE(S): Terry Rojek

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 1705
Sample Location: 13MWT 17
Sampled By: JSW
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/4/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 2:20	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Bladder Pump	CLEAR	5.16	0.135	13.52	0.40	0.18	289.6	---

PURGE DATA:

Date: 5/4/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Bladder Pump								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 20.30'								
Static Water Level (WL): 10.31								
One Casing Volume(gal/L): 5.91								
Start Purge (hrs): 12:50								
End Purge (hrs): 2:10								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] ~~13GWT F~~

Dedicated pump intake @ 15.33' BTOC

20.30
−10.31
9.99' x .163 = 1.63 GAL
= 5.91L

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT17
DATE: 5/4/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
12:50	10.31	Ø	100	5.06	0.133	2.1	1.14	13.53	268.8	CLEAR
1:00	10.39	1	100	5.15	0.131	1.3	0.45	12.99	270.9	
1:10	10.39	2	100	5.16	0.133	1.00	0.41	13.26	273.5	
1:20	10.39	3	100	5.13	0.134	0.75	0.38	13.51	276.9	
1:30	10.39	4	100	5.16	0.133	0.60	0.23	13.53	283.6	
1:40	10.39	5	100	5.12	0.133	0.40	0.21	13.49	291.2	
1:50	10.39	6	100	5.18	0.133	0.35	0.20	13.42	293.8	
2:00	10.39	7	100	5.16	0.134	0.30	0.19	13.58	292.8	
2:10	10.39	8	100	5.16	0.135	0.48	0.18	13.52	289.6	
2:20	END PURGE - SAMPLE									

Water Quality Meter (SN) ~~60~~ 01L0702 AF
Control Box type (SN) MP10-1334
Turbidity Meter (SN) 1728-1600

Pump Intake 15.33' BTOC

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 2105
Sample Location: 13MWT 21
Sampled By: JSW
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/4/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 10:50	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: BLADDER PUMP	CLEAR	5.42	0.176	13.10	2.8	0.42	283.7	---

PURGE DATA:

Date: 5/4/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: BLADDER PUMP								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 17.76'								
Static Water Level (WL): 9.62								
One Casing Volume(gal/L) 4.82								
Start Purge (hrs): 9:30								
End Purge (hrs): 10:40								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L): 7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] ~~13GWT F~~

Dedicated pump intake @ 13.37' BTOC

17.76
− 9.62
8.14'
× .163
1.33 GAL × 3.625 G/L
= 4.82 GALLONS

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT21
DATE: 5/4/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
9:30	10.0	Ø	100	5.38	0.173	9.3	1.32	13.42	286.4	CLEAR
9:40	10.24	1	100	5.63	0.173	18.0	0.94	12.86	266.7	
9:50	10.43	2	100	5.61	0.178	18.0	0.76	12.90	273.6	
10:00	10.59	3	100	5.48	0.178	9.6	0.58	12.99	283.0	
10:10	10.68	4	100	5.53	0.177	7.2	0.51	12.98	276.8	
10:20	10.75	5	100	5.41	0.177	4.7	0.46	13.02	279.5	
10:30	10.76	6	100	5.44	0.176	3.1	0.39	13.13	281.4	
10:40	10.76	7	100	5.42	0.176	2.8	0.42	13.10	283.7	
	END PURGE - START SAMPLE									

Water Quality Meter (SN): ØIL Ø7Ø2 AF
Control Box type (SN): MP10-1334
Turbidity Meter (SN): 1728-1600

Pump Intake: 13.37' BTOC

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 2804
Sample Location: 13MWT 28
Sampled By: Gorrell
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-3-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1420								
Method: Ded. bladder	clear	7.58	.771	14.09	4.2	0.59	191.3	---

PURGE DATA:

Date: 5-3-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded. bladder								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 91.70								
Static Water Level (WL): 77.88								
One Casing Volume(gal/L) 8.33								
Start Purge (hrs): 1015								
End Purge (hrs): 1415								
Total Purge Time (min): 240								
Total Vol. Purged (gal/L) 22.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(1) (2) L Glass Amber	(Yes) No
		Minimum vol. of 1 L collected on 5-3-05	

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ 88'

Upon completing 4-hr purge, WL was near pump intake. Well was allowed to recharge several times during sampling.

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—	—	[signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT28
DATE: 5-3-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1015	77.88	-	-	-	-	-	-	-	-	clear
1025	77.46	1.5	150	7.61	.986	4.8	2.73	16.43	201.7	
1035	78.85	3.0	150	7.60	.934	3.2	2.65	16.03	204.4	
1045	79.60	3.4	90	7.55	.916	1.7	1.33	15.38	207.1	
1055	80.16	4.8	90	7.52	.914	1.2	1.04	15.36	207.5	
1105	80.56	5.7	90	7.51	.911	0.86	0.95	15.40	207.9	
1115	80.97	~~6.6~~	90	7.53	.909	0.41	0.79	15.38	207.9	
1125	81.36	7.5	90	7.54	.906	0.25	0.75	15.18	207.4	
1135	81.47	8.4	90	7.54	.906	0.42	0.75	15.28	207.1	
1145	81.80	9.3	90	7.53	.896	0.95	0.73	15.30	206.2	
1155	82.62	10.2	90	7.54	.846	15	1.18	14.98	205.3	
1205	83.17	11.1	90	7.55	.857	—	1.21	15.21	204.9	
1215	83.58	12.0	90	7.56	.865	—	1.23	15.46	204.6	
1225	83.97	12.9	90	7.58	.873	37	1.06	15.06	200.4	
1235	84.67	13.8	90	7.58	.882	55	0.95	15.46	200.3	sl. cloudy
1245	-	14.7	90	7.59	.879	-	0.81	15.27	199.1	"
1255	-	15.6	90	7.59	.867	-	0.79	15.06	198.8	"
1305	-	16.5	90	7.58	.862	-	0.76	14.87	198.7	"
1315	-	17.4	90	7.60	.856	37	0.75	14.30	198.5	"
1325	86.76	18.3	90	7.59	.824	28	0.69	14.23	196.2	"
1335	86.87	19.2	90	7.59	.819	-	0.68	14.21	195.8	"
1345	87.12	20.1	90	7.61	.811	-	0.65	14.16	194.3	"
1355	87.48	21.0	90	7.60	.807	-	0.66	14.07	194.1	"
1405	87.87	21.9	90	7.60	.787	37	0.63	14.11	192.7	"
1415	88.27	22.8	90	7.58	.771	42	0.59	14.09	191.3	Stop purge

Water Quality Meter (SN) 04<3884 AB
Control Box type (SN) MP10 1600
Turbidity Meter (SN) 0359-4197

Pump Intake 88'

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 3104
Sample Location: 13MWT 31
Sampled By: Gorski
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-5-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1250								
Method: Ded. Bladder	Clear	5.74	1.119	13.77	3.4	2.39	271.8	--

PURGE DATA:

Date: 5-5-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded. Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" pvc			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 22.5'								
Static Water Level (WL): 11.04								
One Casing Volume(gal/L): 6.9								
Start Purge (hrs): 1045								
End Purge (hrs): 1245								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 12.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ 17.65'

Circle if Applicable:

MS/MSD	Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MW31
DATE: 5-5-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1045	11.04	-	-	-	-	-	-	-	-	Start purge
1055	12.24	1.50	150	5.66	1.270	8.4	2.24	12.23	210.0	Clear
1105	12.38	2.75	125	5.71	1.304	8.1	2.52	12.51	228.4	"
1115	12.46	3.75	100	5.74	1.309	7.9	2.99	12.57	237.6	"
1125	12.52	4.75	100	5.78	1.303	7.2	4.09	12.27	246.6	"
1135	12.58	5.75	100	5.82	1.293	6.3	2.77	12.24	254.0	"
1145	12.61	6.75	100	5.81	1.252	6.1	2.52	12.12	258.3	"
1155	12.69	7.75	100	5.82	1.200	5.7	2.52	12.06	262.5	"
1205	12.78	8.75	100	5.82	1.146	5.2	2.62	11.99	266.5	"
1215	12.73	9.75	100	5.80	1.125	4.8	2.49	12.48	268.9	"
1225	12.61	10.75	100	5.80	1.116	4.1	2.44	12.71	270.4	"
1235	12.49	11.75	100	5.77	1.114	3.7	2.42	13.82	271.5	"
1245	12.35	12.75	100	5.74	1.119	3.4	2.39	13.77	271.8	end purge

Water Quality Meter (SN): 04C 3884 AB
Control Box type (SN): MP10 1600
Turbidity Meter (SN): 2843-4501

Pump Intake: 17.65'

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 3404
Sample Location: 13MWT 35
Sampled By: T. ROJAHN
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-05-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1330								
Method: SAME	CLEAR	3.87	0.311	15.29	28	0.62	+ 640	---

PURGE DATA:

Date: 5-05-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: DED. BLADDER								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: ~~DED~~ TR 2"Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 22.40								
Static Water Level (WL): 5.44								
One Casing Volume(gal/L): 10.5								
Start Purge (hrs): 1055								
End Purge (hrs): 1325								
Total Purge Time (min): 150								
Total Vol. Purged (gal/L): 18.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	DUP	Container Requirements	MS/MSD	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2)	~~(2)~~ TR L Glass Amber	(4)	(Yes) / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT ——— -F 16.96' x .163 = 2.8 gal or 10.5

Dedicated pump intake @ ~ 17.58'

Circle if Applicable:

MS/MSD (YES) Duplicate ID No.: 13FD050505 01

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT34
DATE: 5-05-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1055	5.44	0	—	—	—	—	—	—	—	Start Purge
1105	5.74	1300	130	4.28	0.332	5.4	1.54	16.24	347	Clear
1115	5.84	2300	100	3.69	0.315	5.4	0.86	15.28	548	"
1125	5.87	3600	130	3.55	0.315	5.3	0.71	15.29	582	"
1135	5.88	4900	130	3.90	0.314	7.2	0.71	15.20	586	"
1145	5.88	6200	130	4.11	0.313	8.4	0.74	15.12	592	"
1155	5.87	7400	120	4.11	0.313	9.3	0.61	15.23	598	"
1205	5.87	8600	120	3.86	0.314	15	0.66	15.26	612	"
1215	5.87	9800	120	3.86	0.313	13	0.71	15.39	618	"
1225	5.87	11000	120	4.05	0.313	14	0.72	15.35	618	"
1235	5.87	12200	120	4.09	0.312	20	0.70	15.14	612	"
1245	5.87	13400	120	3.78	0.311	22	0.61	15.22	630	"
1255	5.87	14600	120	3.78	0.311	24	0.60	15.30	635	"
1305	5.87	15800	120	3.87	0.312	23	0.57	15.26	635	"
1315	5.87	17000	120	3.90	0.311	25	0.58	15.18	635	"
1325	5.87	18200	120	3.87	0.311	28	0.62	15.29	640	"
1330	—	—	—	—	—	—	—	—	—	Start Sampling
1524	—	—	—	—	—	32	—	—	—	Finish "

Water Quality Meter (SN) 99E0049 AA
Control Box type (SN) 16789 QED 400
Turbidity Meter (SN) 0359-4197

Pump Intake ~ 17.58'

All parameters stable but Turb. on increase.

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 3704
Sample Location: 13MWT 37
Sampled By: Gerald
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-4-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1658	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Ded. Bladder	Clear	5.37	.127	13.50	2.8	4.64	300.8	---

PURGE DATA:

Date: 5-4-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded. Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 27.15								
Static Water Level (WL): 13.81								
One Casing Volume(gal/L): 8.0								
Start Purge (hrs): 1505								
End Purge (hrs): 1655								
Total Purge Time (min): 110								
Total Vol. Purged (gal/L): 14.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ 22'

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	
—	—	

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13 GWT 37
DATE: 5-4-05

Time (Hrs)	Water Level (Ft below TOC)	Volume (L)	Flowrate (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1505	13.81	–	–	–	–	–	–	–	–	Start purge
1515	14.17	1.5	150	5.18	.127	3.2	5.01	13.98	272.4	clear
1525	14.52	3.0	150	5.21	.112	–	4.86	13.83	281.0	"
1535	14.59	4.4	140	5.22	.110	2.9	4.80	13.40	286.1	"
1545	14.68	5.8	140	5.21	.110	1.9	4.79	13.33	291.5	"
1555	14.71	7.2	140	5.22	.111	1.7	4.76	13.30	294.6	"
1605	14.75	8.6	140	5.25	.112	1.2	4.72	13.29	297.9	"
1615	14.69	9.8	120	5.29	.115	2.3	4.66	13.65	298.7	"
1625	14.69	11.0	120	5.33	.117	2.1	4.66	13.69	299.0	"
1635	14.69	12.2	120	5.38	.122	–	4.62	13.61	299.0	"
1645	14.71	13.4	120	5.39	.124	2.4	4.69	13.58	300.0	"
1655	14.70	14.6	120	5.37	.127	2.8	4.64	13.50	300.8	stop purge

Water Quality Meter (SN): 04C3884 AB
Control Box type (SN): MP10 1600
Turbidity Meter (SN): 2843 4501

Pump Intake: 22'

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 4004
Sample Location: 13MWT 40
Sampled By: Goeydt
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-4-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1118	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Ded. Bladder	Clear	6.10	.287	11.87	2.3	8.41	256.7	--

PURGE DATA:

Date: 5-4-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded. Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC		See Low Flow Purge Data Sheets						
Total Well Depth (TD): 27.70								
Static Water Level (WL): 18.35								
One Casing Volume(gal/L): 5.64								
Start Purge (hrs): 0945								
End Purge (hrs): 1115								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 8.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ 23'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT40
DATE: 5-4-05

Time (Hrs.)	Water Level (Ft below TOC)	Volume (L)	Flowrate (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
0945	18.35	-	-	-	-	-	-	-	-	Start purge
0955	18.64	0.90	90	6.32	0.300	5.1	8.46	11.90	228.5	clear
1005	18.79	1.8	90	6.20	.293	3.5	8.41	11.94	237.2	"
1015	18.83	2.7	90	6.18	.289	3.4	8.42	11.80	241.0	"
1025	18.99	3.6	90	6.16	.286	3.2	8.37	12.02	247.7	"
1035	18.84	4.5	90	6.20	.297	3.0	8.37	12.76	249.2	"
1045	18.78	5.4	90	6.26	.301	2.7	8.39	12.20	250.8	"
1055	18.81	6.3	90	6.16	.293	2.6	8.38	11.96	253.6	"
1105	18.80	7.3	100	6.12	.291	—	8.40	11.91	256.2	"
1115	18.81	8.3	100	6.10	.287	2.3	8.41	11.87	256.7	

Water Quality Meter (SN) 04C 3884 AB
Control Box type (SN) MP10 1600
Turbidity Meter (SN) 2843-4501

Pump Intake 23'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT4504
Sample Location: 13MWT45
Sampled By: T. ROSAHN
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-05-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1015								
Method: SAME	CLEAR	6.70	0.518	16.63	13	0.91	+71	---

PURGE DATA:

Date: 5-04-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Bladder Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2" Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 84.0								
Static Water Level (WL): 70.65								
One Casing Volume(gal/L)								
Start Purge (hrs): 0923								
End Purge (hrs): 1040								
Total Purge Time (min): 77								
Total Vol. Purged (gal/L): 9.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT NA -F

13.35 x 0.163 = 2.17 gal or 8.2 L

Dedicated pump intake @ 80'

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Terry Rosahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT45
DATE: 5-04-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
0923	70.81	—	—	—	—	—	—	—	—	Start Purge
0933	72.65	1000	100	6.59	0.498	5.5	1.20	15.06	+ 88	CLEAR
0943	73.95	2500	150	6.25	0.470	0.6	0.77	14.78	+ 245	CLEAR
0953	75.38	4000	150	5.97	0.456	10	1.21	14.88	371	CLEAR
1003	76.84	5500	150	6.09	0.468	20	0.93	14.82	346	CLEAR
1013	78.40	7000	150	6.45	0.487	17	0.69	14.87	116	CLEAR
1023	*	8500	150	6.63	0.504	13	0.62	15.73	80	CLEAR
1033	*	9300	80	6.70	0.518	13	0.91	16.63	71	CLEAR
1040					DRY					WL below Pump

Water Quality Meter (SN) 99E0049 AA
Control Box type (SN) 16789 QED 400
Turbidity Meter (SN) 0359-4197

Pump Intake 80'

Well Dries out - Historically

SIGNATURE(S): Terry Regal

* W.L. below Top of Pump

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 4604
Sample Location: 13MWT 46
Sampled By: Goerdt
C.O.C. No.: 3713
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-4-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1425	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Ded. Bladder	clear	6.44	.596	13.64	3.5	0.99	64.7	--

PURGE DATA:

Date: 5-4-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded. Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 67.60								
Static Water Level (WL): 56.83								
One Casing Volume(gal/L): 6.5								
Start Purge (hrs): 1250								
End Purge (hrs): 1420								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L): 9.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 13GWT_____-F

Dedicated pump intake @ 63'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13GWT46
DATE: 5-4-03

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (~~mL/Min.~~)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1250	56.83	-	-	-	-	-	-	-	-	Start purge
1300	56.85	1.0	100	6.47	.627	33	2.72	13.65	85.8	Clear
1310	56.88	2.0	100	6.47	.617	27	1.14	13.48	77.3	"
1320	56.89	3.0	100	6.47	.616	16	1.07	13.49	73.3	"
1330	56.89	4.0	100	6.47	.606	12	0.94	13.52	71.2	"
1340	56.91	5.0	100	6.46	.602	8.7	0.89	13.57	68.3	"
1350	56.91	6.0	100	6.45	.599	5.5	0.91	13.50	68.2	"
1400	56.91	7.0	100	6.44	.597	4.8	0.88	13.54	66.7	"
1410	56.91	8.0	100	6.44	.595	3.7	0.91	13.60	65.4	"
1420	56.90	9.0	100	6.44	.596	3.5	0.92	13.64	64.7	End purge

Water Quality Meter (SN) 04C3884 AB
Control Box type (SN) MP 10 - 1600
Turbidity Meter (SN) 2843-4501

Pump Intake 63'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT 47 Ø4
Sample Location: 13MWT 47
Sampled By: JSW
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/5/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 13:55	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Bladder Pump	Clear	3.41	0.751	11.59	0.18	0.07	320.1	---

PURGE DATA:

Date: 5/5/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Bladder Pump								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 20.2'								
Static Water Level (WL): 7.90'								
One Casing Volume(gal/L): 7.3								
Start Purge (hrs): 12:25								
End Purge (hrs): 13:45								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 9.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] ~~13GWT~~ ~~F~~

Dedicated pump intake @ 14.82' BTOC

20.20'
− 7.90
12.30 (0.163) = 2.01 Gal
= 7.3 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT47
DATE: 5/5/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
12:25	JSW ~~Ø~~ 7.92'	Ø	120	3.40	0.743	0.04	0.14	11.33	343.6	CLEAR
12:35	8.45	1.2	120	3.41	0.750	1.7	0.11	11.59	335.8	" "
12:45	8.52	2.4	120	3.38	0.752	2.5	0.15	11.70	333.4	" "
12:55	8.65	3.6	120	3.39	0.752	1.8	0.13	11.62	329.7	" "
13:05	8.72	4.8	120	3.42	0.750	0.95	0.11	11.63	323.6	" "
13:15	8.80	6.0	120	3.40	0.751	0.60	0.10	11.59	320.8	" "
13:25	8.69	7.2	120	3.41	0.752	0.21	0.08	11.69	320.9	" "
13:35	8.71	8.4	120	3.41	0.752	0.23	0.08	11.65	319.5	" "
13:45	8.72	9.6	120	3.41	0.751	0.18	0.07	11.59	320.1	" "
13:55	END PURGE AND COLLECT SAMPLES									

Water Quality Meter (SN): Ø1LØ7Ø2 AF
Control Box type (SN): MPIØ - 1334
Turbidity Meter (SN): 1728 - 16ØØ

Pump Intake: 14.82' BTOC

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 13GWT5103
Sample Location: 13MWT51
Sampled By: JSW
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/5/05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 11:30								
Method: BLADDER PUMP	CLEAR	5.93	0.131	11.07	8.3	0.17	249.6	---

PURGE DATA:

Date: 5/5/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: BLADDER PUMP								
Monitor Reading (ppm): NA								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 17.72								
Static Water Level (WL): 6.77'								
One Casing Volume(gal/L): 6.5								
Start Purge (hrs): 10:00								
End Purge (hrs): 11:20								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): 8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] ~~13GWT~~ ~~F~~

Dedicated pump intake @ 15' BTOC

17.72
- 6.77
10.95 (0.163) = 1.79 GAL
= 6.5 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 13MWT51
DATE: 5/5/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
10:00	6.90	Ø	100	5.98	0.136	9.8	0.76	11.63	228.7	CLEAR
10:10	6.98	1	100	5.88	0.133	9.2	0.35	11.18	257.5	
10:20	6.98	2	100	5.86	0.131	8.6	0.28	11.10	263.2	
10:30	JSW ~~6~~ 7.01	3	100	5.89	0.130	8.8	0.21	10.94	258.9	
10:40	7.01	4	100	5.88	0.130	8.7	0.20	10.98	252.6	
10:50	7.02	5	100	5.91	0.130	8.3	0.19	10.88	249.7	
11:00	7.02	6	100	5.92	0.130	8.4	0.18	10.93	248.4	
11:10	7.03	7	100	5.94	0.130	8.3	0.17	11.02	247.6	
11:20	7.03	8	100	5.93	0.131	8.3	0.17	11.07 JSW ~~249~~	249.6	
11:30	END PURGE AND COLLECT SAMPLES									

Water Quality Meter (SN) ØIL Ø7Ø2 AF
Control Box type (SN) MPIØ - 1334
Turbidity Meter (SN) 1728 - 16ØØ

Pump Intake 15' BTOC

SIGNATURE(S):

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A.1.2

SWMU 13

GROUNDWATER SAMPLE LOG SHEETS

ROUND 6

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/9/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4505
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/9/05	**Static Water Level (ft.)**	70.55	**Water Quality Meter**	99K 1014 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	84.0	**Pump Control Box**	MP10-1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/9/05	10:30	70.55	160	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/9/05	10:40	72.23	160	Clear	5.04	509	3.68	1.1	17.15	333.7	NA	NA	1600
8/9/05	10:50	NA	160	Clear	NA	NA	NA	NA	NA	NA	NA	NA	1600
8/9/05	11:00	73.82	160	Clear	5.05	476	0.90	0.0	16.71	589.9	NA	NA	1600
8/9/05	11:10	74.84	160	Clear	4.99	461	1.34	3.4	16.69	603.0	NA	NA	1600
8/9/05	11:20	72.18	160	Clear	4.95	459	1.73	6.3	16.71	607.9	NA	NA	1600
8/9/05	11:30	76.60	160	Clear	4.9	463	1.57	14	16.83	607.5	NA	NA	1600
8/9/05	11:40	77.42	160	Clear	4.87	471	1.26	14	16.80	609.0	NA	NA	1600

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/9/05	11:50	78.08	160	Clear	4.84	477	1.11	17	16.84	607.6	NA	NA	1600
8/9/05	12:00	NA	160	Clear	4.79	492	0.81	21	16.78	591.2	NA	NA	1600
8/9/05	12:07	NA	160	Clear	4.76	505	0.72	34	17.09	580.3	NA	NA	1120

Final Purge / Sample Data

One Casing Volume	8.11	**Method**		**Dissolved Oxygen (mg/L)**	0.72
Total Vo. Purge (L)	15.52	**Waterlevel (ft.)**	NA	**Turbidity (NTUs)**	34
Start Purge (hrs.)	8/9/05	**Flowrate (mL/min)**	160	**Temp (C)**	17.09
End Purge (hrs.)	8/9/05	**Color**	Clear	**ORP (mV)**	580.3
Total Purge Time (min.)	0	**pH (S.U.)**	4.76	**Salinity**	
		Conductivity (mS/cm)	505	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/10/05	08:40	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-1
✓	8/10/05	08:40	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-1
✓	8/10/05	08:40	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/9/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT2805
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/9/05	**Static Water Level (ft.)**	77.76	**Water Quality Meter**	99K1014AB
Purge Method	-Select-	**Total Well Depth (ft.)**	91.70	**Pump Control Box**	MP10 1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/9/05	14:05	71.76	100	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/9/05	14:15	77.25	100	Clear	4.40	907	8.02	5.3	30.06	332.9	NA	NA	1000
8/9/05	14:25	79.08	100	Clear	4.26	900	2.84	4.7	18.59	563.4	NA	NA	1000
8/9/05	14:35	80.1	100	Clear	4.23	909	1.78	0.0	18.18	605.7	NA	NA	1000
8/9/05	14:45	80.63	100	Clear	4.23	902	1.25	0.0	18.04	623.4	NA	NA	1000
8/9/05	14:55	80.99	100	Clear	4.21	899	1.08	0.0	18.01	632.4	NA	NA	1000
8/9/05	15:05	81.38	100	Clear	4.20	896	0.98	0.0	17.93	648.7	NA	NA	0
8/9/05	15:15	82.02	110	Clear	4.20	872	0.85	0.0	17.75	653.4	NA	NA	1100

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/9/05	15:25	82.70	110	Clear	4.21	892	0.92	0.0	17.86	643.2	NA	NA	3300
8/9/05	15:35	82.98	110	Clear	4.20	838	1.31	12	17.41	672.5	NA	NA	1100
8/9/05	15:45	83.92	110	Clear	4.19	838	1.30	22	17.35	676.4	NA	NA	1100
8/9/05	15:55	84.73	110	Clear	4.17	845	1.20	34	17.31	683.6	NA	NA	1100
8/9/05	16:05	85.90	110	Clear	4.17	840	0.93	41	16.86	668.2	NA	NA	1100
8/9/05	16:15	86.23	100	Clear	4.18	843	0.86	63	16.93	664.1	NA	NA	1000
8/9/05	16:25	87.32	100	Clear	4.17	840	0.73	49	16.76	659.8	NA	NA	1000
8/9/05	16:35	88.17	100	Clear	4.16	825	0.66	31	16.42	657.0	NA	NA	1000
8/9/05	16:45	NA	100	Clear	4.14	810	0.55	24	16.38	603.6	NA	NA	1000
8/9/05	16:48	NA	100	Clear	4.14	808	0.49	11	16.40	564.4	NA	NA	300

Final Purge / Sample Data

Casing Volume	8.4	**Method**		**Dissolved Oxygen (mg/L)**	0.49
Total Vo. Purge (L)	16.9	**Waterlevel (ft.)**	NA	**Turbidity (NTUs)**	11
Start Purge (hrs.)	8/9/05	**Flowrate (mL/min)**	100	**Temp (C)**	16.40
End Purge (hrs.)	8/9/05	**Color**	Clear	**ORP (mV)**	564.4
Total Purge Time (min.)	0	**pH (S.U.)**	4.14	**Salinity**	
		Conductivity (mS/cm)	808	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/10/05	13:00	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-1
✓	8/10/05	13:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-1
✓	8/10/05	13:00	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/10/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4605
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/10/05	**Static Water Level (ft.)**	57.12	**Water Quality Meter**	99K1014 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	67.60	**Pump Control Box**	MP10-1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	Y	**Well Volumes Req.**			
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)
8/10/05	13:45	57.12	.13	Clear									0
8/10/05	13:55	57.21	.13	Clear	6.0	577	4.57	16	16.67	302.6			0
8/10/05	14:05	57.22	.13	Clear		559	1.33	12	15.28	356.9			0
8/10/05	14:15	57.23	.13	Clear		561	1.00	1.9	15.18	441.3			0
8/10/05	14:25	57.23	.13	Clear		565	0.94	1.6	15.26	496.8			0
8/10/05	14:35	57.23	.13	Clear	6.0	563	0.91	1.7	15.23	532.7			0
8/10/05	14:45	57.22	.13	Clear		559	0.85	1.5	15.08	558.7			0
8/10/05	15:05	57.21	.13	Clear		554	0.84	.35	15.05	597.6			0

Final Purge / Sample Data

One Casing Volume	6.3	**Method**		**Dissolved Oxygen (mg/L)**	0.84
Total Vo. Purge (L)		**Waterlevel (ft.)**	57.21	**Turbidity (NTUs)**	.35
Start Purge (hrs.)	8/10/05	**Flowrate (mL/min)**	0.13	**Temp (C)**	15.05
End Purge (hrs.)	8/10/05	**Color**	Clear	**ORP (mV)**	597.6
Total Purge Time (min.)	0	**pH (S.U.)**		**Salinity**	
		Conductivity (mS/cm)	554	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/10/05	15:15	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	4	Glass	1L Amber		112G00041-8122005-1
✓	8/10/05	15:15	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	3	Plastic	1L HDPE		112G00041-8122005-1
✓	8/10/05	15:15	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	2	Glass	1L Amber		112G00041-8122005-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	Terry Rojahn	**Printed By**	Joseph Lucas
Created Date	8/10/05	**Modified Date**	1/19/06	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT2106
TtNUS Project #	112G00041	**Well ID**	13MWT21
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/10/05	**Static Water Level (ft.)**	10.45	**Water Quality Meter**	99K1014 AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	17.76	**Pump Control Box**	MP 10-1588
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/10/05	09:50	10.45	150	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/10/05	10:00	10.74	150	Clear	6.0	NA	NA	4.4	NA	NA	NA	NA	0
8/10/05	10:10	10.78	150	Clear	NA	136	0.90	3.5	22.58	608.8	NA	NA	0
8/10/05	10:20	10.80	90	Clear	NA	133	0.72	3.1	21.14	640.6	NA	NA	0
8/10/05	10:30	10.82	90	Clear	NA	144	0.69	5.3	21.41	700.8	NA	NA	0
8/10/05	10:40	10.85	90	Clear	5.0	150	0.68	3.7	21.47	708.8	NA	NA	0
8/10/05	10:50	10.96	90	Clear	NA	159	0.66	3.9	21.62	724.1	NA	NA	0
8/10/05	11:00	11.02	90	Clear	5.0	164	0.67	2.6	22.09	739.4	NA	NA	0

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/10/05	11:10	11.03	90	Clear	5.0	168	0.65	3.8	22.09	746.3	NA	NA	0
8/10/05	11:20	11.02	90	Clear	5.0	171	0.65	4.2	22.30	748.2	NA	NA	0

Final Purge / Sample Data

One Casing Volume	4.4	**Method**		**Dissolved Oxygen (mg/L)**	0.65
Total Vo. Purge (L)		**Waterlevel (ft.)**	11.02	**Turbidity (NTUs)**	4.2
Start Purge (hrs.)	8/10/05	**Flowrate (mL/min)**	90	**Temp (C)**	22.30
End Purge (hrs.)	8/10/05	**Color**	Clear	**ORP (mV)**	748.2
Total Purge Time (min.)	0	**pH (S.U.)**	5.0	**Salinity**	NA
		Conductivity (mS/cm)	171	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/10/05	11:25	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-1
✓	8/10/05	11:25	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-1
✓	8/10/05	11:25	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	John Wright	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT3405
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	John Wright
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**	5.9	**Water Quality Meter**	98F0478AB
Purge Method	-Select-	**Total Well Depth (ft.)**	22.40	**Pump Control Box**	US100
Sampling Method		**Well Riser Diameter (in.)**	2	**Turbidity Meter**	1733-1600
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/11/05	09:00	5.9	120	Clear									0
8/11/05	09:10	6.64	120	Clear	6.93	.320	1.14	6.8	17.85	229.7	NA	NA	0
8/11/05	09:20	6.84	120	Clear	7.43	.303	.66	3.7	17.45	218.9	NA	NA	0
8/11/05	09:30	6.77	120	Clear	6.33	.296	0.59	2.2	17.32	200.9	NA	NA	0
8/11/05	09:40	6.97	120	Clear	5.85	.288	0.55	1.8	17.29	207.5	NA	NA	0
8/11/05	09:51	6.96	120	Clear	5.80	.288	0.53	2.2	17.16	216.2	NA	NA	0
8/11/05	10:00	7.03	120	Clear	5.75	.287	0.50	2.5	17.08	216.1	NA	NA	0
8/11/05	10:09	7.06	120	Clear	5.63	.285	0.48	1.7	17.05	218.6	NA	NA	0

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/11/05	10:19	7.08	120	Clear	5.44	.285	0.47	1.8	17.00	222.6	NA	NA	0
8/11/05	10:30	7.09	120	Clear	5.29	.286	0.46	1.6	16.94	226.9	NA	NA	0
8/11/05	10:40	7.13	120	Clear	5.24	.287	0.44	1.3	16.90	230.6	NA	NA	0
8/11/05	10:51	7.16	120	Clear	4.99	.290	0.44	1.6	16.92	243.1	NA	NA	0
8/11/05	11:02	7.17	120	Clear	4.83	.284	0.43	1.2	16.88	259.2	NA	NA	0
8/11/05	11:10	7.21	120	Clear	1.17	.292	0.40	1.4	16.87	339.8	NA	NA	0
8/11/05	11:21	7.21	120	Clear	0.58	.291	0.38	1.1	16.83	355.5	NA	NA	0
8/11/05	11:30	7.18	120	Clear	1.37	.291	0.38	0.95	16.80	329.4	NA	NA	0
8/11/05	11:39	7.22	120	Clear	4.61	.291	0.36	1.3	16.79	253.6	NA	NA	0
8/11/05	11:50	7.28	120	Clear	4.63	.289	0.36	0.85	16.85	247.2	NA	NA	0
8/11/05	12:00	7.21	120	Clear	4.49	.289	0.36	1.1	16.85	244.6	NA	NA	0

Final Purge / Sample Data

One Casing Volume	10.19	**Method**		**Dissolved Oxygen (mg/L)**	0.36
Total Vo. Purge (L)	calc	**Waterlevel (ft.)**	7.21	**Turbidity (NTUs)**	1.1
Start Purge (hrs.)	8/11/05	**Flowrate (mL/min)**	120	**Temp (C)**	16.85
End Purge (hrs.)	8/11/05	**Color**	Clear	**ORP (mV)**	244.6
Total Purge Time (min.)	0	**pH (S.U.)**	4.49	**Salinity**	
		Conductivity (mS/cm)	.289	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/11/05	12:22	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	12:22	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-2
✓	8/11/05	12:22	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	John Wright	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13FD08110501
TtNUS Project #	112G00041	**Well ID**	-Select-
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	John Wright
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	
MS/MSD Collected?	N	**Well Volumes Req.**			
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)

Final Purge / Sample Data

One Casing Volume		**Method**		**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)		**Waterlevel (ft.)**		**Turbidity (NTUs)**	
[illegible]rt Purge (hrs.)		**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)		**Color**	error	**ORP (mV)**	
Total Purge Time (min.)	0	**pH (S.U.)**		**Salinity**	
		Conductivity (mS/cm)		**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/11/05	00:00	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	00:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	00:00	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-2
✗	8/11/05		SW-846 8330	Energetics	4 ° C	2	Glass	1L Amber		
✗	8/11/05		SW-846 8330 (mod) LC/MS	Energetics	4 ° C	1	Glass	1L Amber		

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	John Wright	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1106
TtNUS Project #	112G00041	**Well ID**	13MWT11
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	John Wright
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**	10.09	**Water Quality Meter**	98F0478AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	17.75	**Pump Control Box**	US 100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2	**Turbidity Meter**	1733-1600
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/11/05	14:15	10.09	100	Clear									0
8/11/05	14:25	10.58	100	Cloudy	4.45	.249	1.12	30	22.68	186.8	NA	NA	0
8/11/05	14:35	10.86	100	Cloudy	4.38	.234	0.87	60	20.90	189.2	NA	NA	0
8/11/05	14:45	11.38	100	Cloudy	4.44	.226	0.65	130	20.24	189.9	NA	NA	0
8/11/05	14:55	11.62	100	Cloudy	4.21	.237	0.47	80	19.74	200.1	NA	NA	0
8/11/05	15:05	12.03	100	Cloudy	4.18	.244	0.43	120	19.17	190.6	NA	NA	0
8/11/05	15:15	12.41	100	Cloudy	4.14	.246	0.43	170	19.05	193.0	NA	NA	0
8/11/05	15:25	12.27	80	Cloudy	4.12	.258	0.39	90	21.18	183.6	NA	NA	0

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/11/05	15:35	11.98	80	Cloudy	4.14	.267	0.41	22	23.40	179.9	NA	NA	0
8/11/05	15:45	11.83	80	Cloudy	4.15	.254	0.40	7.0	22.81	154.4	NA	NA	0
8/11/05	15:56	11.74	80	Cloudy	4.09	.253	0.39	7.0	22.81	156.1	NA	NA	0
8/11/05	16:05	11.72	80	Clear	4.09	.253	0.39	6.3	23.00	154.1	NA	NA	0

Final Purge / Sample Data

One Casing Volume	4.73	**Method**		**Dissolved Oxygen (mg/L)**	0.39
Total Vo. Purge (L)	calc	**Waterlevel (ft.)**	11.72	**Turbidity (NTUs)**	6.3
Start Purge (hrs.)	8/11/05	**Flowrate (mL/min)**	80	**Temp (C)**	23.00
End Purge (hrs.)	8/11/05	**Color**	Clear	**ORP (mV)**	154.1
Total Purge Time (min.)	0	**pH (S.U.)**	4.09	**Salinity**	NA
		Conductivity (mS/cm)	.253	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/11/05	16:10	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	16:10	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-2
✓	8/11/05	16:10	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1706
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**	11.41	**Water Quality Meter**	98H1228-AB
Purge Method	-Select-	**Total Well Depth (ft.)**	20.30	**Pump Control Box**	MP10-1088
Sampling Method				**Turbidity Meter**	4557-3303
MS/MSD Collected?	N	**Well Riser Diameter (in.)**	2		
Duplicate Sample Collected?	N	**Well Volumes Req.**			
Corresponding Duplicate Sample ID		**Monitor Reading (ppm)**	NA		

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)
8/11/05	11:27	11.41	130	Clear									0
8/11/05	11:37	11.45	120	Clear	4.86	0.226	1.53	0.15	21.66	333			0
8/11/05	11:47	11.45	120	Clear	4.79	0.228	1.33	0.20	22.08	425			0
8/11/05	11:57	11.45	120	Clear	4.79	0.230	1.11	0.20	21.94	451			0
8/11/05	12:07	11.45	120	Clear	4.65	0.229	1.10	0.15	21.70	469			0
8/11/05	12:17	11.45	120	Clear	4.53	0.230	1.10	0.10	21.83	498			0
8/11/05	12:27	11.45	120	Clear	4.48	0.231	0.95	0.20	21.72	512			0
8/11/05	12:37	11.45	120	Clear	4.44	0.232	0.95	0.00	21.71	520			0

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/11/05	12:47	11.45	120	Clear	4.43	0.233	0.96	0.00	21.81	517			0

Final Purge / Sample Data

One Casing Volume	5.5	**Method**		**Dissolved Oxygen (mg/L)**	0.96
Total Vo. Purge (L)	9.7	**Waterlevel (ft.)**	11.45	**Turbidity (NTUs)**	0.00
Start Purge (hrs.)	8/11/05	**Flowrate (mL/min)**	120	**Temp (C)**	21.81
End Purge (hrs.)	8/11/05	**Color**	Clear	**ORP (mV)**	517
Total Purge Time (min.)	0	**pH (S.U.)**	4.43	**Salinity**	
		Conductivity (mS/cm)	0.233	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/11/05	12:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	12:50	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-2
✓	8/11/05	12:50	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

SMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1506
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**	15.91	**Water Quality Meter**	98H1228-AB
Purge Method	-Select-	**Total Well Depth (ft.)**	27.87	**Pump Control Box**	MP-1088
Sampling Method				**Turbidity Meter**	4557-3303
MS/MSD Collected?	N	**Well Riser Diameter (in.)**	2		
Duplicate Sample Collected?	N	**Well Volumes Req.**			
Corresponding Duplicate Sample ID		**Monitor Reading (ppm)**	NA		

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)
8/11/05	14:45	15.91	120	Clear									0
8/11/05	14:55	16.80	120	Clear	2.85	0.358	1.86	2.8	18.34	341			0
8/11/05	15:05	16.86	90	Clear	2.95	0.342	1.13	3.5	18.87	335			0
8/11/05	15:15	16.84	90	Clear	3.03	0.331	1.08	2.3	18.74	336			0
8/11/05	15:25	16.85	90	Clear	3.04	0.322	0.91	5.3	18.84	338			0
8/11/05	15:35	16.85	90	Clear	3.14	0.316	0.91	5.4	18.72	339			0
8/11/05	15:45	16.86	90	Clear	3.13	0.312	0.87	5.6	18.49	341			0
8/11/05	15:55	16.86	90	Clear	3.10	0.312	0.90	4.5	18.38	342			0

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/11/05	16:05	16.86	90	Clear	3.14	0.309	0.91	4.4	18.40	342			0

Final Purge / Sample Data

One Casing Volume	7.4	**Method**		**Dissolved Oxygen (mg/L)**	0.91
Total Vo. Purge (L)	7.8	**Waterlevel (ft.)**	16.86	**Turbidity (NTUs)**	4.4
Start Purge (hrs.)	8/11/05	**Flowrate (mL/min)**	90	**Temp (C)**	18.40
End Purge (hrs.)	8/11/05	**Color**	Clear	**ORP (mV)**	342
Total Purge Time (min.)	0	**pH (S.U.)**	3.14	**Salinity**	
		Conductivity (mS/cm)	0.309	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/11/05	16:10	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	16:10	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	16:10	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4005
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**	17.95	**Water Quality Meter**	99K1014AB
Purge Method	-Select-	**Total Well Depth (ft.)**	27.70	**Pump Control Box**	MP10-1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?		**Well Volumes Req.**			
Duplicate Sample Collected?					
Corresponding Duplicate Sample ID		**Monitor Reading (ppm)**	NA		

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)
8/11/05	11:45	17.95	90	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/11/05	11:55	18.11	90	Clear	6.0	253	8.35	0.0	16.70	431.2	NA	NA	0
8/11/05	12:05	18.21	90	Clear	NA	257	8.18	0.0	17.50	469.5	NA	NA	0
8/11/05	12:15	18.24	90	Clear	NA	264	8.04	0.0	18.66	508.3	NA	NA	0
8/11/05	12:25	18.16	50	Clear	6.0	256	8.15	1.1	17.21	542.0	NA	NA	0
8/11/05	12:35	18.27	50	Clear	NA	247	8.04	1.5	16.00	556.5	NA	NA	0
8/11/05	12:45	18.33	110	Clear	NA	246	7.94	1.9	15.88	563.8	NA	NA	0
8/11/05	12:55	18.36	110	Clear	NA	245	7.91	0.0	15.89	564.2	NA	NA	0

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/11/05	13:05	18.39	110	Clear	6.0	246	7.88	0.0	15.90	575.4	NA	NA	0
8/11/05	13:15	18.37	110	Clear	NA	245	7.80	1.8	15.93	578.6	NA	NA	0
8/11/05	13:25	18.39	110	Clear	NA	243	7.82	0.0	15.63	579.7	NA	NA	0
8/11/05	13:35	18.38	110	Clear	NA	246	7.79	1.2	15.95	580.1	NA	NA	0
8/11/05	13:45	18.39	110	Clear	6.0	248	7.84	1.4	15.03	588.7	NA	NA	0

Final Purge / Sample Data

One Casing Volume	5.9	**Method**		**Dissolved Oxygen (mg/L)**	7.84
Total Vo. Purge (L)	11.4	**Waterlevel (ft.)**	18.39	**Turbidity (NTUs)**	1.4
Start Purge (hrs.)	8/11/05	**Flowrate (mL/min)**	110	**Temp (C)**	15.03
End Purge (hrs.)	8/11/05	**Color**	Clear	**ORP (mV)**	588.7
Total Purge Time (min.)	0	**pH (S.U.)**	6.0	**Salinity**	
		Conductivity (mS/cm)	248	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/11/05	13:50	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-2
✓	8/11/05	13:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	13:50	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT5104
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**	13.97	**Water Quality Meter**	99K1014AB
Purge Method	-Select-	**Total Well Depth (ft.)**	17.72	**Pump Control Box**	MP10 1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/11/05	14:45	13.97	140	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/11/05	14:55	14.92	140	Clear	6.0	334	0.64	33	17.70	430.7	NA	NA	0
8/11/05	15:03	NA	140	Clear	6.0	344	0.52	110	17.78	356.2	NA	NA	0

Final Purge / Sample Data

One Casing Volume	2.3	**Method**		**Dissolved Oxygen (mg/L)**	0.52
Total Vo. Purge (L)	2.52	**Waterlevel (ft.)**	NA	**Turbidity (NTUs)**	110
Start Purge (hrs.)	8/11/05	**Flowrate (mL/min)**	140	**Temp (C)**	17.78
End Purge (hrs.)	8/11/05	**Color**	Clear	**ORP (mV)**	356.2
Total Purge Time (min.)	0	**pH (S.U.)**	6.0	**Salinity**	
		Conductivity (mS/cm)	344	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/12/05	08:35	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/12/05	08:35	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	17:00	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/11/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT3705
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/11/05	**Static Water Level (ft.)**	13.65	**Water Quality Meter**	99K1014AB
Purge Method	-Select-	**Total Well Depth (ft.)**	27.15	**Pump Control Box**	MP10 1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/11/05	08:30	13.65	110	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/11/05	08:40	14.21	110	Clear	4.5	105	5.12	0.0	15.65	327.9	NA	NA	0
8/11/05	08:50	14.32	110	Clear	NA	100	4.78	0.0	15.63	370.7	NA	NA	0
8/11/05	09:00	14.40	110	Clear	NA	100	4.75	0.0	15.55	386.2	NA	NA	0
8/11/05	09:10	14.51	110	Clear	5.0	101	4.65	0.0	15.59	403.1	NA	NA	0
8/11/05	09:20	14.55	110	Clear	NA	102	4.58	0.0	15.65	414.1	NA	NA	0
8/11/05	09:30	14.59	130	Clear	5.0	106	4.36	0.0	15.87	427.3	NA	NA	0
8/11/05	09:40	14.58	130	Clear	NA	108	4.30	0.0	15.65	435.6	NA	NA	0

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/11/05	09:50	14.60	130	Clear	NA	119	4.26	0.0	15.91	453.7	NA	NA	0
8/11/05	10:00	14.60	130	Clear	NA	122	4.23	0.0	16.03	465.0	NA	NA	0
8/11/05	10:10	14.59	130	Clear	5.0	124	4.37	1.1	16.40	469.2	NA	NA	0
8/11/05	10:20	14.58	130	Clear	5.0	127	4.39	1.6	16.53	472.7	NA	NA	0

Final Purge / Sample Data

One Casing Volume	8.1	**Method**		**Dissolved Oxygen (mg/L)**	4.39
Total Vo. Purge (L)	13.3	**Waterlevel (ft.)**	14.58	**Turbidity (NTUs)**	1.6
Start Purge (hrs.)	8/11/05	**Flowrate (mL/min)**	130	**Temp (C)**	16.53
End Purge (hrs.)	8/11/05	**Color**	Clear	**ORP (mV)**	472.7
Total Purge Time (min.)	0	**pH (S.U.)**	5.0	**Salinity**	
		Conductivity (mS/cm)	127	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/11/05	10:23	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8122005-2
✓	8/11/05	10:23	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8122005-2
✓	8/11/05	10:23	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8122005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/15/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1306
TtNUS Project #	112G00041	**Well ID**	13MWT13
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/15/05	**Static Water Level (ft.)**	6.31	**Water Quality Meter**	99K1014 AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	21.44	**Pump Control Box**	MP10 1588
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/15/05	13:35	6.31	150	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/15/05	13:45	6.55	150	Clear	3.67	89	4.07	0.6	19.04	629.6	NA	NA	1500
8/15/05	13:55	6.55	150	Clear	3.53	86	4.04	0.0	19.74	678.4	NA	NA	1500
8/15/05	14:05	6.55	150	Clear	3.52	88	3.81	0.0	19.54	686.6	NA	NA	1500
8/15/05	14:15	6.51	150	Clear	3.54	91	3.63	0.0	19.52	687.4	NA	NA	1500
8/15/05	14:25	6.50	150	Clear	3.55	92	3.52	0.0	19.46	688.3	NA	NA	1500
8/15/05	14:35	6.51	150	Clear	3.54	93	3.38	0.0	19.58	691.6	NA	NA	1500
8/15/05	14:45	6.50	150	Clear	3.58	97	3.30	0.0	19.47	688.9	NA	NA	1500

Final Purge / Sample Data

One Casing Volume	9.1	**Method**		**Dissolved Oxygen (mg/L)**	3.30
Total Vo. Purge (L)	10.5	**Waterlevel (ft.)**	6.50	**Turbidity (NTUs)**	0.0
Start Purge (hrs.)	8/15/05	**Flowrate (mL/min)**	150	**Temp (C)**	19.47
End Purge (hrs.)	8/15/05	**Color**	Clear	**ORP (mV)**	688.9
Total Purge Time (min.)	0	**pH (S.U.)**	3.58	**Salinity**	NA
		Conductivity (mS/cm)	97	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/15/05	14:50	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8162005-3
✓	8/15/05	14:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8162005-3
✓	8/15/05	14:50	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8162005-3

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/15/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT0106
TtNUS Project #	112G00041	**Well ID**	13MWT01
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/15/05	**Static Water Level (ft.)**	9.75	**Water Quality Meter**	99K1014 AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	17.91	**Pump Control Box**	MP10 1588
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/15/05	08:55	9.75		Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/15/05	09:05	9.94	60	Clear	4.00	170	2.03	0.0	20.49	519.8	NA	NA	600
8/15/05	09:15	9.95	50	Clear	3.88	170	1.46	0.0	20.73	595.4	NA	NA	500
8/15/05	09:25		60	Clear	3.81	190	1.19	0.0	20.77	628.6	NA	NA	600
8/15/05	09:35	9.95	50	Clear	3.80	176	1.16	0.0	20.87	635.5	NA	NA	500
8/15/05	09:45	9.50	50	Clear	3.57	174	1.20	0.0	19.83	663.9	NA	NA	500
8/15/05	09:55	10.17	110	Clear	3.51	169	1.60	0.0	19.70	677.6	NA	NA	1100
8/15/05	10:05	10.01	50	Clear	3.54	181	1.48	0.0	21.25	681.1	NA	NA	500

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/15/05	10:15	10.02	50	Clear	3.34	192	0.93	0.0	21.26	691.1	NA	NA	500
8/15/05	10:25		50	Clear	3.55	188	0.82	0.0	20.73	680.2	NA	NA	500
8/15/05	10:35	10.01	50	Clear	3.53	189	0.79	0.0	21.07	687.2	NA	NA	500
8/15/05	10:45	10.02	50	Clear	3.51	189	0.76	0.0	21.15	691.5	NA	NA	500
8/15/05	10:55	10.01	50	Clear	3.56	188	0.73	0.73	20.97	687.8	NA	NA	500

Final Purge / Sample Data

One Casing Volume	4.9	**Method**		**Dissolved Oxygen (mg/L)**	0.73
Total Vo. Purge (L)	6.8	**Waterlevel (ft.)**	10.01	**Turbidity (NTUs)**	0.73
Start Purge (hrs.)	8/15/05	**Flowrate (mL/min)**	50	**Temp (C)**	20.97
End Purge (hrs.)	8/15/05	**Color**	Clear	**ORP (mV)**	687.8
Total Purge Time (min.)	0	**pH (S.U.)**	3.56	**Salinity**	NA
		Conductivity (mS/cm)	188	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/15/05	11:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8162005-3
✓	8/15/05	11:00	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8162005-3
✓	8/15/05	11:00	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8162005-3

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/15/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4705
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	Low Concentration

Well and Sample Data

Date	8/15/05	**Static Water Level (ft.)**	7.10	**Water Quality Meter**	98H1228 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	20.20	**Pump Control Box**	MP10-1088
Sampling Method		**Well Riser Diameter (in.)**	2	**Turbidity Meter**	1733-1600
MS/MSD Collected?		**Well Volumes Req.**			
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)
8/15/05	11:00	7.10		Clear									0
8/15/05	11:10	7.62	110	Clear	3.38	0.789	3.12	0.70	18.57	371			1100
8/15/05	11:20	7.85	100	Clear	3.41	.0778	3.26	40	18.31	352			1000
8/15/05	11:30	7.96	100	Clear	3.34	0.777	4.95	60	18.40	357			1000
8/15/05	11:40	8.05	100	Clear	3.37	0.781	5.10	37	18.41	359			1000
8/15/05	11:50	8.04	100	Clear	3.37	0.779	*	32	18.39	358			1000
8/15/05	12:00	8.10	100	Clear	3.39	0.7871	*	25	18.78	357			1000
8/15/05	12:10	8.09	80	Clear	3.40	0.788	*	23	18.87	354			800

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/15/05	12:20	8.05	80	Clear	3.40	0.787	*	16	18.96	353			800
8/15/05	12:30	8.05	80	Clear	3.39	0.792	*	13	19.12	353			800
8/15/05	12:40	8.05	80	Clear	3.38	0.793	*	10	19.16	353			800

Final Purge / Sample Data

One Casing Volume	8.1	**Method**		**Dissolved Oxygen (mg/L)**	*
Total Vo. Purge (L)	9.3	**Waterlevel (ft.)**	8.05	**Turbidity (NTUs)**	10
Start Purge (hrs.)	8/15/05	**Flowrate (mL/min)**	80	**Temp (C)**	19.16
End Purge (hrs.)	8/15/05	**Color**	Clear	**ORP (mV)**	353
Total Purge Time (min.)	0	**pH (S.U.)**	3.38	**Salinity**	
		Conductivity (mS/cm)	0.793	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/15/05	12:45	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8162005-3
✓	8/15/05	12:45	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8162005-3
✓	8/15/05	12:45	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8162005-3

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/16/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1406
TtNUS Project #	112G00041	**Well ID**	13MWT14
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/16/05	**Static Water Level (ft.)**	16.33	**Water Quality Meter**	99K1014 AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	25.60	**Pump Control Box**	MP10 1588
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3892
MS/MSD Collected?	Y	**Well Volumes Req.**			
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)
8/16/05	10:15	16.33	80	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/16/05	10:25	16:42	80	Clear	5.55	747	2.59	9.2	18.21	237.6	NA	NA	800
8/16/05	10:35	16.46	80	Clear	5.49	749	1.16	7.3	18.12	309.8	NA	NA	640
8/16/05	10:45	16.55	80	Clear	5.49	719	0.83	6.2	18.08	355.5	NA	NA	800
8/16/05	10:55	16.50	80	Clear	5.50	681	0.76	3.2	18.15	380.4	NA	NA	800
8/16/05	11:05	16.48	80	Clear	5.51	652	0.69	2.7	18.22	402.7	NA	NA	-800
8/16/05	11:15	16.49	80	Clear	5.49	634	0.65	2.0	18.55	456.3	NA	NA	1600
8/16/05	11:25	16.50	80	Clear	5.47	628	0.63	1.9	18.72	482.6	NA	NA	-800

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/16/05	11:35	16.49	80	Clear	5.48	601	0.61	1.8	18.95	515.7	NA	NA	1600
8/16/05	11:45	16.49	80	Clear	5.46	594	0.61	1.3	19.02	521.8	NA	NA	800
8/16/05	11:55	16.50	80	Clear	5.48	586	0.54	0.8	19.15	526.8	NA	NA	800

Final Purge / Sample Data

One Casing Volume	5.6	**Method**		**Dissolved Oxygen (mg/L)**	0.54
Total Vo. Purge (L)	8.0	**Waterlevel (ft.)**	16.50	**Turbidity (NTUs)**	0.8
Start Purge (hrs.)	8/16/05	**Flowrate (mL/min)**	80	**Temp (C)**	19.15
End Purge (hrs.)	8/16/05	**Color**	Clear	**ORP (mV)**	526.8
Total Purge Time (min.)	0	**pH (S.U.)**	5.48	**Salinity**	NA
		Conductivity (mS/cm)	586	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/16/05	12:00	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	3	Plastic	1L HDPE		112G00041-8162005-3
✓	8/16/05	12:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	6	Glass	1L Amber		112G00041-8162005-3
✓	8/16/05	12:00	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	3	Glass	1L Amber		112G00041-8162005-3

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/27/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT0907
TtNUS Project #	112G00041	**Well ID**	13MWT09
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/27/05	**Static Water Level (ft.)**	10.34	**Water Quality Meter**	99K1014 AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	23.0	**Pump Control Box**	MP10 1588
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/27/05	16:15	10.34	140	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/27/05	16:25	10.69	140	Clear	4.37	.408	1.67	0.6	18.74	483.0	NA	NA	1400
8/27/05	16:35	10.70	140	Clear	4.14	.417	1.20	0.5	18.88	528.1	NA	NA	1400
8/27/05	16:45	10.73	140	Clear	4.60	.414	0.82	0.3	18.18	531.9	NA	NA	1400
8/27/05	16:55	10.74	140	Clear	4.60	.416	0.78	0.4	18.32	536.2	NA	NA	-4200
8/27/05	17:05	10.74	140	Clear	4.59	.416	0.74	0.3	18.41	539.1	NA	NA	2800
8/27/05	17:15	10.74	140	Clear	4.67	.417	0.65	0.9	17.86	543.0	NA	NA	1400
8/27/05	17:25	10.75	140	Clear	4.73	.421	0.64	1.3	17.61	542.8	NA	NA	2100

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/27/05	17:35	10.75	140	Clear	4.73	.427	.065	1.1	17.69	544.3	NA	NA	1400

Final Purge / Sample Data

One Casing Volume	7.6	**Method**		**Dissolved Oxygen (mg/L)**	.065
Total Vo. Purge (L)	11.2	**Waterlevel (ft.)**	10.75	**Turbidity (NTUs)**	1.1
Start Purge (hrs.)	8/27/05	**Flowrate (mL/min)**	140	**Temp (C)**	17.69
End Purge (hrs.)	8/27/05	**Color**	Clear	**ORP (mV)**	544.3
Total Purge Time (min.)	0	**pH (S.U.)**	4.73	**Salinity**	NA
		Conductivity (mS/cm)	.427	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/27/05	17:40	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8292005-4
✓	8/27/05	17:40	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8292005-4
✓	8/27/05	17:40	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8292005-4
✓	8/27/05	17:40	SW-846 9060	Total Organic Carbon	-Select-	2	Glass	40ml vials		112G00041-8292005-4

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/29/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	13GWT3105
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	Low Concentration

Well and Sample Data

Date	8/29/05	**Static Water Level (ft.)**	13.18	**Water Quality Meter**	98F0478 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	22.50	**Pump Control Box**	MP10-1088
Sampling Method		**Well Riser Diameter (in.)**	2	**Turbidity Meter**	4557-3303
MS/MSD Collected?	N	**Well Volumes Req.**			
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)
8/29/05	08:30	13.18	0	Clear	NA	NA	NA	NA	NA	NA			0
8/29/05	08:40	13.61	140	Clear	5.5*	0.871	2.05	0.80	16.25	120			1400
8/29/05	08:50	13.95	120	Clear	5.5*	0.819	2.33	16	16.47	119			1200
8/29/05	09:00	14.08	100	Clear	5.5*	0.826	2.32	16	16.94	120			1000
8/29/05	09:10	14.21	70	Clear	5.5*	0.830	2.05	14	16.86	120			700
8/29/05	09:20	14.25	70	Clear	5.5*	0.834	1.92	12	16.94	121			700
8/29/05	09:30	14.34	70	Clear	5.5*	0.838	1.81	10	17.12	122			700
8/29/05	09:40	14.39	70	Clear	5.5*	0.836	1.71	7.2	17.33	122			700

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - 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)
8/29/05	09:50	14.45	70	Clear	5.5*	0.832	1.60	8.1	17.53	123			700
8/29/05	10:00	14.49	70	Clear	5.5*	0.825	1.49	8.39	17.64	123			700
8/29/05	10:10	14.54	70	Clear	5.5*	0.799	1.29	7.84	17.76	124			700
8/29/05	10:20	14.54	60	Clear	5.5*	0.783	1.16	7.45	17.87	125			600
8/29/05	10:30	14.56	70	Clear	5.5*	0.760	1.05	7.65	17.91	126			700
8/29/05	10:40	14.54	60	Clear	5.5*	0.751	1.01	7.06	19.00	126			600
8/29/05	10:50	14.52	50	Clear	5.5*	0.749	0.98	4.40	19.09	126			500

Final Purge / Sample Data

One Casing Volume	5.8	**Method**		**Dissolved Oxygen (mg/L)**	0.98
Total Vo. Purge (L)	10.9	**Waterlevel (ft.)**	14.52	**Turbidity (NTUs)**	4.40
Start Purge (hrs.)	8/29/05	**Flowrate (mL/min)**	50	**Temp (C)**	19.09
[illegible] Purge (hrs.)	8/29/05	**Color**	Clear	**ORP (mV)**	126
Total Purge Time (min.)	0	**pH (S.U.)**	5.5*	**Salinity**	
		Conductivity (mS/cm)	0.749	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/29/05	10:55	SW-846 9060	Total Organic Carbon	4 ° C / H3PO4	2	Glass	40ml vials		112G00041-8292005-4
✓	8/29/05	10:55	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8292005-4
✓	8/29/05	10:55	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8292005-4
✓	8/29/05	10:55	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8292005-4

General Observations and Notes

No Notes

- End of Report -

A.2.1

SWMU 13

SURFACE WATER SAMPLE LOG SHEETS

ROUND 5

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 13SW 1404
Sample Location: 13SW/SD 14
Sampled By: JG/TK
C.O.C. No.: 3716

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 5/8/05 Time: 1350 Depth: SURFACE Method: DIRECT	Clear	7.51	0.223	15.05	*<10	11.85	+208	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[.] No[X] 13SW_____-F

Flow ~5gpm

PHOTO # 1773

* TURB. METER MALFUNCTION
VALUE EST.

MAP

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s): Terry Azal

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

Sample ID No.: 13SW 1504
Sample Location: 13SW/SD 15
Sampled By: JG/TC
C.O.C. No.: 3716

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 5/8/05 Time: 1338 Depth: Surface Method: Direct	Clear	7.40	0.140	16.88	*<10	10.43	+194	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	(Yes) / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 13SW_____-F

Flow None

Pool 2'x3'x4"

* Turb Meter Malfunction value est.

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: ____

Signature(s): Tej Patel

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Sample ID No.: 13SW1604
Sample Location: 13SW/SD16
Sampled By: JG/TL
C.O.C. No.: 3716

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 5-08-05 Time: 1315	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Depth: SURFACE Method: DIRECT	Clear	7.53	0.134	14.24	*<10	11.35	173	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 13SW ___ -F

Flow 1-3 gpm

PHOTO # 1772

*TURB. METER MALFUNCTION VALUE EST.

MAP

Circle if Applicable:

MS/MSD ___ Duplicate ID No.: ___

Signature(s): Terry Lopat

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

Sample ID No.: 13SW 1903
Sample Location: 13SW/SD 19
Sampled By: JG/TC
C.O.C. No.: 3716

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 5-03-05 / Time: 1448	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Depth: SURFACE / Method: Direct	Clear	7.13	0.316	15.03	*<10	1158	+213	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 13SW_____-F

PHOTO# 1775

* Turb. meter malfunction value est.

MAP

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

Sample ID No.: 13SW 2003
Sample Location: 13SW/SD 20
Sampled By: JG / TK
C.O.C. No.: 3716

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 5-8-05 Time: 1433 Depth: SURFACE Method: DIRECT	CLEAR	7.21	0.174	14.94	*<10	11.18	+214	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 13SW_____-F

Flow: 1-5 gpm

* TURB. METER MALFUNCTION VALUE EST.

MAP

Circle if Applicable:

MS/MSD | Duplicate ID No.: —

Signature(s): [signature]

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

Sample ID No.: 13SW 2204
Sample Location: 13SW/SD 22
Sampled By: JG/TR
C.O.C. No.: 3716

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 5/8/05 Time: 1410	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Depth: Surface Method: Direct	Clear	7.03	0.184	13.53	*<10	6.86	+199	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 13SW_____-F

Flow ~ 1gpm 3" depth

Photo # 1774

* Turb. meter malfunction value est.

MAP

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Ty Rogers

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU13
Project No.: N7448 CTO 0343

Sample ID No.: 13SW 3004
Sample Location: 13SW/SD 30
Sampled By: JG / TK
C.O.C. No.: 3716

[X] Stream
[] Spring
[] Pond
[] Lake
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

Date: 5/8/05 Time: 1300 Depth: SURFACE Method: DIRECT	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
	CLEAR	8.06	0.234	19.29	3.5	11.30	+165	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 13SW—-F

Flow:
.2' x 5.5 x 1 sec/ft = 494 gpm
PHOTO # ~~1770~~
1770

MAP

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s):

A.2.2

SWMU 13

SURFACE WATER SAMPLE LOG SHEETS

ROUND 6

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by John Wright on 08/16/2005

Log Status:

Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW11-DRY**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD11
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	-Select-	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	DRY	do	DRY
Time: [Set Now:]	13:20	ph	DRY	salinity	DRY
Depth (ft.)		sc	DRY	orp	
Method:	Other	temp	DRY	other	DRY
		turbidity	DRY		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

ted	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
X	08/16/2005		SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber	Location was dry.	
X	08/16/2005		SW-846-8330	Explosives Nitroaromatics and	4 ° C	2	Glass	3	Dry location - no surface water. No	

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by John Wright on 08/16/2005

Log Status:

eData Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13FD08160501**
TtNUS Project No.:	112G00041	Sample Location ID	QC
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:	Duplicate of 13SW3005		

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	do
Time: [Set Now:]	11:36	ph	salinity
Depth (ft.)		sc	orp
Method:	Other	temp	other
		turbidity	

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

Collected	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
✓	08/16/2005	00:00	SW-846-	Explosives	4 ° C	2	Glass	1L Amber		112G00041-

GENERAL OBSERVATIONS AND NOTES

FOOTER

MS/MSD: N	Duplicate ID No. Y	Signature(s): John Wright

SURFACE WATER SAMPLE LOG SHEET

Tetra Tech NUS, INC.

Entered by John Wright on 08/16/2005

Log Status:

eD[illegible] Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW1405**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD14
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	clear	do	7.78
Time: [Set Now:]	10:21	ph	8.23	salinity	NA
Depth (ft.)		sc	0.323	orp	78.6
Method:	Direct Bottle	temp	21.68	other	
		turbidity	9.1		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

C[illegible]ed	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
✓	08/16/2005	10:30	SW-846-[illegible]	Explosives Nitroaromatics and [illegible]	4°C	2	Glass	1L Amber		112G00041-[illegible]

GENERAL OBSERVATIONS AND NOTES

Estimated flow with light rain 1-5 gpm.
Sampled a pool 3.5' by 8' depth of 8-12inches.
Very little flow out of pool.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): James Goerdt

SURFACE WATER SAMPLE LOG SHEET

Tetra Tech NUS, INC.

Entered by John Wright on 08/16/2005

Log Status:

eData Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW1505**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD15
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	cloudy	do	8.56
Time: [Set Now]	10:48	ph	8.60	salinity	NA
Depth (ft.)		sc	0.181	orp	74.6
Method:	Direct Bottle	temp	21.47	other	
		turbidity	655		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

Collected	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
✔	08/16/2005	10:50	SW-846-	Explosives	4°C	2	Glass 1L Amber			112G00041-

GENERAL OBSERVATIONS AND NOTES

Note - small pool of standing water.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

SURFACE WATER SAMPLE LOG SHEET

Entered by John Wright on 08/16/2005

Tetra Tech NUS, INC.

Log Status:

Data Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW1605**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD16
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	clear/slight turbid	do	5.40
Time: [Set Now:]	11:11	ph	7.91	salinity	NA
Depth (ft.)		sc	0.215	orp	92.3
Method:	Direct Bottle	temp	21.08	other	
		turbidity	24.5		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

Collected	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
✓	08/16/2005	11:15	SW-846-	Explosives	4°C	2	Glass	1L Amber		112G00041-

GENERAL OBSERVATIONS AND NOTES

Note - 3" deep x 12" w x 2.5' long pool.
Very little to no flow out of pool.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by John Wright on 08/16/2005

Log Status:

eData Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW1904**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD19
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	Clear	do	12.02
Time: [Set Now:]	13:40	ph	8.51	salinity	NA
Depth (ft.)		sc	0.376	orp	134.2
Method:	Direct Bottle	temp	21.35	other	
		turbidity	12		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

Collected	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
✔	08/16/2005	13:45	SW-846-	Explosives	4°C	2	Glass	1L Amber		112G00041-

GENERAL OBSERVATIONS AND NOTES

Note - flow est 5 gpm.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

SURFACE WATER SAMPLE LOG SHEET

Entered by John Wright on 08/16/2005

Tetra Tech NUS, INC.

Log Status:

eData Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW2004**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD20
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	clear	do	2.54
Time: [Set Now:]	13:30	ph	7.58	salinity	NA
Depth (ft.)		sc	0.231	orp	103.3
Method:	Direct Bottle	temp	21.73	other	
		turbidity	3.71		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

ected	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
✓	08/16/2005	13:30	SW-846-	Explosives	4°C	2	Glass	1L Amber		112G00041-

GENERAL OBSERVATIONS AND NOTES

Note - pool 4'x3' x 8" no flow.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by John Wright on 08/16/2005

Log Status:

eData Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW22-DRY**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD22
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	DRY	do	DRY
Time: [Set Now:]	13:12	ph	DRY	salinity	DRY
Depth (ft.)		sc	DRY	orp	
Method:	Other	temp	DRY	other	DRY
		turbidity	DRY		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

Collected	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chai
X	08/16/2005	13:12	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber	Dry location - no surface water. No samples collected	

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by John Wright on 08/16/2005

Log Status:

e[illegible] Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**13SW3005**
TtNUS Project No.:	112G00041	Sample Location ID	13SW/SD30
Task/Contract No.	CTO 0377	Sampled By:	John Wright
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:	13FD08160501		

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/16/2005	color	clear	do	10.21
Time: [Set Now:]	11:25	ph	8.59	salinity	NA
Depth (ft.)		sc	0.364	orp	71.0
Method:	Direct Bottle	temp	22.52	other	
		turbidity	2.18		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

[illegible]ed	Date	Time	Analysis	Description	Preservative	Count	Type	Requirements	Observations	Chain#
✔	08/16/2005	11:30	SW-846-[illegible]	Explosives Nitroaromatics and [illegible]	4°C	6	Glass	1L Amber	Do MS/MSD	112G00041-[illegible]

GENERAL OBSERVATIONS AND NOTES

Note - flowing water approx 20 gpm.
Width is 2.2 feet x 0.09 feet v = 2 sec per ft of flow.

FOOTER

MS/MSD: Y	Duplicate ID No. Y	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

eData Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**16SW10-DRY**
TtNUS Project No.:	112G00041	Sample Location ID	16SW/SD10
Task/Contract No.	CTO 0377	Sampled By:	Terry Rojahn
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/27/2005	color	Dry	do	Dry
Time: [Set Now:]	09:35	ph	Dry	salinity	Dry
Depth (ft.)	DRY	sc	Dry	orp	
Method:	Other	temp	Dry	other	Dry
		turbidity	Dry		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

No documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**16SW12-DRY**
TtNUS Project No.:	112G00041	Sample Location ID	16SW/SD12
Task/Contract No.	CTO 0377	Sampled By:	Terry Rojahn
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/27/2005	color	Dry	do	Dry
Time: [Set Now:]	09:25	ph	Dry	salinity	Dry
Depth (ft.)	DRY	sc	Dry	orp	
Method:	Other	temp	Dry	other	Dry
		turbidity	Dry		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

No documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

MS/MSD: N	Duplicate ID No. N	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

eData Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**16SW13-DRY**
TtNUS Project No.:	112G00041	Sample Location ID	16SW/SD13
Task/Contract No.	CTO 0377	Sampled By:	Terry Rojahn
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/27/2005	color	Dry	do	Dry
Time: [Set Now:]	09:20	ph	Dry	salinity	Dry
Depth (ft.)	DRY	sc	Dry	orp	
Method:	Other	temp	Dry	other	Dry
		turbidity	Dry		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

No documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

MS/MSD:	Duplicate ID No.	Signature(s): John Wright

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

e[illegible] Read-Only

Project Site Name:	CRANE NSWC	Sample ID No	**16SW30-DRY**
TtNUS Project No.:	112G00041	Sample Location ID	16SW/SD30
Task/Contract No.	CTO 0377	Sampled By:	Terry Rojahn
WBS Code:	0000	Concentration:	Low Concentration
Source Type:	Stream	Log Completed:	Y
QA SampleType:			

* Complete all fields in this section before adding sample or analysis data.

FINAL SAMPLE DATA

Date: [Set Today]	08/27/2005	color	Dry	do	Dry
Time: [Set Now:]	09:00	ph	Dry	salinity	Dry
Depth (ft.)	DRY	sc	Dry	orp	
Method:	Other	temp	Dry	other	Dry
		turbidity	Dry		

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

N[illegible]documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

MS/MSD:	Duplicate ID No.	Signature(s): John Wright

A.3.1

SWMU 13

SEDIMENT SAMPLE LOG SHEETS

ROUND 5

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~08~~ 13
Project No.: ~~00042~~ CTO ~~376~~ 03 7448 343

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 13SD3601
Sample Location: 13SW/SD 36
Sampled By: JG / TL
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1205 Method: Dis. Trowel Monitor Reading (ppm): —	0-4"	BRN	Silty Sand (Sat)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
Metals (Except Hg)	4°C	(1) 4 oz Glass Jar	YES

OBSERVATIONS / NOTES:

Photo 1826-JG

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD: YES

Duplicate ID No.: 13FD051705D1

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13SD3601	Date: 5/17/05	Time: 1205	Sampler: JG/TR		
Photograph Number/Direction: X Upstream	Downstream	East	West	X North	South
Predominant Surrounding Land Use: Wooded	Open Field	Other			
Canopy Cover: Open	Partly Open	Shaded			
Dicharge Pipe Present: Yes	No				
Aquatic Vegetation Present: Yes	No		Stream channelized: Yes	No	
Water flowing: Yes	No	Not present			
Organisms Present: Fish (in) Likely	Other (insects, frogs, etc.): Likely				
Water Width (ft): 54'	Water Depth (ft): 0.08	Estimated Flow/Velocity: 5 sec 10' = 0.5			
Channel Width (ft): 45'	Channel Depth (ft): 3-6'				
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other: Debris in low branches	
Deep Pools Present (>2 feet): ~~Yes~~ TR	No	If yes (approximate size)			
Sediment Substrate: Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply) Sand	Silt	Clay	Muck		
Debris	Detritus	Concrete	Iron deposits		
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils: Absent	Slight	Moderate	Profuse		
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils: None	Droplets	Sheen			
Turbidity: Clear	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: PHOTO 1826 SPILLWAY @ ANGEL to stream channel

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~09~~ 13
Project No.: ~~00042~~ CTO ~~276~~ 343 (10)
7448

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 13SD 37 01
Sample Location: 13SW/SD 37
Sampled By: JG / TK
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1150 Method: D.S. Trowel Monitor Reading (ppm): –	0-4"	BRN	Silty Sand (sat.)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4oz GLASS JAR	YES

OBSERVATIONS / NOTES:

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD — Duplicate ID No.:

Signature(s):

Tay Rogal

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13503701	Date: 5/17/05	Time: 1150	Sampler: JG/TK		
Photograph Number/Direction: X Upstream	Downstream	East	West	X North	South
Predominant Surrounding Land Use: Wooded	Open Field	Other			
Canopy Cover: Open	Partly Open	Shaded			
Dicharge Pipe Present: Yes	No				
Aquatic Vegetation Present: Yes	No	Stream channelized: Yes	No		
Water flowing: Yes	No	Not present			
Organisms Present: Fish (in) Yes	Other (insects, frogs, etc.): 2				
Water Width (ft): 12	Water Depth (ft): 0.2	Estimated Flow/Velocity: 0.5 sec/ft			
Channel Width (ft): 33	Channel Depth (ft):				
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other:	
Deep Pools Present (>2 feet): Yes	No	If yes (approximate size) 10' x 60'			
Sediment Substrate: ~~Bedrock~~ TK	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply) Sand	Silt	Clay	Muck		
Debris Bricks	Detritus	Concrete	Iron deposits		
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils: Absent	Slight	Moderate	Profuse		
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils: None	Droplets	Sheen			
Turbidity: Clear	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: PHOTO 1825 Just below water fall/spillway

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~09~~ 13
Project No.: ~~00942~~ CTO ~~376~~ 00 7448 343

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 13SD3801
Sample Location: 13SW/SD38
Sampled By: JG / TK
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1140 Method: DIS. Trowel Monitor Reading (ppm): –	0-4"	BRN	FINE - MED SAND (WET)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4 oz GLASS JAR	YES

OBSERVATIONS / NOTES:

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD ✓ Duplicate ID No.: —

Signature(s): [signature]

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13SD3801	Date: 5/17/05	Time: 1140	Sampler: JG		
Photograph Number/Direction: X Upstream	Downstream	East	West	X North	South
Predominant Surrounding Land Use: Wooded	Open Field	Other			
Canopy Cover: Open	Partly Open	Shaded			
Dicharge Pipe Present: Yes	No				
Aquatic Vegetation Present: Yes	No		Stream channelized: Yes	No	
Water flowing: Yes	No	Not present			
Organisms Present: Fish (in): Likely	Other (insects, frogs, etc.): Likely				
Water Width (ft): 24'	Water Depth (ft): 0, 0.2, 0.3, 0.3, 3.0 0.0	Estimated Flow/Velocity: 1 sec/ft			
Channel Width (ft): 32'	Channel Depth (ft): 3-5				
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other:	
Deep Pools Present (>2 feet): Yes	No	If yes (approximate size)			
Sediment Substrate: Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply) Sand	Silt	Clay	Muck		
Debris Bricks	Detritus	Concrete	Iron deposits		
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils: Absent	Slight	Moderate	Profuse		
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils: None	Droplets	Sheen			
Turbidity: Clear	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: PHOTO 1823

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~08~~ 13
Project No.: ~~00042~~ CTO ~~376~~ 08
7448 343

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 135D3901
Sample Location: 135W/SD39
Sampled By: JGoselt/TR
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1125 Method: Dis. Trowel Monitor Reading (ppm): —	0-4"	Brn.	~~Silty Clay~~ Silt & Fine Sand

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4 oz Glass Jar	YES

OBSERVATIONS / NOTES:

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s):

Terry Royal

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13503901	**Date:** 5/17/05	**Time:** 1125	**Sampler:** JG		
Photograph Number/Direction: X Upstream	Downstream	East	West	X North	South
Predominant Surrounding Land Use: Wooded	Open Field	Other			
Canopy Cover: Open	Partly Open	Shaded			
Dicharge Pipe Present: Yes	No				
Aquatic Vegetation Present: Yes	No	**Stream channelized:** Yes	No		
Water flowing: Yes	No	Not present			
Organisms Present: Fish (in)	YES	Other (insects, frogs, etc.):	Likely		
Water Width (ft): 24	**Water Depth (ft):** 0.03, 0.3, 0.4, 7.5, 0.4, 0	**Estimated Flow/Velocity:** 1 sec/ft			
Channel Width (ft): 48	**Channel Depth (ft):** 3 - 7				
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other:	
Deep Pools Present (>2 feet): Yes	No	If yes (approximate size)			
Sediment Substrate: Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply) Sand	Silt	Clay	Muck		
Debris Brick	Detritus	Concrete Tr	Iron deposits		
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils: Absent	Slight	Moderate	Profuse		
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils: None	Droplets	Sheen			
Turbidity: Clear	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: PHOTO# 1822

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~09~~ 13
Project No.: ~~00042~~ CTO ~~276~~ 025
7448 343

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 135D4001
Sample Location: 135W/SD 40
Sampled By: JG / TK
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1105 Method: Dis. trowel Monitor Reading (ppm): —	0-4"	BRN	silt & sand (sat)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4 oz Glass Jar	YES

OBSERVATIONS / NOTES:

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s): [signature]

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 135D4001	Date: 5/17/05	Time: 1105	Sampler: JG/TK			
Photograph Number/Direction: X Upstream	Downstream	East	West	X North	South	
Predominant Surrounding Land Use: Wooded	Open Field	Other				
Canopy Cover: Open	Partly Open	Shaded				
Dicharge Pipe Present: Yes	No					
Aquatic Vegetation Present: Yes	No	TRACE	Stream channelized: Yes	No		
Water flowing: Yes	No	Not present				
Organisms Present: Fish (in) YES	Other (insects, frogs, etc.): likely					
Water Width (ft): 15	Water Depth (ft): 0, 0.1, 2.5, 3.5, 7.0, 6.5, 0	Estimated Flow/Velocity: 3 sec for 10'				
Channel Width (ft): 42	Channel Depth (ft): 3-6					
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other:		
Deep Pools Present (>2 feet): Yes	No	If yes (approximate size)				
Sediment Substrate: Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)			
(Circle all that apply) Sand	Silt	Clay	Muck			
Debris	Detritus	Concrete	Iron deposits			
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic		
Sediment Oils: Absent	Slight	Moderate	Profuse			
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic		
Water Surface Oils: None	Droplets	Sheen				
Turbidity: Clear	Slightly Turbid	Turbid	Opaque			

Other Comments/Observations: PHOTO # 1821

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~08~~ 13
Project No.: ~~00042~~ CTO ~~378~~ 343 (QD) 7448

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 135D4101
Sample Location: 135W/SD41
Sampled By: T. ROHAHN / JG
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1028 Method: Dis Trowel Monitor Reading (ppm): —	0-4"	BRN	FINE & MED SAND (SAT)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4 oz GLASS JAR	YES

OBSERVATIONS / NOTES:

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13SD4101	Date: 5/17/05	Time: 1028	Sampler: JG		
Photograph Number/Direction: X Upstream	Downstream	East	~~X West~~	North	South
Predominant Surrounding Land Use: Wooded	Open Field	Other			
Canopy Cover: Open	Partly Open	Shaded			
Dicharge Pipe Present: Yes	No				
Aquatic Vegetation Present: Yes	No		Stream channelized: Yes	No	
Water flowing: Yes	No	Not present			
Organisms Present: Fish (in) YES	Other (insects, frogs, etc.): likely				
Water Width (ft):	Water Depth (ft): 0, 0.2, 6.5, 7.5, 6.5, 0.2, 0		Estimated Flow/Velocity: 1 cu/ft.		
Channel Width (ft): 40	Channel Depth (ft): 3-5				
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other: under cut banks	
Deep Pools Present (>2 feet): Yes	No	If yes (approximate size)			
Sediment Substrate: Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply) Sand	Silt	Clay	Muck		
Debris	Detritus	Concrete	Iron deposits		
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils: Absent	Slight	Moderate	Profuse		
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils: None	Droplets	Sheen			
Turbidity: Clear	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: PHOTO 1820

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~08~~ 13
Project No.: ~~00942~~ CTO ~~378~~ 7448 343 (JA)

[] Surface Soil
[] Subsurface Soil
[■] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 13SD4201
Sample Location: 13SW/SD42
Sampled By: JG/TC
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5-17-05 Time: 0943 Method: Dis. Trowel Monitor Reading (ppm): —	0 - 4"	Brn	(Sat.) Fin - Med Sand

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
Metals (Except Hg)	4°C	(1) 4oz Glass Jar	YES

OBSERVATIONS / NOTES:

SEE SUPPLEMENTAL SHEET (S.S.)

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13504201	Date: 5/17/05	Time: 0943	Sampler: TROJAHN		
Photograph Number/Direction: X Upstream	Downstream	East	X West	North	South
Predominant Surrounding Land Use: Wooded	Open Field	Other Grassy Fwd 50' then Wooded			
Canopy Cover: Open	Partly Open	Shaded			
Dicharge Pipe Present: Yes	No				
Aquatic Vegetation Present: Yes	No		Stream channelized: Yes	No	
Water flowing: Yes	No	Not present			
Organisms Present: Fish (in) Likely	Other (insects, frogs, etc.): Likely				
Water Width (ft): 9'	Water Depth (ft): 0.035 0.65 0.65 0.40 0		Estimated Flow/Velocity: 0.3		
Channel Width (ft): 40'	Channel Depth (ft): 3-5'				
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other: UNDERCUT BANKS	
Deep Pools Present (>2 feet): Yes	No	If yes (approximate size)			
Sediment Substrate: Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply) Sand	Silt	Clay	Muck		
Debris	Detritus	Concrete TRACE	Iron deposits		
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils: Absent	Slight	Moderate	Profuse		
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils: None	Droplets	Sheen			
Turbidity: Clear	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: PHOTO # 1818

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~09~~ 13
Project No.: ~~00042~~ CTO ~~378~~ 7448 343

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 135D4301
Sample Location: 135W/SD43
Sampled By: JG/TR
C.O.C. No.: (TR) ~~3773~~ 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1320 Method: DIS. TROWEL Monitor Reading (ppm): —	BRN 0-4"	→	MUCK (SAT.)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4oz Glass JAR	YES

OBSERVATIONS / NOTES:

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13SD4301 Date: 05/17/05 Time: 1320 Sampler: JG/TK

Photograph Number/Direction: X Upstream ___ Downstream ___ East ___ West X North ___ South

Predominant Surrounding Land Use: Wooded Open Field Other

Canopy Cover: Open Partly Open Shaded

Dicharge Pipe Present: Yes No

Aquatic Vegetation Present: Yes No | Stream channelized: Yes No

Water flowing: Yes No Not present

Organisms Present: Fish (in) Likely Other (insects, frogs, etc.): Likely

Water Width (ft): 35 | Water Depth (ft): >2 | Estimated Flow/Velocity: 1 sec/ft Flow ?

Channel Width (ft): 35 | Channel Depth (ft): 6-10

Signs of flooding (circle all that apply) Yes No Water marks on trees Water-borne debris piles Other:

Deep Pools Present (>2 feet): Yes No If yes (approximate size) water depth > 2

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)

(Circle all that apply) Sand Silt Clay Muck

Debris Detritus Concrete Iron deposits

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic

Sediment Oils: Absent Slight Moderate Profuse

Water Odors: Normal Sewage Petroleum Chemical Anaerobic

Water Surface Oils: None Droplets Sheen

Turbidity: Clear Slightly Turbid Turbid Opaque

Other Comments/Observations: PHOTO 1828

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~09~~ 13
Project No.: ~~00042~~ CTO ~~378~~ 7448 343

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 13SD4401
Sample Location: 13SW/SD44
Sampled By: JG/TK
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1335 Method: DIS. TROWEL Monitor Reading (ppm): -	0-4"	BRN	FINE - MED SAND (SAT)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4oz GLASS JAR	YES

OBSERVATIONS / NOTES:

SEE S.S.

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: 13504401	Date: 5/17/05	Time: 1335	Sampler: JG/TK		
Photograph Number/Direction: X Upstream	Downstream	East	West	X North	South
Predominant Surrounding Land Use: Wooded	Open Field	Other			
Canopy Cover: Open	Partly Open	Shaded			
Dicharge Pipe Present: Yes	No				
Aquatic Vegetation Present: Yes	No		Stream channelized: Yes	No	
Water flowing: Yes	No	Not present			
Organisms Present: Fish (in) Likely	Other (insects, frogs, etc.): Likely				
Water Width (ft): ~~100~~ 30	Water Depth (ft): >Boots	Estimated Flow/Velocity: 1 sec/ft			
Channel Width (ft): 30	Channel Depth (ft): 8-10				
Signs of flooding (circle all that apply) Yes	No	Water marks on trees	Water-borne debris piles	Other:	
Deep Pools Present (>2 feet): Yes	No	If yes (approximate size)	Stream its self		
Sediment Substrate: Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.10-2.5 in)		
(Circle all that apply) Sand	Silt	Clay	Muck		
Debris	Detritus	Concrete	Iron deposits		
Sediment Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Sediment Oils: Absent	Slight	Moderate	Profuse		
Water Odors: Normal	Sewage	Petroleum	Chemical	Anaerobic	
Water Surface Oils: None	Droplets	Sheen			
Turbidity: Clear	Slightly Turbid	Turbid	Opaque		

Other Comments/Observations: PHOTO # 1829

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NSWC CRANE SWMU ~~09~~ 13
Project No.: ~~00042~~ CTO ~~376~~ 343 (RD)
7448

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 13SD4501
Sample Location: 13SW/SD45
Sampled By: JG/TK
C.O.C. No.: 3717

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 5/17/05 Time: 1355 Method: Dis. Trowel Monitor Reading (ppm): —	0-4"	BRN	FINE - MED. SAND (SAT.)

COMPOSITE SAMPLE DATA:

Date: NA	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Appendix IX Pesticides, PCBs, TOC, pH, and CEC	4°C	(2) 4 oz Glass Jar	Yes (No)
Appendix IX Pesticides and PCBs	4°C	(2) 4 oz Glass Jar	Yes (No)
METALS (EXCEPT Hg)	4°C	(1) 4oz GLASS JAR	YES

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

SUPPLEMENTAL SURFACE WATER/SEDIMENT SAMPLE DOCUMENTATION SHEET
NSWC CRANE, INDIANA

Sample Number: A3504501 Date: 5/17/05 Time: 1355 Sampler: JG/TK

Photograph Number/Direction: X Upstream ___ Downstream ___ East ___ West X North ___ South

Predominant Surrounding Land Use: (Wooded) Open Field Other

Canopy Cover: Open (Partly Open) Shaded

Dicharge Pipe Present: Yes (No)

Aquatic Vegetation Present: Yes (No) | Stream channelized: (Yes) No

Water flowing: (Yes) No Not present

Organisms Present: Fish (in) Likely Other (insects, frogs, etc.): Likely

Water Width (ft): 40 | Water Depth (ft): >Boots | Estimated Flow/Velocity: 1ft/sec

Channel Width (ft): 40 | Channel Depth (ft): ~~>Boots~~ 10-12'

Signs of flooding (circle all that apply) (Yes) No Water marks on trees Water-borne debris piles Other: Debris on low branches

Deep Pools Present (>2 feet): (Yes) No If yes (approximate size) stream its self

Sediment Substrate: Bedrock Boulder (>10 in) Cobble (2.5-10 in) Gravel (0.10-2.5 in)
(Circle all that apply) (Sand) (Silt) (Clay) (Muck)
Debris Detritus Concrete Iron deposits

Sediment Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Sediment Oils: (Absent) Slight Moderate Profuse

Water Odors: (Normal) Sewage Petroleum Chemical Anaerobic

Water Surface Oils: (None) Droplets Sheen

Turbidity: (Clear) Slightly Turbid Turbid Opaque

Other Comments/Observations: PHOTO # 1830
trib from Rifle Range mixing w/main stream
@ this location

A.4.1

SWMU 13

CHAIN OF CUSTODY RECORDS

ROUND 5

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 3713 PAGE 1 OF

PROJECT NO: CTO 7448 343	FACILITY: NSWC CRANE	PROJECT MANAGER: RALPH BASINSKI	PHONE NUMBER: (412) 921-8308	LABORATORY NAME AND CONTACT: H. PRENTICE / LAUCKS
SAMPLERS (SIGNATURE): TR for JIM GOERDT		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857	ADDRESS: 940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER: FED. EX. AB # 8447 8135 4642		CITY, STATE: SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C
TYPE OF ANALYSIS: Nitroaromatics & Nitramines SW8468330

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS									COMMENTS
5/03	1200	13GWT0906	13MW T09	-	-	GW	G	2	2								
5/03	1420	13GWT2804	13MW T28	-	-	GW	G	1	1								
5/03	1750	13GWT0105	13MW T01	-	-	GW	G	2	2								
5/04	1050	13GWT2105	13MW T21	-	-	GW	G	2	2								
5/04	1118	13GWT4004	13MW T40	-	-	GW	G	2	2								
5/04	1405	13GWT1105	13MW T11	-	-	GW	G	2	2								
5/04	1420	13GWT1705	13MW T17	-	-	GW	G	2	2								
5/04	1425	13GWT4604	13MW T46	-	-	GW	G	2	2								

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY: Terry Rojahn	5/4/05	1800	1. RECEIVED BY: FEDERAL EXPRESS	5/4/05	1800
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 3714 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 7448 343	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	H. PRENTICE / LAUCKS
SAMPLERS (SIGNATURE) TR FOR J. WRIGHT		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 4697		SEATTLE WA 98108

Terry Rojahn

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G

PRESERVATIVE USED: 4°C 4°C/HCl

TYPE OF ANALYSIS: Nitroaromatics & Nitramines SW8330 / VOLATILES SW 846 8260B

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Nitroaromatics & Nitramines SW8330	VOLATILES SW 846 8260B							COMMENTS
5/04	1658	13GWT3704	13GW T37	–	–	GW	G	2	2								
5/05	1015	13GWT4504	13GW T45	–	–	GW	G	2	2								
5/05	1018	13GWT1405	13GW T14	–	–	GW	G	2	2								
5/05	1130	13GWT5103	13GW T51	–	–	GW	G	2	2								
5/05	1250	13GWT3104	13GW T31	–	–	GW	G	2	2								
5/05	1330	13GWT3404	13GW T34	–	–	GW	G	4	4								DO MS/MSD
5/05	1355	13GWT4704	13GW T47	–	–	GW	G	2	2								
5/05	1625	13GWT1505	13GW T15	–	–	GW	G	2	2								
5/05	1630	13GWT1305	13GW T13	–	–	GW	G	2	2								
5/05	0000	13F0050505 01	QC	–	–	GW	G	2	2								FROM 13GWT3404
5/06	0700	TB050605 01	QC	–	–	QC	G	2	–	2							
5/06	1140	16GW0405	16MW 04	–	–	GW	G	5	2	3							
5/06	1145	16GW0205	02	–	–	GW	G	5	2	3							
5/06	1655	16GW0305	05	–	–	GW	G	5	2	3							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rojahn	5-06-05	1900	1. RECEIVED BY FEDERAL EXPRESS	5-06-05	1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 3715 PAGE 1 OF

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
7448 CTO 343	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rojahn		TERRY ROJAHN	(412) 921-8857	940 SOUTH HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 8447 8135 4653		SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G

PRESERVATIVE USED: 4°C / HCl 4°C

TYPE OF ANALYSIS: VOLATILES SW8260B / EXP. NITROAROMATICS & NITRAMINES SW8468330

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	VOLATILES SW8260B	EXP. NITROAROMATICS & NITRAMINES SW8468330	COMMENTS
5/07	0800	TB05070501	QC	-	-	QC	G	2	2	-	TRIP BLANK
5/07	1025	16GWT0405	16MW T04	-	-	GW	G	13	9	4	DO MS/MSD
5/07	1103	16GWT0904	16MW T09	-	-	GW	G	5	3	2	
5/07	1400	16GWT1004	16MW T10	-	-	GW	G	5	3	2	
5/07	1600	16GWT1204	16MW T12	-	-	GW	G	5	3	2	
5/07	1610	16GWT1504	16MW T15	-	-	GW	G	5	3	2	
5/07	1715	16GWT0606	16MW T06	-	-	GW	G	5	3	2	
5/07	1925	16GWT1704	TR ~~16MW T06~~ 17	-	-	GW	G	5	3	2	
5/07	0000	16FD05070501	QC	-	-	GW	G	5	3	2	DUP OF 16GWT0904
5/06	0845	16GWT1104	16MW T11	-	-	GW	G	1	-	1	VERY SLOW RECOVERY WELL
5/08	0910	16GWT1104	↓	-	-	GW	G	1	1	-	↓ MIN. VOL
5/08	0810	16GWT1304	16MW T13	-	-	GW	G	5	3	2	
5/08	0935	16SW1304	16SW SD13	-	-	SW	G	5	3	2	

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY Terry Rojahn	05-09-05	1830	1. RECEIVED BY FEDERAL EXPRESS	05-09-05	1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3716 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
7448 CTO 343	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LALICKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
Terry Rojahn		TERRY ROJAHN	(412) 921-8857	940 S. HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 844781354653		SEATTLE, WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: EXP. NITROAROMATICS & NITRAMINES SW8468330 (CONTAINER TYPE: G, PRESERVATIVE: 4°C)	TYPE OF ANALYSIS: VOLATILES SW 8468260B (CONTAINER TYPE: G, PRESERVATIVE: 4°C/HCl)	COMMENTS
5/08	0950	16SW1204	16SW/SD12	–	–	SW	G	5	2	3	
5/08	1025	16SW1003	16SW/SD10	–	–	SW	G	5	2	3	
5/08	1100	16SW3003	16SW/SD30	–	–	SW	G	13	4	9	DO MS/MSD
5/08	1300	13SW3004	13SW/SD30	–	–	SW	G	2	2	–	
5/08	1315	13SW1604	13SW/SD16	–	–	SW	G	2	2	–	
5/08	1338	13SW1504	13SW/SD15	–	–	SW	G	2	2	–	
5/08	1350	13SW1404	13SW/SD14	–	–	SW	G	2	2	–	
5/08	1410	13SW2204	13SW/SD22	–	–	SW	G	2	2	–	
5/08	1433	13SW2003	13SW/SD20	–	–	SW	G	2	2	–	
5/08	1448	13SW1903	13SW/SD19	–	–	SW	G	2	2	–	
5/08	0000	16FD05080501	QC	–	–	SW	G	5	2	3	FROM 16SW3004 (T.C.)

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
Terry Rojahn	05-09-05	1830	FEDERAL EXPRESS	05-09-05	1830
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3717 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 7448 343	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	940 S. HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB # 8447 8135 4756		SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: 4°C

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (~~FT~~) (IN) TR	BOTTOM DEPTH (~~FT~~) (IN) TR	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Metals (except Hg) SW-846 6020								COMMENTS
5/17	0943	13SD4201	13SW SD42	0	4	SD	G	1	1								
5/17	1028	13SD4101	13SW SD41	0	4	SD	G	1	1								
5/17	1105	13SD4001	13SW SD40	0	4	SD	G	1	1								
5/17	1125	13SD3901	13SW SD39	0	4	SD	G	1	1								
5/17	1140	13SD3801	13SW SD38	0	4	SD	G	1	1								
5/17	1150	13SD3701	13SW SD37	0	4	SD	G	1	1								
5/17	1205	13SD3601	13SW SD36	0	4	SD	G	2	2								DO MS/MSD
5/17	1320	13SD4301	13SW SD43	0	4	SD	G	1	1								
5/17	1335	13SD4401	13SW SD44	0	4	SD	G	1	1								
5/17	1355	13SD4501	13SW SD45	0	4	SD	G	1	1								
5/17	0000	13FD051705 01	QC	0	4	SD	G	1	1								FROM 13SD3601

1. RELINQUISHED BY	DATE 5-18-05	TIME 1800	1. RECEIVED BY FEDERAL EXPRESS	DATE 5-18-05	TIME 1800
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

A.4.2

SWMU 13

CHAIN OF CUSTODY RECORDS

ROUND 6

TRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 3261 PAGE 1 OF

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 00041 377	NSWC CRANE	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		TERRY ROJAHN	(412) 921-8857	940 S. HARNEY ST.
		CARRIER/WAYBILL NUMBER		CITY, STATE
		FED. EX. AB# 844781356472		SEATTLE, WA 98108

STANDARD TAT ☑
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P

PRESERVATIVE USED: 4°C 4°C 4°C/H_2SO_4

TYPE OF ANALYSIS: Exp. Nitroaromatics & Nitramines (8330) | RDX Degradation Products (MOD 8330) | Nitrate + Nitrite (as N) EPA 353.2

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Exp. Nitroaromatics & Nitramines (8330)	RDX Degradation Products (MOD 8330)	Nitrate + Nitrite (as N) EPA 353.2						COMMENTS
8/10	0840	13GWT4505	13MW T45	–	–	GW	G	1	2	1	1						MIN. VOL.
8/10	1125	13GWT2106	13MW T21	–	–	GW	G	1	2	1	1						
8/10	1300	13GWT2805	13MW T28	–	–	GW	G	1	2	1	1						
8/10	1515	13GWT4605	13MW T46	–	–	GW	G	1	4	2	3						DO MS/MSD

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY [signature]	8/10/05	1900	1. RECEIVED BY FEDERAL EXPRESS	8/10/05	1900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 3262 | PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
CTO 00041 377	NSWC	RALPH BASINSKI	(412) 921-8308	LAUCKS / HUGH PRENTICE
SAMPLERS (SIGNATURE) TR FOR J. Goerdt		FIELD OPERATIONS LEADER: TERRY ROJAHN	PHONE NUMBER: (412) 921-8857	ADDRESS: 940 S. HARNEY ST.
		CARRIER/WAYBILL NUMBER: FED. EX. AB# 844781356483		CITY, STATE: SEATTLE WA 98108

STANDARD TAT ☒
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P

PRESERVATIVE USED: 4°C 4°C 4°C/H2SO4

TYPE OF ANALYSIS

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	EXP. Nitroaromatics + Nitramines (8330)	RDX DEGRADATION PRODUCTS (MOD 8330)	Nitrate + Nitrite EPA 353.2 (ABN)							COMMENTS
8/11	1023	13GWT3705	13MW T37	-	-	GW	G	4	2	1	1							
8/11	1250	13GWT1706	13MW T17	-	-	GW	G	4	2	1	1							
8/11	1222	13GWT3405	13MW T34	-	-	GW	G	4	2	1	1							
8/11	1350	13GWT4005	13MW T40	-	-	GW	G	4	2	1	1							
8/11	1610	13GWT1106	13MW T11	-	-	GW	G	4	2	1	1							
8/11	1610	13GWT1506	13MW T15	-	-	GW	G	4	2	1	1							
8/11	0000	13FD08110501	QC	-	-	GW	G	4	2	1	1							

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	8/12/05	1800	1. RECEIVED BY: FEDERAL EXPRESS	8/12/05	1800
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS:

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FILE COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	John Wright
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	8/15/05
Task/Contract #	CTO 0377	**Field Op Leader (FOL)**	Terry Rojahn	**Modified By**	
WBS Code #	0000	**FOL Phone**	412-921-8857	**Modified Date**	
Chain of Custody ID	112G00041-8152005-2	**Carrier**	Fedex	**Printed By**	Joseph Lucas
		Carrier/Waybill No.	8447 8135 6494	**Printed Date**	5/2/06

Chain of Custody Information

Chain of Custody #	**112G00041-8152005-2**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	John Wright
Carrier	Fedex	**Address**	940 South Harney Street	**Date**	8/15/05
Carrier/Waybill No.	8447 8135 6494	**City, State, Zip**	Seattle, WA 98108	**Time**	17:32
		Lab Contact		**Received By:**	Fedex
		Lab Telephone		**Date**	8/15/05
				Time	18:32

Sample Records

	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/12/05	13GWT5104	08:35	Modified SW-846-8330	Explosives RDX Degradation Products	13MWT51	GW	4 ° C	1	Glass	1L Amber	Well dry after collecting approximately 400 ml. (min. volume)
8/12/05	13GWT5104	08:35	SW-846-8330	Explosives Nitroaromatics and Nitramines	13MWT51	GW	4 ° C	1	Glass	1L Amber	WL prior to collecting sample on 8/12/05 was 14.73. Water color was tannish.
8/12/05	16GWT0607	16:20	EPA 353.2	Nitrate + Nitrite (as N)	16MWT06	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/12/05	16GWT0607	16:20	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT06	GW	4 ° C	1	Glass	1L Amber	
8/12/05	16GWT0607	16:20	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT06	GW	4 ° C	2	Glass	1L Amber	
8/12/05	16GWT0607	16:20	SW846 9056	Sulfate and Chloride	16MWT06	GW	4 ° C	1	Plastic	1L HDPE	
8/12/05	16GWT0607	16:20	SW-846 8260B	Volatile Organic Compounds	16MWT06	GW	4 ° C / HCL	3	Glass	40ml vials	
8/12/05	16GWT1105	09:50	SW-846 8260B	Volatile Organic Compounds	16MWT11	GW	4 ° C / HCL	3	Glass	40ml vials	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/12/05	16GWT1105	09:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT11	GW	4 ° C	1	Glass	1L Amber	Well dried out after collecting this 1 L amber
8/12/05	16TB08120501	08:30	SW-846 8260B	Volatile Organic Compounds		GW	4 ° C / HCL	2	Glass	40ml vials	Trip Blank
8/13/05	13GWT5104	17:00	EPA 353.2	Nitrate + Nitrite (as N)	13MWT51	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	Water level on 8/13/05 = 14.81.
8/13/05	16GW0306	10:40	EPA 353.2	Nitrate + Nitrite (as N)	16MW03	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/13/05	16GW0306	10:40	SW846 9056	Sulfate and Chloride	16MW03	GW	4 ° C	1	Plastic	1L HDPE	
8/13/05	16GW0306	10:40	SW-846 8260B	Volatile Organic Compounds	16MW03	GW	4 ° C / HCL	3	Glass	40ml vials	
8/13/05	16GW0306	10:40	Modified SW-846-8330	Explosives RDX Degradation Products	16MW03	GW	4 ° C	1	Glass	1L Amber	
8/13/05	16GW0306	10:40	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MW03	GW	4 ° C	2	Glass	1L Amber	
8/13/05	16GW0406	10:45	Modified SW-846-8330	Explosives RDX Degradation Products	16MW04	GW	4 ° C	1	Glass	1L Amber	
8/13/05	16GW0406	10:45	SW846 9056	Sulfate and Chloride	16MW04	GW	None	1	Plastic	1L Amber	
8/13/05	16GW0406	10:45	SW-846 8260B	Volatile Organic Compounds	16MW04	GW	4 ° C / HCL	3	Glass	40ml vials	
8/13/05	16GW0406	10:45	EPA 353.2	Nitrate + Nitrite (as N)	16MW04	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/13/05	16GW0406	10:45	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MW04	GW	4 ° C	2	Glass	-SELECT-	
8/13/05	16GWT1005	15:15	SW846 9056	Sulfate and Chloride	16MWT10	GW	4 ° C	1	Plastic	1L HDPE	
8/13/05	16GWT1005	15:15	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT10	GW	4 ° C	1	Glass	1L Amber	
8/13/05	16GWT1005	15:15	EPA 353.2	Nitrate + Nitrite (as N)	16MWT10	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/13/05	16GWT1005	15:15	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT10	GW	4 ° C	2	Glass	1L Amber	
8/13/05	16GWT1005	15:15	SW-846 8260B	Volatile Organic Compounds	16MWT10	GW	4 ° C / HCL	3	Glass	40ml vials	
8/13/05	16GWT1105	16:10	Modified SW-846-	Explosives RDX Degradation	16MWT11	GW	4 ° C	1	Glass	1L Amber	Water level on 8/13/05 =

			8330	Products							95.91
8/13/05	16GWT1205	11:24	EPA 353.2	Nitrate + Nitrite (as N)	16MWT12	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/13/05	16GWT1205	11:24	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT12	GW	4 ° C	2	Glass	1L Amber	
8/13/05	16GWT1205	11:24	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT12	GW	4 ° C	1	Glass	1L Amber	
8/13/05	16GWT1205	11:24	SW-846 8260B	Volatile Organic Compounds	16MWT12	GW	4 ° C / HCL	3	Glass	40ml vials	
8/13/05	16GWT1205	11:24	SW846 9056	Sulfate and Chloride	16MWT12	GW	4 ° C	1	Plastic	1L HDPE	
8/14/05	16FD08140501	00:00	SW-846 8260B	Volatile Organic Compounds	DUP	GW	4 ° C / HCL	3	Glass	40ml vials	Potential high VOC concentration (TCE)
8/14/05	16FD08140501	00:00	Modified SW-846-8330	Explosives RDX Degradation Products	DUP	GW	4 ° C	1	Glass	1L Amber	
8/14/05	16FD08140501	00:00	EPA 353.2	Nitrate + Nitrite (as N)	DUP	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/14/05	16FD08140501	00:00	SW846 9056	Sulfate and Chloride	DUP	GW	4 ° C	1	Plastic	1L HDPE	
8/14/05	16FD08140501	00:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	DUP	GW	4 ° C	2	Glass	1L Amber	
8/14/05	16GW0206	10:50	SW846 9056	Sulfate and Chloride	16MW02	GW	4 ° C	1	Plastic	1L HDPE	
8/14/05	16GW0206	10:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MW02	GW	4 ° C	2	Glass	1L Amber	
8/14/05	16GW0206	10:50	SW-846 8260B	Volatile Organic Compounds	16MW02	GW	4 ° C / HCL	3	Glass	40ml vials	
8/14/05	16GW0206	10:50	EPA 353.2	Nitrate + Nitrite (as N)	16MW02	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/14/05	16GW0206	10:50	Modified SW-846-8330	Explosives RDX Degradation Products	16MW02	GW	4 ° C	1	Glass	1L Amber	
8/14/05	16GWT0406	10:55	EPA 353.2	Nitrate + Nitrite (as N)	16MWT04	GW	4 ° C / H2SO4	3	Plastic	1L HDPE	DO MS/MSD
8/14/05	16GWT0406	10:55	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT04	GW	4 ° C	3	Glass	1L Amber	DO MS/MSD
8/14/05	16GWT0406	10:55	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT04	GW	4 ° C	6	Glass	1L Amber	DO MS/MSD
8/14/05	16GWT0406	10:55	SW-846 8260B	Volatile Organic Compounds	16MWT04	GW	4 ° C / HCL	9	Glass	40ml vials	DO MS/MSD
8/14/05	16GWT0406	10:55	SW846	Sulfate and	16MWT04	GW	4 ° C	3	Plastic	1L	DO MS/MSD

			9056	Chloride						HDPE	
8/14/05	16GWT0905	14:30	EPA 353.2	Nitrate + Nitrite (as N)	16MWT09	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/14/05	16GWT0905	14:30	SW-846 8260B	Volatile Organic Compounds	16MWT09	GW	4 ° C / HCL	3	Glass	40ml vials	
8/14/05	16GWT0905	14:30	SW846 9056	Sulfate and Chloride	16MWT09	GW	4 ° C	1	Plastic	1L HDPE	
8/14/05	16GWT0905	14:30	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT09	GW	4 ° C	1	Glass	1L Amber	
8/14/05	16GWT0905	14:30	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT09	GW	4 ° C	2	Glass	1L Amber	
8/14/05	16GWT1105	15:35	EPA 353.2	Nitrate + Nitrite (as N)	16MWT11	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/14/05	16GWT1105	15:35	SW846 9056	Sulfate and Chloride	16MWT11	GW	4 ° C	1	Plastic	1L HDPE	
8/14/05	16GWT1305	14:20	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT13	GW	4 ° C	2	Glass	1L Amber	
8/14/05	16GWT1305	14:20	SW846 9056	Sulfate and Chloride	16MWT13	GW	4 ° C	1	Plastic	1L HDPE	
8/14/05	16GWT1305	14:20	SW-846 8260B	Volatile Organic Compounds	16MWT13	GW	4 ° C / HCL	3	Glass	40ml vials	Potential high VOC concentration (TCE)
8/14/05	16GWT1305	14:20	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT13	GW	4 ° C	1	Glass	1L Amber	
8/14/05	16GWT1305	14:20	EPA 353.2	Nitrate + Nitrite (as N)	16MWT13	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/14/05	16GWT1505	14:30	SW-846 8260B	Volatile Organic Compounds	16MWT15	GW	4 ° C / HCL	3	Glass	40ml vials	
8/14/05	16GWT1505	14:30	SW-846-8330	Explosives Nitroaromatics and Nitramines	16MWT15	GW	4 ° C	2	Glass	1L Amber	
8/14/05	16GWT1505	14:30	EPA 353.2	Nitrate + Nitrite (as N)	16MWT15	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/14/05	16GWT1505	14:30	SW846 9056	Sulfate and Chloride	16MWT15	GW	4 ° C	1	Plastic	1L HDPE	
8/14/05	16GWT1505	14:30	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT15	GW	4 ° C	1	Glass	1L Amber	
8/14/05	16GWT1705	10:40	SW-846 8260B	Volatile Organic Compounds	16MWT17	GW	4 ° C / HCL	3	Glass	40ml vials	Potential high VOC concentration (TCE)
8/14/05	16GWT1705	10:40	Modified SW-846-8330	Explosives RDX Degradation Products	16MWT17	GW	4 ° C	1	Glass	1L Amber	
			SW-846-	Explosives						1L	

8/14/05	16GWT1705	10:40	8330	Nitroaromatics and Nitramines	16MWT17	GW	4 ° C	2	Glass	Amber	
8/14/05	16GWT1705	10:40	EPA 353.2	Nitrate + Nitrite (as N)	16MWT17	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/14/05	16GWT1705	10:40	SW846 9056	Sulfate and Chloride	16MWT17	GW	4 ° C	1	Plastic	1L HDPE	

General Observations and Notes

Three sample IDs for 16MWT0607 should be changed to 16GWT0607

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	John Wright
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	8/16/05
Task/Contract #	CTO 0377	**Field Op Leader (FOL)**	Terry Rojahn	**Modified By**	
WBS Code #	0000	**FOL Phone**	412-921-8857	**Modified Date**	
Chain of Custody ID	112G00041-8162005-3	**Carrier**	Fedex	**Printed By**	Joseph Lucas
		Carrier/Waybill No.	8447 8135 6520	**Printed Date**	5/2/06

Chain of Custody Information

Chain of Custody #	**112G00041-8162005-3**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	John Wright
Carrier	Fedex	**Address**	940 South Harney Street	**Date**	8/16/05
Carrier/Waybill No.	8447 8135 6520	**City, State, Zip**	Seattle, WA 98108	**Time**	
		Lab Contact	Hugh Prentice	**Received By:**	Fedex
		Lab Telephone	206-767-5060 x 1028	**Date**	8/16/05
				Time	

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/15/05	13GWT0106	11:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	13MWT01	GW	4 ° C	2	Glass	1L Amber	
8/15/05	13GWT0106	11:00	EPA 353.2	Nitrate + Nitrite (as N)	13MWT01	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/15/05	13GWT0106	11:00	Modified SW-846-8330	Explosives RDX Degradation Products	13MWT01	GW	4 ° C	1	Glass	1L Amber	
8/15/05	13GWT1306	14:50	EPA 353.2	Nitrate + Nitrite (as N)	13MWT13	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/15/05	13GWT1306	14:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	13MWT13	GW	4 ° C	2	Glass	1L Amber	
8/15/05	13GWT1306	14:50	Modified SW-846-8330	Explosives RDX Degradation Products	13MWT13	GW	4 ° C	1	Glass	1L Amber	
8/15/05	13GWT4705	12:45	EPA 353.2	Nitrate + Nitrite (as N)	13MWT47	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/15/05	13GWT4705	12:45	SW-846-8330	Explosives Nitroaromatics and Nitramines	13MWT47	GW	4 ° C	2	Glass	1L Amber	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/15/05	13GWT4705	12:45	Modified SW-846-8330	Explosives RDX Degradation Products	13MWT47	GW	4 ° C	1	Glass	1L Amber	
8/16/05	13FD08160501	00:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	QC	SW	4 ° C	2	Glass	1L Amber	
8/16/05	13GWT1406	12:00	EPA 353.2	Nitrate + Nitrite (as N)	13MWT14	GW	4 ° C / H2SO4	3	Plastic	1L HDPE	Do MS/MSD.
8/16/05	13GWT1406	12:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	13MWT14	GW	4 ° C	6	Glass	1L Amber	Do MS/MSD.
8/16/05	13GWT1406	12:00	Modified SW-846-8330	Explosives RDX Degradation Products	13MWT14	GW	4 ° C	3	Glass	1L Amber	Do MS/MSD.
8/16/05	13SW1405	10:30	SW-846-8330	Explosives Nitroaromatics and Nitramines	13SW/SD14	SW	4°C	2	Glass	1L Amber	
8/16/05	13SW1505	10:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	13SW/SD15	SW	4°C	2	Glass	1L Amber	
8/16/05	13SW1605	11:15	SW-846-8330	Explosives Nitroaromatics and Nitramines	13SW/SD16	SW	4°C	2	Glass	1L Amber	
8/16/05	13SW1904	13:45	SW-846-8330	Explosives Nitroaromatics and Nitramines	13SW/SD19	SW	4°C	2	Glass	1L Amber	
8/16/05	13SW2004	13:30	SW-846-8330	Explosives Nitroaromatics and Nitramines	13SW/SD20	SW	4°C	2	Glass	1L Amber	
8/16/05	13SW3005	11:30	SW-846-8330	Explosives Nitroaromatics and Nitramines	13SW/SD30	SW	4°C	6	Glass	1L Amber	Do MS/MSD.

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - 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**	8/29/05
Task/Contract #	CTO 0377	**Field Op Leader (FOL)**	Terry Rojahn	**Modified By**	
WBS Code #	0000	**FOL Phone**	412-921-8857	**Modified Date**	
Chain of Custody ID	112G00041-8292005-4	**Carrier**	Federal Express	**Printed By**	Joseph Lucas
		Carrier/Waybill No.	8447 8135 6542	**Printed Date**	5/2/06

Chain of Custody Information

Chain of Custody #	**112G00041-8292005-4**	**Lab Name**	Laucks Testing Laboratories	**Relenquished By**	Terry Rojahn
Carrier	Federal Express	**Address**	940 South Harney Street	**Date**	8/29/05
Carrier/Waybill No.	8447 8135 6542	**City, State, Zip**	Seattle, WA 98108	**Time**	
		Lab Contact	Hugh Prentice	**Received By:**	Federal Express
		Lab Telephone	206-767-5060 x 1028	**Date**	8/29/05
				Time	

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/27/05	13GWT0907	17:40	Modified SW-846-8330	Explosives RDX Degradation Products	13MWT09	GW	4 ° C	1	Glass	1L Amber	
8/27/05	13GWT0907	17:40	SW-846-8330	Explosives Nitroaromatics and Nitramines	13MWT09	GW	4 ° C	2	Glass	1L Amber	
8/27/05	13GWT0907	17:40	EPA 353.2	Nitrate + Nitrite (as N)	13MWT09	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/27/05	13GWT0907	17:40	SW-846 9060	Total Organic Carbon	13MWT09	GW	-Select-	2	Glass	40ml vials	
8/29/05	13GWT3105	10:55	SW-846 9060	Total Organic Carbon	13MWT31	GW	4 ° C / H3PO4	2	Glass	40ml vials	
8/29/05	13GWT3105	10:55	SW-846-8330	Explosives Nitroaromatics and Nitramines	13MWT31	GW	4 ° C	2	Glass	1L Amber	
8/29/05	13GWT3105	10:55	EPA 353.2	Nitrate + Nitrite (as N)	13MWT31	GW	4 ° C / H2SO4	1	Plastic	1L HDPE	
8/29/05	13GWT3105	10:55	Modified SW-846-8330	Explosives RDX Degradation Products	13MWT31	GW	4 ° C	1	Glass	1L Amber	

General Observations and Notes

No Notes

- End of Report -

A.5.1

SWMU 13

WATER LEVEL MEASUREMENTS

ROUND 5

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name:	NSWC CRANE	**Project No.:**	N7448
Location:	SWMU 13	**Personnel:**	T. Rojahn/J. Wright
Weather Conditions:	Mostly Sunny and 60s	**Measuring Device:**	M-Scope
Tidally Influenced:	Yes ___ No _X_	**Remarks:**	----

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
13MWT01	5/3/2005	1103	715.34	15.00	7.71	NA	707.63	
13MWT02	5/3/2005	1118	704.72	27.00	16.19	NA	688.53	
13MWT03	5/3/2005	1100	721.10	15.00	9.72	NA	711.38	
13MWT04	5/3/2005	1130	706.84	15.00	14.27	NA	692.57	
13MWT05	5/3/2005	1125	696.44	16.00	5.96	NA	690.48	
13MWT06	5/3/2005	1056	717.93	15.00	11.66	NA	706.27	
13MWT07	5/3/2005	1140	687.22	15.00	3.44	NA	683.78	
13MWT08	5/3/2005	1133	700.56	15.00	4.85	NA	695.71	
13MWT09	5/3/2005	1025	705.90	20.00	9.15	NA	696.75	
13MWT10	5/3/2005	1136	700.15	25.00	13.68	NA	686.47	
13MWT11	5/3/2005	1150	682.29	15.00	9.03	NA	673.26	
13MWT12	5/3/2005	1154	682.12	20.00	10.14	NA	671.98	
13MWT13	5/3/2005	1802	701.98	19.00	5.13	NA	696.85	
13MWT14	5/3/2005	1750	705.50	23.00	14.10	NA	691.4	
13MWT15	5/3/2005	1200	696.65	25.00	13.88	NA	682.77	
13MWT16	5/3/2005	1400	684.35	15.00	12.33	NA	672.02	
13MWT17	5/3/2005	1405	693.01	18.00	9.91	NA	683.1	
13MWT18	5/3/2005	1203	702.92	30.00	19.41	NA	683.51	
13MWT19	5/3/2005	1745	705.82	19.00	10.40	NA	695.42	
13MWT20	5/3/2005	1452	702.07	20.00	4.94	NA	697.13	
13MWT21	5/3/2005	1410	690.74	15.00	9.30	NA	681.44	
13MWT22	5/3/2005	1434	671.96	15.00	8.21	NA	663.75	
13MWT23	5/3/2005	1449	699.14	22.00	8.60	NA	690.54	
13MWT24	5/3/2005	1447	693.93	22.00	9.27	NA	684.66	
13MWT25	5/3/2005	1439	681.57	15.00	6.65	NA	674.92	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name:	NSWC CRANE	**Project No.:**	N7448
Location:	SWMU 13	**Personnel:**	T. Rojahn/J. Wright
Weather Conditions:	Mostly Sunny and 60s	**Measuring Device:**	M-Scope
Tidally Influenced:	Yes ___ No _X_	**Remarks:**	----

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
13MWT26	5/3/2005	1443	687.49	20.00	9.81	NA	677.68	
13MWT27	5/3/2005	1157	698.13	21.00	9.27	NA	688.86	
13MWT28	5/3/2005	1015	705.55	88.00	77.88	NA	627.67	
13MWT29	5/3/2005	1806	700.44	20.00	5.61	NA	694.83	
13MWT30	5/3/2005	1758	698.94	25.00	11.55	NA	687.39	
13MWT31	5/3/2005	1733	696.21	20.00	10.74	NA	685.47	
13MWT32	5/3/2005	1730	696.04	25.00	9.02	NA	687.02	
13MWT33	5/3/2005	1740	701.97	20.00	10.41	NA	691.56	
13MWT34	5/3/2005	1432	695.93	20.50	5.26	NA	690.67	
13MWT35	5/3/2005	1149	681.73	69.00	63.94	NA	617.79	
13MWT36	5/3/2005	1458	667.21	26.00	18.83	NA	648.38	
13MWT37	5/3/2005	1509	662.29	25.00	13.64	NA	648.65	
13MWT38	5/3/2005	1507	661.04	80.00	61.81	NA	599.23	
13MWT39	5/3/2005	1517	654.44	25.00	13.36	NA	641.08	
13MWT40	5/3/2005	1529	667.18	25.50	18.15	NA	649.03	
13MWT41	5/3/2005	1524	665.67	66.00	66.52	NA	599.15	
13MWT42	5/3/2005	1545	670.31	25.00	20.38	NA	649.93	
13MWT43	5/3/2005	1352	690.9	21.00	8.17	NA	682.73	
13MWT44	5/3/2005	1339	683.82	88.00	64.36	NA	619.46	
13MWT45	5/3/2005	1408	690.59	84.00	70.76	NA	619.83	
13MWT46	5/3/2005	1516	653.61	68.00	56.61	NA	597.00	
13MWT47	5/3/2005	1820	677.23	21.00	7.15	NA	670.08	
13MWT48	5/3/2005	1605	548.67	10.50	10.29	NA	538.38	
13MWT49	5/3/2005	1608	553.90	9.50	7.25	NA	546.65	
13MWT50	5/3/2005	1611	560.49	26.00	7.90	NA	552.59	
13MWT51	5/3/2005	1614	571.36	16.00	5.80	NA	565.56	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name:	NSWC CRANE	**Project No.:**	N7448
Location:	SWMU 13	**Personnel:**	T. Rojahn/J. Wright
Weather Conditions:	Mostly Sunny and 60s	**Measuring Device:**	M-Scope
Tidally Influenced:	Yes ___ No _X_	**Remarks:**	---

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments / Flow (ppm)
STAFF GAUGES							Surface Water Elevation	
13SG01	5/3/2005	1122	698.35		1.77	NA	696.58	<1
13SG02	5/3/2005	1111	701.95		3.73	NA	698.22	1-2
13SG03	5/3/2005	1809	696.24		1.96	NA	694.28	0
13SG04	5/3/2005	1812	688.99		2.45	NA	686.54	<1
13SG05	5/3/2005	1816	692.94		3.89	NA	689.05	<1
13SG06	5/3/2005	1739	704.88		DRY	NA	DRY	0
13SG07	5/3/2005	1455	680.3		1.69	NA	678.61	Stagnate
13SG08	5/3/2005	1437	665.95		5.13	NA	660.82	1-5
13SG09	5/3/2005	1430	675.3		4.21	NA	671.09	1-5
13SG10	5/3/2005	1144	676.1		4.84	NA	671.26	1-5
13SG11	5/3/2005	1830	675.36		2.51	NA	672.85	~1
13SG12	5/3/2005	1621	595.28		6.85	NA	588.43	148
13SG13	5/3/2005	1634	572.52		6.06	NA	566.46	6
13SG14	5/3/2005	1636	567.75		6.41	NA	561.34	5-10
13SG15	5/3/2005	1641	544.18		5.24	NA	538.94	377
13SG16	5/3/2005	1725	537.01		Dry	NA	Dry	0
13SG17	5/3/2005	1708	532.48		Dry	NA	Dry	0
13SG18	5/3/2005	1726	524.23		8.19	NA	516.04	404

* All measurements to the nearest 0.01 foot

A.5.2

SWMU 13

WATER LEVEL MEASUREMENTS

ROUND 6

Ground Water Level
Entered by John Wright on 08/09/2005

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112G00041
Task/Contract No.	CTO 0377
WBS Code:	0000
Weather Conditions	Hazy, Hot, Humid/90+ oF
Measuring Device:	M-Scope

Sample ID No	
Sample Location ID	SWMU 13
Sampled By:	James Goerdt
Log Completed:	

Well ID	Date	Time	Ref. Elev.	Tot. Depth	Level Ind.	Elevation	Thickness	PID/FID	Tidally Influenced	Comments
13MWT01	08/09/2005	12:10	715.34		9.79	705.55	NA	NA	N	NO PID,Ref Toc
13MWT02	08/09/2005	12:07	704.72	27	16.00	688.72	NA	NA		Reference elevation is TOC
13MWT03	08/09/2005	14:27	721.10		11.18	709.92	NA	NA		Reference elevation is TOC
13MWT04	08/09/2005	11:51	706.84	15	15.83	691.01	NA	NA		Reference elevation is TOC
13MWT05	08/09/2005	11:56	696.44	16	8.31	688.13	NA	NA		Reference elevation is TOC
13MWT06	08/09/2005	14:28	717.93		14.95	702.98	NA	NA		Reference elevation is TOC
13MWT07	08/09/2005	11:54	687.22		3.35	683.87	NA	NA		Reference elevation is TOC
13MWT08	08/09/2005	11:48			8.77	e	NA	NA		Reference elevation is TOC
13MWT09	08/09/2005	14:32	705.90	20	10.40	695.5	NA	NA		Reference elevation is TOC
13MWT10	08/09/2005	11:46			15.32	e	NA	NA		Reference elevation is TOC
3MWT11	08/09/2005	11:42	682.29	15	10.14	672.15	NA	NA		Reference elevation is TOC
13MWT12	08/09/2005	11:29	682.12	20	11.93	670.19	NA	NA		Reference

										elevation is TOC
13MWT13	08/09/2005	14:48	701.98		6.04	695.94	NA	NA		
13MWT14	08/09/2005	15:12	705.5	23	16.09	689.41	NA	NA		
13MWT15	08/09/2005	11:33	696.65	25	15.89	680.76	NA	NA		Reference elevation is TOC
13MWT16	08/09/2005	11:27	684.35	15	14.76	669.59	NA	NA		Reference elevation is TOC
13MWT17	08/09/2005	11:24	693.01	18	11.23	681.78	NA	NA		Reference elevation is TOC
13MWT18	08/09/2005	11:37	702.92	30	20.31	682.61	NA	NA		Reference elevation is TOC
13MWT19	08/09/2005	15:06	705.82		12.08	693.74	NA	NA		Reference elevation is TOC
13MWT20	08/09/2005	14:35	702.07		4.96	697.11	NA	NA		Reference elevation is TOC
13MWT21	08/09/2005	11:21			10.37	e	NA	NA		Reference elevation is TOC
13MWT22	08/09/2005	11:09			9.92	e	NA	NA		Reference elevation is TOC
13MWT23	08/09/2005	14:37	699.14		9.39	689.75	NA	NA		Reference elevation is TOC
13MWT24	08/09/2005	14:39	693.93		10.52	683.41	NA	NA		Reference elevation is TOC
13MWT25	08/09/2005	11:07			9.27	e	NA	NA		Reference elevation is TOC
13MWT26	08/09/2005	11:04			10.79	e	NA	NA		Reference elevation is TOC
13MWT27	08/09/2005	11:31	698.13	20	10.97	687.16	NA	NA		Reference elevation is TOC
13MWT28	08/09/2005	14:05	705.55		71.76	633.79	NA	NA		
13MWT29	08/09/2005	14:50	700.44		6.32	694.12	NA	NA		Reference elevation is TOC
13MWT30	08/09/2005	15:14	698.94	24	13.13	685.81	NA	NA		Reference elevation is TOC
13MWT31	08/09/2005	15:09	696.21	20	13.00	683.21	NA	NA		Reference elevation is

										TOC
13MWT32	08/09/2005	15:19	696.04	18	10.16	685.88	NA	NA		Reference elevation is TOC
13MWT33	08/09/2005	15:04	701.97		13.92	688.05	NA	NA		Reference elevation is TOC
13MWT34	08/09/2005	14:42	695.93		5.81	690.12	NA	NA		Reference elevation is TOC
13MWT35	08/09/2005	16:09	681.73	67	63.98	617.75	NA	NA		Reference elevation is TOC
13MWT36	08/09/2005	15:24	667.21	25	18.80	648.41	NA	NA		Reference elevation is TOC
13MWT37	08/09/2005	15:28	662.29	24.5	13.56	648.73	NA	NA		Reference elevation is TOC
13MWT38	08/09/2005	15:27	661.04	65	61.63	599.41	NA	NA		Reference elevation is TOC
13MWT39	08/09/2005	15:33	654.44	24	16.31	638.13	NA	NA		Reference elevation is TOC
13MWT40	08/09/2005	15:37	667.18	25	17.93	649.25	NA	NA		Reference elevation is TOC
13MWT41	08/09/2005	15:38	665.67	65	66.21	599.46	NA	NA		Reference elevation is TOC
13MWT42	08/09/2005	15:42	670.31	21	20.28	650.03	NA	NA		Reference elevation is TOC
13MWT43	08/09/2005	12:02	690.90		10.05	680.85	NA	NA		Reference elevation is TOC
13MWT44	08/09/2005	12:00	683.82		64.47	619.35	NA	NA		Reference elevation is TOC
13MWT45	08/09/2005	10:30			70.55	e	NA	NA		Reference elevation is TOC
13MWT46	08/09/2005	15:32	653.61	65	57.12	596.49	NA	NA		Reference elevation is TOC
13MWT47	08/09/2005	14:57	677.23	18	3.95	673.28	NA	NA		Reference elevation is TOC
13MWT48	08/09/2005	15:53	NA		12.21	e	NA	NA		No well tag installed.
13MWT49	08/09/2005	15:49	NA		8.65	e	NA	NA		No well tag installed on

										this well (13MWT49).
13MWT50	08/09/2005	15:56	NA		8.76	e	NA	NA		No well tag installed.
13MWT51	08/09/2005	15:58	NA	17.72	14.00	e	NA	NA		No well tag installed.

Tetra Tech NUS, Inc.

SURFACE WATER MEASUREMENT LOG

MU 12 Routine Sampling - August 2005 Round 4 - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	John Wright
TtNUS Project #	112GN6878	**PM Telephone**	412-921-8308	**Created Date**	8/16/05
Task/Contract #	CTO 0357	**Field Op Leader (FOL)**	Terry Rojahn	**Modified By**	
WBS Code #	NA	**FOL Phone**	412-921-8857	**Modified Date**	
Chain of Custody ID		**Carrier**		**Printed By**	Joseph Lucas
		Carrier/Waybill No.		**Printed Date**	5/2/06

Surface Water Measurements

Location ID	Date	Time	Flow Rate (est.)	Type	Measurement	Flow Width	Flow Depth	Flow Velocity
12SG01	8/10/05	13:49	Dry	Dry				
12SG02	8/10/05	14:07	Dry	Dry				
12SG03	8/10/05	14:10	Dry	Dry				
12SG04	8/10/05	14:23	Dry	Dry				
12SG05	8/10/05	14:40	Dry	Dry				
12SG06	8/10/05	14:59	Dry	Dry				
12SG07	8/10/05	15:22	Dry	Dry	Dry			
12SG08	8/10/05	13:01	Dry	Dry				

Tetra Tech NUS, Inc.

SURFACE WATER MEASUREMENT LOG

SWMU 12 Routine Sampling - August 2005 Round 4 - CRANE NSWC

Surface Water Measurements

Location ID	Date	Time	Flow Rate (est.)	Type	Measurement	Flow Width	Flow Depth	Flow Velocity
12SG09	8/10/05	13:25	<5 GPM	Estimated	17.55	NA	NA	NA
12SG10	8/10/05	13:10	0.0 GPM	Stagnant	15.05	21	1.85	No flow
12SG11	8/10/05	13:18	<10 GPM	Estimated	20.05	1.3	0.25	1
12SG12	8/10/05	13:30	Dry	Dry				

General Observations and Notes

No Notes

- End of Report -

A.6.1

SWMU 13

EQUIPMENT CALIBRATION FORMS

ROUND 5

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE Summer 09 INSTRUMENT NAME/MODEL: YSI / 600 XL

SITE NAME: Mine Fill B (13) Mine Fill A (2) MANUFACTURER: YSI

PROJECT No.: 7448/00042/6878 SERIAL NUMBER: 04C 3884 AB

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
5-3-05	JG/JW	7.12	3.89	1093	8.85	236.5 15.33	6.99	4.00	1000	9.50	237.5 15.98		
5-4-05	JG/JW	7.05	3.92	1021	9.62	236.5 17.41	7.00	4.00	1000	9.53	237.5 17.35		
5-5-05	JG	7.06	3.94	987	9.38	236.6 17.60	7.00	4.00	1000	9.36	237.5 17.48		
5-6-05	JG	6.99	3.94	1012	9.76	237.5 18.18	7.00	4.00	1000	9.32	237.5 18.23		
5-7-05	JG	7.02	4.06	1101	8.21	232.7 19.01	7.00	4.00	1000	9.51	237.5 18.83		
5-8-05	JG	7.09	3.92	982	8.99	234.5 19.57	7.00	4.00	1000	8.83	237.5 19.41	replaced DO membrane	
5-17-05	JG	6.89	3.88	963	9.20	237.7 15.48	7.00	4.00	1001	8.88	237.5 15.70	"not used"	
5-18-05	JG		Not used				–	–	–	–	–		
5-19-05	JG	6.99	4.01 checked				–	–	–	–	–		
5-21-05	JG	6.99	4.02	988	7.41	235.8 19.11	4.00 → 7.00		999	8.96	237.5 19.20		
5-22-05	JG	–	–	1082	9.78	236.7 18.26	–	–	999	8.98	237.5 18.33	pH bulb is broken	
5-23-05	JG	–	–	1004	9.93	236.2 19.53	–	–	1000	8.82	237.5 19.54		
6-1-05	CD	10.00	4.39	938	6.66	213.7 18.86	7.00	4.00	1000	8.96	~~237.7~~ ~~18.86~~	237.5 18.58	replaced DO membrane replaced pH bulb.
											~~237.5~~ ~~18.86~~	CD	
6-2-05	CD	5.68	6.73	1003	8.90	237.6 18.98	7.01	4.02	1000	8.80	237.5 18.87		
6-3-05	CD	5.75	3.92	1041	8.97	236.1 20.20	7.11	4.01	1000	8.76	237.5 20.01		
6-4-05	CD	7.13	4.14	1010	8.83	237.0 20.33	7.05	4.00	1000	8.76	237.5 20.02		
6-5-05	CD	7.10	3.25	1044	8.56	232.2 22.35	7.00	4.00	1000	8.34	237.5 22.29		

Summer 8

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE SWMU 09

INSTRUMENT NAME/MODEL: YSI / 600 XLM

SITE NAME: Mine Fill B (13) Mine Fill A (12)

MANUFACTURER: YSI

PROJECT No.: 7445/00042/6878

SERIAL NUMBER: 01L0702AF

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
5-3-05	JG/JW	6.83	3.92	1136	9.71	241.2 16.76	7.00	4.00	1000	9.54	235.0 16.65	PH 4 4098 PH 7 4110	pH
5-4-05	JG/JW	7.06	3.99	1001	10.46	235.7 16.56	7.00	4.00	1000	9.61 ~~100~~	234.9 16.61	SpC 4554 ORP 0341234	
5-5-05	JW/JG	7.03	4.09	990	6.54	232.0 17.26	7.00	4.00	1000	9.48	235.0 17.25		
5-6-05	JW	7.05	3.87	1122	11.65	234.6 19.68	7.00	4.00	1000	8.98	234.4 19.95		
5-7-05	JW	—	-	—	—	—	—	-	—	—	—		use 5/6/05 CALIBRATION DO NOT USE INSTRUMENT
5-9-05	JW	6.93	4.16	992	4.93	229.6 19.37	7.00	4.00	1000	8.85	235.1 19.02		
5-18-05	TR	7.08	3.89	992	8.13	236.1 19.02	7.00	4.00	1000	9.10	235.0 18.6		
5-19-05	JG	6.90	3.79	1160	8.52	236.3 19.35	7.00	4.00	999	8.72	235.0 19.61		
5-20-05	JG	6.99	4.04	1002	9.10	241.3 19.94	7.00	4.00	999	8.88	235.0 19.95		
5-21-05	JG	7.12	3.98	995	11.07	232.3 18.93	7.00	4.00	1000	9.00	235.0 18.89		
5-22-05	JG	7.17	4.24	1040	8.61	227.0 19.55	7.00	4.00	1000	8.78	235.0 19.57		
5-23-05	JG	7.02	3.97	1016	6.77	235.2 19.78	7.00	4.00	1000	8.85	235.0 19.61		
5-24-05	JG	6.80	4.11	962	7.35	237.9 18.96	7.00	4.00	1000	9.06	235.0 18.83		
6-1-05	CD	6.85	3.72	1063	11.47	229.8 17.73	7.00	4.00	1000	8.88	235.0 17.86	PH 4 4098 PH 7 4110	replaced DO membrane
6-2-05	CD	6.99	4.01	991	9.06	234.7 19.07	7.00	4.00	1000	8.80	235.0 18.91		
6-3-05	CD	6.94	3.97	997	8.66	235.4 20.01	7.00	4.00	1000	8.72	235.1 19.93		
6-4-05	CD	7.04	4.02	1000	8.83	234.0 20.08	7.00	4.00	1000	8.76	235.0 20.03		

SWMU 5

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE SWMU 09

INSTRUMENT NAME/MODEL: YSI / 600 XL

SITE NAME: Mine Fill B (13)

MANUFACTURER: YSI

PROJECT No.: 7448/00042

SERIAL NUMBER: 99E00409 AA

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
5-3-05	JG/JW	7.00	3.95	1025	9.24	242.3 16.64	7.00	4.00	1000	9.58	237.5 16.70		
5-4-05	JG/JW	7.01	4.08	971	9.89	236.4 17.55	7.00	4.00	1000	9.52	237.5 17.63		
5-5-05	JG	6.98	4.12	991	10.30	235.8 17.70	7.01	4.00	1000	9.38	237.5 17.82		
5-6-05	JG	7.10	3.99	989	6.30	232.9 18.97	7.00	4.00	1000	9.26	237.5 19.01		
5-7-05	JG	NA*	4.16*	1105	7.20	366.8 19.56	N/A*	4.00*	1000	9.42	237.5 19.54		* pH bulb broken

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

SITE NAME: SWMU 9 Mine Fill B (13) Mine Fill A (12)

PROJECT No.: 7448/00042/6878

INSTRUMENT NAME/MODEL: Turbidimeter

MANUFACTURER: Lamotte

SERIAL NUMBER: 1728-1600

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
5/3/05		JW / JG	0.00	0.00	9.7	10		
5/4/05		JSW	0.00	0.00	9.86	10		
5/5/05		JSW	0.00	0.00	10	10		
5/6/05		JSW	0.00	0.00	10	10		
5/7/05		JSW	–	–	–	–		USE 5/6/05 CALIBRATION – DID NOT USE INSTRUMENT
5/8/05		JSW	0.00	0.00	9.8	10		
5/18/05		TR	0.00	0.00	10	10		
5/19/05		JG	0	0	11	10		
5/20/05		TR	0.00	0.00	10	10		
5/21/05		JG	0	0	10	10		
5/22/05		JG	0	0	10	10		
5/23/05		JG	0	0	9.9	10		
5/24/05		JG	0	0	10	10		
6-1-05		CD	0	0	10	10		
6-2-05		CD	0	0	10	10		
6-3-05		CD	0	0	10	10		
6-4-05		CD	0	0	10	10		
6-5-05		CD	0	0	10.40	10.00		

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: NSWC CRANE

INSTRUMENT NAME/MODEL: Turbidimeter

SITE NAME: Mine Fill B(13)

MANUFACTURER: LaMotte

PROJECT No.: 7448

SERIAL NUMBER: 2843-4501

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
5-3-05		JG/JW	0	0	9.5	9.9		Ok
5-4-05		JG	0	0	10	10		
5-5-05		JG	0	0	9.9	10		
5-6-05		JG	0	0	10	10		
5-7-05		JG	0	0	9.9	10		
5-19-05		JG	0	0	10	10		
5-21-05		JG	0.65	0	9.7	10		
5-22-05		JG	0	0	10	10		
5-23-05		JG	0	0	10	10		
6-1-05		CD	0	0	9.38	10		
6-2-05		CD	0	0	10.45	10		
6-3-05		CD	0	0	8.89	10		
6-4-05		CD	0	0	10.59	10		

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

INSTRUMENT NAME/MODEL: Turbidimeter

SITE NAME: Mine Fill B (J3)

MANUFACTURER: LaMotte

PROJECT No.: 7448

SERIAL NUMBER: 0359-4197

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
5-3-05		JG	0	0	9.7	10.0		
5-4-05		JG	0	0	9.7	10.0		
5-5-05		JG	0.5	0	10	10		
5-6-05		JG	0	0	10	10		
5-7-05		JG	0	0	10	10		
5-8-05		JG	0	0	10	10		

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

SITE NAME: SWMU 13, 16 & 12

PROJECT No.: 7448 & 6878

INSTRUMENT NAME/MODEL: MINI RAE 2000

MANUFACTURER: RAE SYSTEMS

SERIAL NUMBER: 110-003829

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
5/3/05	SAME	TR	—	—	0.0/100	0.0/100	00324-04	EXP. DATE 11/15/05
5/6/05	"	TR	—	—	0.0/100	0.0/100	"	"
5/19/05	"	TR	—	—	0.0/116	0.0/100	"	"

A.6.2

SWMU 13

EQUIPMENT CALIBRATION FORMS

ROUND 6

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	Turbidity Meter	**Created By**	James Goerdt
TtNUS Project #	112G00041	**Manufacturer**	LaMotte 2020	**Created Date**	8/9/05
Task/Contract #	CTO 0377	**Serial Number**	3655-3802	**Modified By**	
WBS Code #	0000			**Modified Date**	
Client				**Printed By**	Joseph Lucas
				Printed Date	5/2/06

Calibration Records

Date	Calibrator	Turbidity	Turbidity	Comments
8/9/05	James Goerdt	Pre: 0.0 Post: 0.0 Std: NA Exp: NA	Pre: 11.0 Post: 10.0 Std: NA Exp: NA	
8/10/05	James Goerdt	Pre: 0 Post: NA Std: Exp:	Pre: 12 Post: 10 Std: Exp:	
8/11/05	James Goerdt	Pre: 0 Post: Std: Exp:	Pre: 8.4 Post: 10 Std: Exp:	
8/12/05	James Goerdt	Pre: 0 Post: NA Std: Exp:	Pre: 12 Post: 10 Std: Exp:	
8/13/05	James Goerdt	Pre: 0 Post: Std: Exp:	Pre: 9.4 Post: 10 Std: Exp:	
8/14/05	James Goerdt	Pre: 0 Post: Std: Exp:	Pre: 9.1 Post: 10 Std: Exp:	
8/15/05	James Goerdt	Pre: 0 Post: Std: Exp:	Pre: 10 Post: Std: Exp:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	YSI600	**Created By**	James Goerdt
TtNUS Project #	112G00041	**Manufacturer**	YSI	**Created Date**	8/9/05
Task/Contract #	CTO 0377	**Serial Number**	99K1014 AB	**Modified By**	
WBS Code #	0000			**Modified Date**	
Client				**Printed By**	Joseph Lucas
				Printed Date	5/2/06

Calibration Records

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	YSI600	**Created By**	James Goerdt
TtNUS Project #	112G00041	**Manufacturer**	YSI	**Created Date**	8/9/05
Task/Contract #	CTO 0377	**Serial Number**	98H1228AB	**Modified By**	
WBS Code #	0000			**Modified Date**	
Client				**Printed By**	Joseph Lucas
				Printed Date	5/2/06

Calibration Records

Date	Calibrator	pH	pH	Conductivity	ORP	DO	Comments
8/9/05	James Goerdt	Pre: 4.10 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 6.85 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 1019 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 230.4 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 24.63	Pre: 7.98 Post: 8.14 Std: NA Exp: NA	
8/[illegible]/05	James Goerdt	Pre: 6.85 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 4.10 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 1019 Post: 1000 Std: Exp:	Pre: 230 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 24.63	Pre: 7.98 Post: 8.14 Std: NA Exp: NA	
8/12/05	James Goerdt	Pre: 6.98 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 3.99 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 1063 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 2328.6 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 25.12	Pre: 8.00 Post: 8.14 Std: Exp:	
8/14/05	James Goerdt	Pre: 7.18 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 3.87 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 1022 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 239.3 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 24.44	Pre: 8.59 Post: 8.20 Std: Exp:	
8/15/05	James Goerdt	Pre: 6.95 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 4.05 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 1007 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 239.2 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 23.79	Pre: 8.15 Post: 8.23 Std: Exp:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	YSI600	**Created By**	James Goerdt
TtNUS Project #	112G00041	**Manufacturer**	YSI	**Created Date**	8/9/05
Task/Contract #	CTO 0377	**Serial Number**	98F0478AB	**Modified By**	
WBS Code #	0000			**Modified Date**	
Client				**Printed By**	Joseph Lucas
				Printed Date	5/2/06

Calibration Records

Date	Calibrator	pH	pH	Conductivity	ORP	DO	Comments
8/9/05	James Goerdt	Pre: 5.05 Post: 3.93 Std: 4098 Exp: 8/18/05	Pre: 7.75 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 982 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 241.0 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 24.19	Pre: Post: Std: NA Exp: NA	
8/12/05	John Wright	Pre: 3.02 Post: 4.00 Std: Exp:	Pre: 6.45 Post: 7.00 Std: Exp:	Pre: 1079 Post: 1000 Std: Exp:	Pre: 232.5 Post: 231.2 Std: Exp: ORP: 25	Pre: 7.87 Post: 7.88 Std: Exp:	
8/14/05	James Goerdt	Pre: 6.10 Post: 7.01 Std: 4110 Exp: 8/28/05	Pre: 5.74 Post: 4.01 Std: 4098 Exp: 8/18/05	Pre: 962 Post: 999 Std: 4885 Exp: 4/16/06	Pre: 234.9 Post: 231.0 Std: 03L1234 Exp: 12/05 ORP: 24.25	Pre: 8.13 Post: 8.19 Std: Exp:	
8/15/05	James Goerdt	Pre: 6.55 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 4.51 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 997 Post: 999 Std: 4885 Exp: 4/16/06	Pre: 232.7 Post: 231.0 Std: 03L1234 Exp: 12/05 ORP: 23.92	Pre: 8.45 Post: 8.20 Std: Exp:	
8/22/05	James Goerdt	Pre: 7.63 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 3.38 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 1003 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 228.3 Post: 237.5 Std: 03L1234 Exp: 12/05 ORP: 22.60	Pre: 8.32 Post: 8.02 Std: Exp:	Beginning of new shift. Two monitoring wells yet to sample at SWMU 13.

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	Turbidity Meter	**Created By**	James Goerdt
TtNUS Project #	112G00041	**Manufacturer**	LaMotte 2020	**Created Date**	8/10/05
Task/Contract #	CTO 0377	**Serial Number**	1733-1600	**Modified By**	
WBS Code #	0000			**Modified Date**	
Client				**Printed By**	Joseph Lucas
				Printed Date	5/2/06

Calibration Records

Date	Calibrator	Turbidity - 0 NTU	Turbidity - 10 NTU	Comments
8/10/05	James Goerdt	Pre: 0 Post: NA Std: Exp:	Pre: 10 Post: NA Std: Exp:	
8/11/05	John Wright	Pre: 0 Post: 0 Std: Exp:	Pre: 10 Post: 10 Std: Exp:	
8/12/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 10.26 Post: 10.00 Std: NA Exp: NA	
8/14/05	James Goerdt	Pre: 0 Post: Std: Exp:	Pre: 11 Post: 10 Std: Exp:	

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Instrument**	Turbidity Meter	**Created By**	Terry Rojahn
TtNUS Project #	112G00041	**Manufacturer**	LaMotte 2020	**Created Date**	8/11/05
Task/Contract #	CTO 0377	**Serial Number**	4557-3303	**Modified By**	
WBS Code #	0000			**Modified Date**	
Client				**Printed By**	Joseph Lucas
				Printed Date	5/2/06

Calibration Records

Date	Calibrator	Turbidity - 0 NTU	Turbidity - 10 NTU	Comments
8/11/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 9.4 Post: 9.9 Std: NA Exp: NA	
8/12/05	Terry Rojahn	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 10.1 Post: 10.0 Std: NA Exp: NA	
8/14/05	John Wright	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 10 Post: 10 Std: NA Exp: NA	
8/16/05	John Wright	Pre: 0.00 Post: 0.00 Std: NA Exp: NA	Pre: 9.8 Post: 10.0 Std: NA Exp: NA	

Equipment Calibration
Entered by Joseph Lucas on 05/02/2006

Project Site Name:	CRANE NSWC
TtNUS Project No.:	112G00041
Task/Contract No.	CTO 0377
WBS Code	0000

Instrument Name/Model:	**YSI600**
Manufacturer:	YSI
Serial Number:	99K1014 AB

Date	Author							Notes
8/22/2005 James Goerdt	Pre: 7.00 Post: 7.00 Std: 4319 Exp: 12/18/05	Pre: 3.98 Post: 4.00 Std: 4439 Exp: 2/23/06	Pre: 1053 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 232.3 Post: 237.5 ORP 24.89 Std: 03L1234 Exp: 12/05	Pre: 8.49 Post: 8.11 Std: Exp:	Pre: Post: Std: Exp:		Beginning of a new shift. Two monitoring wells left to sample at SWMU 13.
8/16/2005 James Goerdt	Pre: 6.97 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 3.98 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 976 Post: 1000 Std: 4885 Exp: 4/16/05	Pre: 246.9 Post: 23.4 ORP 21.65 Std: 03L1234 Exp: 12/05	Pre: 8.14 Post: 8.23 Std: Exp:	Pre: Post: Std: Exp:		
8/15/2005 James Goerdt	Pre: 7.05 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 3.99 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 1011 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 241.9 Post: 237.6 ORP 22.06 Std: 03L1234 Exp: 12/05	Pre: 8.28 Post: 8.37 Std: Exp:	Pre: Post: Std: Exp:		
8/14/2005 James Goerdt	Pre: 6.29 Post: 7.00 Std: 4110 Exp: 8/28/05	Pre: 3.51 Post: 4.00 Std: 4098 Exp: 8/18/05	Pre: 1014 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 151.6 Post: 237.4 ORP 23.72 Std: 03L1234 Exp: 12/05	Pre: 8.08 Post: 8.22 Std: Exp:	Pre: Post: Std: Exp:		
8/13/2005 James Goerdt	Pre: 980 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 157.7 Post: 237.5 ORP 25.03 Std: 03L1234 Exp: 12/05	Pre: 7.58 Post: 8.24 Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:		
8/12/2005 James Goerdt	Pre: 996 Post: 1000 Std: Exp:	Pre: 246.2 Post: 237.3 ORP 24.49 Std: Exp:	Pre: 8.24 Post: 8.14 Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:		Ph bulb broken on meter. pH indicator strips being used
8/11/2005 James Goerdt	Pre: 996 Post: 1000	Pre: 236.5 Post: 237.4	Pre: 9.41 Post: 8.20	Pre: Post:	Pre: Post:	Pre: Post:		pH bulb broken on meter

	Std: 4885 Exp: 4/16/06	ORP 24.24 Std: 03L1234 Exp: 12/05	Std: NA Exp: NA	Std: Exp:	Std: Exp:	Std: Exp:	
8/10/2005 James Goerdt	Pre: 1109 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 235.1 Post: 237.5 ORP 23.69 Std: 03L1234 Exp: 12/05	Pre: 7.65 Post: 8.19 Std: NA Exp: NA	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	pH bulb broken on meter. Using pH indicator strips.
8/9/2005 James Goerdt	Pre: 7.36 Post: 7.00 Std: 4098 Exp: 8/18/05	Pre: 4.17 Post: 4.01 Std: 4110 Exp: 8/28/05	Pre: 1042 Post: 1000 Std: 4885 Exp: 4/16/06	Pre: 242.2 Post: 237.5 ORP 24.16 Std: 03L1234 Exp: 12/05	Pre: 7.20 Post: 8.17 Std: NA Exp: NA	Pre: Post: Std: Exp:	PH 4.0 AND 7.0 CALIBRATION NUMBERS CURRENTLY SWITCHED (0930)
8/9/2005 Michael Quaill	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	Pre: Post: Std: Exp:	

APPENDIX B

SMWU 13

MISCELLANEOUS FIELD DOCUMENTATION

ROUNDS 5 AND 6

B.1.1

SWMU 13

SITE LOGBOOK

ROUND 5

NSWC CRNE

N7448

SWMU 13 & 16

1376

TABLE OF CONTENTS	PAGE No.
ROUND 3	1-121
B-2930 SOIL MONITORING	132-137
ROUND 4	122-159
B-2930 SOIL MONITORING	149-151
ROUND 5	160-181

Start Round 5

MON. - 5-02-05

Work continued from Page

TRAVEL DAY

1235 Hrs - ARRIVE @ B 3245
- OPEN EQ. PACKAGES FROM WAREHOUSE & WINDOW
- SET UP YSI UNITS
- MEET W/ T. BRENT
- MISSING (2) REGULATORS - CALL U.S. ENV. to HAV them SHIPPED to SITE ASAP
- CHECK NITROGEN TANKS AND ORDER 4 NEW CYLINDERS item 102s
- GET VEHICAL PASSES FROM T/BRENT
- INITIATE CAMERA PASS PAPERWORK W/T. BRENT
- H&S MEETINGS (J. Wright & J. Goerdt)
  - TRAINING DOC.
  - MSD. DATA SHEETS
- PREP to LEAVE SITE to PURCHASE SUPPLIES

700 Hrs - LEFT B 3245 FOR SAM'S CLUB.

756 Hrs - CHECK OUT @ SAM'S CLUB

PURCHASED - ZIP lock bags
WATER & PAPER towels

END

SIGNATURE

DATE 5-2-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

B 100 P ©

SAMPLE SUMMARY:

SAMPLE ID	START PURGE	END PURGE	VOL. PURGED	SAMPLE TIME	COMMENTS
13GWT0906	1025	1155	13.5	1200	JW SAMPLER
13GWT2804	1015	1415	22.8L	1420	JG SAMPLER
13GWT0105	1545	1745	12.3L	1750	JG SAMPLER

TOOK WATER LEVELS @ MINE FILL B (WELLS & STAFF GAUGES)

TUES 5-03-05

Work continued from Page

0705 HRS - ARRIVE @ B-3245
- PREP. FOR GW SAMPLING (J.G & J.W)
- PREP. to collect WATER LEVELS @ MINE FILL B
- CALI YSIs, LAMOTTES & MINI RAE (PID)
- Obtain CAMERA PASS FOR NAVY
- T. BRENT Checked w/ Army - NO activity @ B-165 ok to do WATER level Round

1040 HRS - LEFT B-3245 FOR MINE FILL B

1050 HRS - ARRIVE @ MINE FILL B
- obtain WATER LEVEL FROM WELLS that J.G & JW are purging (13MWT29 & 09 respectively)
- continue taking WATER LEVELS @ MINE FILL B

1210 HRS - Break FOR LUNCH (TB & JW)

1240 HRS - Drop off JWs rental @ B-3245

1310 HRS - Drop OFF JGs Lunch @ 13MWT28
- Continue taking WATER LEVELS this time w/ JW
- JW is doing WELL INVENTORY @ SAME time electronically

1835 HRS - FINISH WATER LEVELS of Monitoring WELL & STAFF gauges @ MINE FILL B (SEE PAGES 164 & 165)

1845 HRS - ARRIVE @ B 3245
Drop OFF EQUIPMENT

1900 HRS - LEAVE B 3245 FOR motel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 · MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 5/03/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

 TUES 5-03-05

STAFF GAUGE ID	TIME	W.L	AVE W	AVE D	SEC/FT	Flow Rate
1356 01	1122	1.77	—			<1 gpm
02	1111	3.73	~~8"~~	~~0.03'~~	~~1 ft~~	~1-2 gpm
03	1809	1.96				No Flow
04	1812	2.45				<1 GPM
05	1816	3.89				<1 GPM
06	~~15:39~~ 17:39 JSW	DRY				DRY
07	1455	1.69				STAG.
08	1437	5.13				1-5 GPM
09	1430	4.21				1-5 GPM
10	1444	4.84				1-5 gpm
11	1830	2.51				~1 GPM
12	1621	6.85	12'	0.03'	1 ft/sec	148 gpm
13	1634	6.06				6 GPM
14	1636	6.41				5-10 GPM
15	1641	5.24	12'	0.07'	1 ft/sec	377 gpm
16	1725	DRY				DRY
17	1708	DRY				DRY
18	1726	8.19	18'	0.05'	1 ft/sec	404 gpm

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60605 MADE IN USA

TUES 5-03-05 (Con't)

Work continued from Page

WEATHER - Mostly Sunny 60's

WELL ID	TIME	WL	PID
13MWT01	1103	7.71	0.1
02	1118	16.19	0.0
03	1100	9.72	0.1
04	1130	14.27	0.0
05	1125	5.96	0.5
06	1056	11.66	0.6
07	1140	3.44	0.1
08	1133	4.85	0.2
09	1025	9.15	(JW)
10	1136	13.69	0.0
11	1150	9.03	0.0
12	1154	10.14	0.0
13	1802	05.13	0.0
14	1750	14.10	0.0
15	1200	13.88	0.0
16	1400	12.33	0.0
17	1405	9.91	0.0
18	1203	19.41	0.0
19	1745	10.40	0.0
20	1452	4.94	0.0
21	1410	9.30	0.0
22	1434	8.21	0.0
23	14:49	8.60	0.0
24	14:47	9.27	0.0
25	1439	6.65	0.0
26	1443	9.81	0.0
27	1157	9.27	0.0
28	1015	77.88	(JG)
29	1806	5.61	0.0
30	17:58	11.55	0.0
31	1733	10.74	0.0
32	1730	9.02	0.0
33	1740	10.41	0.0
34	14:32	5.26	0.0
35	1149	63.94	0.0
36	1458	18.83	0.0
37	1509	13.64	0.0
38	1507	61.81	0.0
39	1517	13.36	0.0
40	1529	18.15	0.0
41	1524	66.52	0.0
42	1545	20.38	0.0
43	1352	8.17	0.6
44	1339	64.36	0.1
45	1408	70.76	0.0
46	1516	56.61	0.0
47	1820	7.15	0.0
48	1605	10.29	0.0
49	1608	7.25	0.0
50	1611	7.90	0.0
51	1614	5.80	0.0

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5-03-05

DISCLOSED TO AND UNDERSTOOD BY

DATE

WITNESS

DATE

SAMPLE SUMMARY

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE ~~BEGIN~~ TIME	COMMENTS
13GWT4504	0923	1040	9.3 L	NA	(TR)
13GWT2105	0930	1040	7.0 L	1050	(JW)
13GWT4004	0945	1115	8.3 L	1118	(JG)
13GWT1105	1305	1400	5.3 L	1405	(TC)
13GWT1705	1250	1410	8.0 L	1420	(JW)
13GWT4604	1250	1420	9.0 L	1425	(JG)
13GWT3904	1505	1655	14.6 L	1658	(JG)

SCIENTIFIC BINDERY PRODUCTS...CHICAGO 60405 MADE IN USA

TITLE NSWC CRANE

CREW
J. Wright
J. Goerdt
T. Rosahn

PROJECT NO. 7448
BOOK NO. 1376

WED. 5-04-05

Work continued from Page

Weather - Mostly Sunny & 60's

0710 Hrs - Arrive @ B-3245
- Prep. for Groundwater Sampling Cali. Ysis & LaMottes
- Select wells for crew to sample this date

0900 Hrs - Arrive @ SWMU 13 (13MWT45)
SEE PAGE 166 FOR details

1100 Hrs - JW & TR break for lunch

1155 Hrs - Return to Field Office
TR & J.W. - office check in w/ office

1225 Hrs - Return to Mine Fill B - drop JW off @ 13MWT17
& Check on JG

1305 Hrs - Start Purging 13MWT11
SEE PAGE 166 for details

1450 Hrs - Finish @ 13MWT11 check on JG - pick up
Jims paperwork & samples

1520 Hrs - Return to B 3245
- Process paperwork for samples collected
5/03-04/05 (SEE COC # 3713)
- Prep. samples for shipping
- JW - entering paperwork electronically
- Check in w T. Brent - get figure of new
drilling locations @ B-55.

1730 Hrs - Leave site for FED EX

1800 Hrs - Drop off samples @ FED. EX on AB # 8447813542 42

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5/04/05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY 5-05-05:

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
13GWT4504	SEE PAGE 166 →			1015	(TR)
13GWT1405	0830	1015	10.3 L	1048	(JG)
13GWT5103	1000	1120	8.0 L	1130	(JW)
13GWT3104	1025	1245	12.8 L	1250	(JG)
13GWT3404	1055	1325	18.2 L	1330	(TA)
13GWT4704	1225	1345	9.6 L	1355	(JW)
13GWT1505	1440	1620	9.0 L	1625	(TR)
13GWT1305	1445	1625	14.3 L	1630	(JG)

Note: Lay out SWMU 9 DPT locations

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60605 MADE IN U.S.A.

THURS 5-05-05

Work continued from Page

WEATHER - Partly Cloudy & 60's

ARRIVE @ SITE 0650 HRS

- PREP. FOR GW SAMPLING Cal. YSIs & LAMottes
- FAX COC # 3713 to LAB & OFFICE
- SELECT WELLS FOR SAMPLING

0830 HRS - LAY OUT DPT locations @ SWMU 9 BLDG 55

0915 HRS - ARRIVE @ Public Works - LEFT DONNA 2 KNOWN that SWMU 9 is laid out

0955 HRS - ARRIVE @ SWMU 13

1015 HRS - START SAMPLING 13MWT45 (PURGED 5/4/05)
SEE PAGES 166 & 168 FOR DETAILS

1055 HRS - START PURGE @ 13MWT34
SEE PAGE 168 FOR DETAILS

1440 HRS - START PURGE @ 13MWT15
SEE PAGE 168 FOR DETAILS

1720 HRS - ARRIVE @ B-3245

- DROP OFF EQ & REFRIGERATE SAMPLES
- PICK UP PAPERWORK (JW & JG)
- SECURE Nitrogen cylinders
- IN. OXYGEN dropped off 2 more cylinders & picked up 2

1748 HRS - LEFT B-3245 FOR Bloomington

EVENING - Complete COC # 3714 & E-MAIL R. Basinski & R. Clark ON daily Activities

END

SIGNATURE

DATE 5-05-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

SAMPLE SUMMARY

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
16GWT 1104	NA	NA	NA	0845	(JG) WELL DRIES out RAPIDLY sampling incomplete
16GW 0405	1000	1135	14.0 L	1140	(JG)
16GW 0205	1000	1140	8.6 L	1145	(TA)
16GW 0305	1400	1650	15.3 L	1655	(JG)

Collected staff gauge & well measurements

SW work on Electronic Form Entry this morning

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 50605 MADE IN USA

TITLE NSWC CRANE

CREW
J. Wright
J. Boerdt
T.R.

PROJECT NO. 7448
BOOK NO. 1376

FRI. 5-06-05

Work continued from Page WEATHER: Mostly sunny & 70's

0655 Hrs - Arrive @ B-3245
- Meet w/ T. Brent - give Tom weekend info for security letter
- Checked SWMU 16 gate - looks like No Army activity for today - can start GW sampling
- Select wells to be sampled @ SWMU 16
- Prep for GW sampling, Cal. YSIs & LaMottes
- Check in w/ R. Clark regarding SWMU 9
- Check in w/ R. Basinski left message
- Talk to U.S. Env. regarding EQ. order
- Talk to J. Schubert regarding ded. pump order for SWMU 12 & SWMU 9 sampling.

0945 Hrs - Arrive @ SWMU 16 WES19
SEE PAGE 170 FOR DETAILS

1230 Hr - Lunch

1305 Hr - Return to B-3245
Prep. to collect GW & SG meas. @ SWMU 16 w/ JW - SEE PAGES 172 & 173

1715 Hrs - Arrive @ B-3245 Prep paperwork for shipment
SEE COC # 3714
JW - Check MWT 16 & 18
TR - Prep samples for shipment on AB# 0497 8135 4697

1800 Hrs - Leave B-3245 for FED. EX.

1835 Hrs - Drop off samples @ FED. EX.

END

SIGNATURE Terry Boerdt DATE 5-06-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

FRI 05-06-05 (cont)

Staff Gauge ID	W.L.	Time	Meas. W	D	sec/ft	Flow Rate
135601 → 05	DRY	1320-1600 ~~1320-1609~~	—	—	0	DRY
135606	3.67	1624	20-25 gpm			→
135607	Staff Gauge Washed Away	1633	.22' x 4' 0.5 sec/ft .22' x 4' x 2 ft/sec			790 gpm
135608	4.22	1651	—			1-5 gpm
135609	DRY	1655	—			0

Note: JW ~~Keep~~ Kept Above INFO. Electronically & Page 173

SCIENTIFIC SUNDRY PRODUCTS, CHICAGO 60635 MADE IN USA

TITLE NSWC CRANE

PROJECT NO. 7448

BOOK NO. 1376

FRI. 05-06-05 Con't

Work continued from Page

WELL ID	TIME	W.L.	PID	
16MW 01	15:34	31.62	0.0	
02	16:09	15.40	0.0	
03	15:11	19.44	NA	(JG STATIC LEVEL)
04	15:20	27.67	0.0	
05	15:26	33.80	0.0	
16MWT 01	14:15	15.55'	2.7	
02	JSW ~~14:16~~ 15:03	11.68'	0.0	
03	14:53	27.85'	0.0	
04	14:37	13.13'	0.0	
05	14:43	31.10'	0.0	
06	JSW ~~14:16~~ 14:16	16.69'	2.31	
07	14:18	N/A	36.6	DRY @ 27.26'
08	14:20	~~N/A~~ 96.16'	0.0	JSW ~~DRY @ 95.70'~~ INDEX CASING WITH BAILER
09	14:27	13.82'	0.0	
10	14:30	21.07'	0.0	
11	14:33	96.10'	0.0	
12	15:42	19.85'	0.0	
13	15:00	10.42'	0.0	
A 14	~~14:57~~ JSW	~~13.13'~~ JSW	~~0.0~~ JSW	ABANDONED
15	14:57	56.57	0.0	
16	17:45	33.47	0.0	
17	14:08	15.38'	0.0	
18	~~14:08~~ 17:28 JSW	~~15.38~~ 95.68' JSW	0.0	
19	16:48	3.36	0.0	
20	16:46	3.81	0.0	
21	15:18	64.90'	0.0	

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Taylor

DATE 5-06-05

DISCLOSED TO AND UNDERSTOOD BY | **DATE** | **WITNESS** | **DATE**

SAMPLE SUMMARY 5-07-05:

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
7B050705CC	NA	NA	NA	0800	TR
16GWT0904	0909	1059	9.2 L	1103	(TR) ALSO DUP 16FD050705-01
16GWT0606	1312	1712	10.6 L	1745	TR
16GWT1304	0830	1100	15.0 L	NA	JW
16GWT1504	1150	1550	18.0 L	1610	JW
16GWT0405	0850	1020	9.3 L	1025	JG
16GWT1004	1135	1335	12.0 L	1400	JG
16GWT1204	1445	1555	7.0 L	1600	JG
16GWT1704	1110	1920	12.5 L	1925	JG

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 93805 MADE IN USA

SAT 05-07-05

Work continued from Page

WEATHER - Mostly Sunny & 70's

0650 Hrs - Arrive @ B-3245
- Select & Prep. Paperwork for wells to be sampled this date
- Prep. SUV for GW sampling

0830 Hrs - Arrive @ BWMU 16
- Drop off VOA vials for JW

0850 Hrs - Arrive @ 16MWT09
SEE PAGE 174 for details

1210 Hrs - Left site for SUBWAY - Picked up subs for JW & JG

1230 Hrs - Return to SWMU 16 - give subs to JW & JG

1250 Hrs - Arrive @ 16MWT06
SEE PAGE 174 for Details

1800 Hrs - Finish @ 16MWT06 - Return to B-3245
- Drop off Eq.
- Refrigerate samples

1820 Hrs - Left B-3245 for Bloomington

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 5-07-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY

FINISHED collecting SAMPLES @ 16 MWT 13 E11

Collected SW SAMPLES @ SWMW5 13 E 16

JW worked on Electronic Form Entry this afternoon

SCIENTIFIC BINDERY PRODUCTS, CHICAGO

SUN 5-08-05

Work continued from Page

WEATHER: Partly Cloudy, Temp 80's

0650 Hrs - ARRIVE @ B-3245

- PREP. to SAMPLE (TR) SURFACE WATER
- PAPERWORK (COCs & 5/07 SAMPLE SUMMARY)
- PREP. SUV FOR SW SAMPLING
- (JW) collect GW samples @ 16MW13 & 11
- (JG) YSI & LaMotte CALY.

0910 Hrs - ARRIVE @ SWMU 16 to collect SURFACE WATER SAMPLES

SAMPLE ID	TIME	COMMENTS
16SW1304	0935	JG/TR
16SW1204	0950	JG/TR
16SW1003	1025	JG/TR/JW
16SW3003	1100	JG/TR/JW MS/MSD 16FD050805 01
13SW3003	1300	
13SW1604	~~1300~~ 1315	JG/TR
13SW1504	~~1315~~ 1338	
13SW1404	~~1338~~ 1350	
13SW2204	~~1350~~ 1410	
13SW/SD11	—	DRY
13SW2003	1433	JG/TR
13SW1903	1448	JG/TR

(TR)

Note: JW WORKED ON ELECTRONIC FORMS this AFTERNOON

1510 Hrs - ARRIVE @ B-3245

- Discussed Electronic Forms
- PAPERWORK (COCs 3715 & 3716, SAMPLE SUMMARY)
- SECURED SAMPLES IN FRIG

1745 Hrs - LEFT B3245

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers DATE 5/08/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

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VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 59505 MADE IN USA

TITLE NSWC CRANE

MON 5-09-05

PROJECT NO. 7448

BOOK NO. 1376

Work continued from Page

WEATHER - Mostly Cloudy TEMP 80°s

0650 Hrs - ARRIVE @ B-3245
PREP. to work @ SWMU 9 this date

1630 Hrs - PREP. SAMPLES FOR SHIPMENT
ON COCs 3715 & 3716

1830 Hrs - DROP OFF SAMPLES @ FED. EX. ON
AB# 8447 8135 4653

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogel

DATE 5-09-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 50505 MADE IN USA

TUES. 5/17/05

Work continued from Page

0650 Hrs - ARRIVE @ B-3245
- Work on SWMU 12 until 0900

0900 Hrs - PREP. to SAMPLE SEDIMENT @ SWMU 13

SAMPLE ID	SAMPLE TIME	COMMENTS
13SD4201	0943	SAMPLERS JG & TK
13SD4101	1028	
13SD4001	1105	
13SD3901	1125	
13SD3801	1140	
13SD3701	1150	
13SD3601	1205	MS/MSD @ 13F0051705 01
13SD4301	1320	
13SD4401	1335	
13SD4501	1355	

1220 Hrs - LUNCH

1250 Hrs - Stop @ DEMO RANGE CHECK IN W/ WALT WAGGONER to SEE if it is OK to SAMPLE @ SED. LOCATIONS 13SD43 → 45
OK W/ WALT

1410 Hrs - Stop @ DEMO RANGE AND LET WALT KNOW that WE (JG & TK) ARE CLEAR OF DEMO RANGE

1423 Hrs - Return to B-3245
- PROCESS & Complete COC # 3717 SED SAMPLES
- Organize SWMU 12 Round 2 PAPERWORK
  - ☆ Prep. Table showing WELL ID & Past Purge time, pump used & days to complete sampling
- Organize OFFICE

1800 Hrs - LEAVE B 3245 FOR Bloomington

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers DATE 5/17/05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

B.1.2

SWMU 13

DAILY ACTIVITES RECORD

ROUND 6

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/08/2005	**Weather/Temp**		**Created By**	John Wright
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	8/8/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	
Task/Contract #		**Visitors**		**Modified Date**	
WBS Code #	xxx			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/8/05	16:00	John Wright	Arrived at Base and checked in with security. Issued gate pass and went to field office to prepare for E-Data use. Met with Terry R. and Jim G. and trained in E-Data demo and Crane-specific projects (SWMUS 13/16 and 12).

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/08/2005	**Weather/Temp**		**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	8/8/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	xxx			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/8/05	11:45	Terry Rojahn	Arrive at B-3245
8/8/05	16:00	Terry Rojahn	John Wright and Jim Goerdt arrive at B-3245
8/8/05	18:15	Terry Rojahn	Leave B-3245 for Sam's Club
8/8/05	18:45	Terry Rojahn	Arrive at Sam's Club - purchase supplies
8/8/05	19:30	Terry Rojahn	Leave Sam's Club For Motel - Last Entry

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/09/2005	**Weather/Temp**	Hazy, Hot & Humid, Temp. High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/9/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/9/05	06:58	Terry Rojahn	Arrive at B-3245:
8/9/05	09:07	Terry Rojahn	Attempted to calibrate PID - Problem with battery (shuts down right away)
8/9/05	09:51	Terry Rojahn	Turbidity meter also bad (stuck on 2.31)
8/9/05	10:25	Terry Rojahn	Arrive at Mine FIll B -Measure water levels and staff gauges
8/9/05	12:20	Terry Rojahn	Lunch break
8/9/05	12:56	Terry Rojahn	Return to B-3245
8/9/05	13:30	Terry Rojahn	Returned to Mine Fill B (all wells measured and 8 staff gauges checked)
[illegible]/05	16:20	Terry Rojahn	Start measuring water levels at SWMU 9.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/9/05	18:37	Terry Rojahn	Complete water levels at SWMU 9: return to B-3245
8/9/05	19:00	Terry Rojahn	Leave B-3245 for motel

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/10/2005	**Weather/Temp**	Hazy, Hot & Humid, Temp 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/10/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/10/05	06:55	Terry Rojahn	Arrive at B-3245: Organize office - more space for toughbook entry.
8/10/05	08:40	Terry Rojahn	Arrive @ SWMU 12: Park one car @ bottom of RR Tracks and drive second car to north end of track - collect water levels (WL) on RR tracks. Also
8/10/05	11:05	Terry Rojahn	Arrive at B-3245 to sync toughbooks for changes to surface water/staff gauge data forms.
8/10/05	11:25	Terry Rojahn	Lunch Break
/05	11:50	Terry Rojahn	Return to B-3245: Called U.S. Environmental to order pH probe
8/10/05	13:00	Terry Rojahn	Return to SWMU 12 and 13 Water level and staff gauge measurements.
8/10/05	16:15	Terry Rojahn	Finish water level and staff gauge measurements and return to B-3245.
8/10/05	18:00	Terry Rojahn	Left B-3245 for Fed. Ex.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/10/05	18:30	Terry Rojahn	Drop off samples @ Fed. Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/11/2005	**Weather/Temp**	Hot, Humid & Partly Sunny ; Temp. High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC			**Created Date**	8/11/05
TtNUS Project #	112G00041	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Modified By**	Terry Rojahn
Task/Contract #	0000			**Modified Date**	3/9/06
WBS Code #	0000	**Subcontractor Personnel**		**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/11/05	06:55	Terry Rojahn	Arrive at B3245: Fax COC #3261 to Laucks (H. Prentice). Select wells for sampling this date. Calibrate Turbidity meter. Discuss computer generated Groundwater Form with JW. Prep SUV for groundwater sampling. Discuss the shipment of a pH replacement probe w/ US Environmental
8/11/05	11:00	Terry Rojahn	Arrive at SWMU 13 to sample 13MWT17 and 13MWT15. Returned to B-3245 briefly between wells to check on Microseep sample containers (they did arrive) and to fax E. Sedlmyer yesterday's COC.
8/11/05	17:15	Terry Rojahn	Arrive at B-3245: Drop off equipment, gas cylinders and secure samples in frig.
/05	17:30	Terry Rojahn	Leave B-3245 for motel. Sample Summary: completed the sampling of monitoring wells 13MWT11, 5, 17, 34, 37 and 41 (10 of 17 wells completed to date at SWMU 13). Monitoring well 13MWT51 was purged but not sampled - well was purged dry. The initial water level at 13MWT51 has dropped significantly from prior rounds. Well may have been impacted by new water line installed just next to it.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/12/2005	**Weather/Temp**	Hot & Humid, Temp low 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/12/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/12/05	07:05	Terry Rojahn	Arrive at B-3245:
8/12/05	08:40	Terry Rojahn	Calibrate turbidity meters (JW & TR)
8/12/05	09:17	Terry Rojahn	Got weekend work letters from T. Brent.
8/12/05	09:30	Terry Rojahn	Arrive at SWMU 16 to measure water levels and staff gauges.
8/12/05	11:20	Terry Rojahn	Finish water level & staff gauge measurements at SWMU 16.
8/12/05	11:35	Terry Rojahn	Lunch break
8/12/05	12:15	Terry Rojahn	Arrive at B-3245:
8/12/05	18:03	Terry Rojahn	Left B-3245 for Fed. Ex.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/12/05	18:35	Terry Rojahn	Drop off samples on COC #3262 @ Fed. Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/13/2005	**Weather/Temp**	Hot & Humid, 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/13/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000	**Visitors**		**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/13/05	07:15	Terry Rojahn	Arrive at B-3245:
8/13/05	08:30	Terry Rojahn	Arrive @ SWMU 16 set up @ 16MW04
8/13/05	12:05	Terry Rojahn	Finish @ 16MW04 - pick up lunch @ subway
8/13/05	12:20	Terry Rojahn	Arrive @ B-3245: Track Fed Ex coolers (Sat.pick up) - not picked up as of yet by Laucks. Attemped to call Laucks -no response.
8/13/05	12:50	Terry Rojahn	Return to SWMU 16 to purge monitoring well 16MWT15
8/13/05	17:30	Terry Rojahn	Finish purge @ 16MWT15 - return to B-3245 -drop off equipment and secure samples in frig. Track coolers - still being held at Fed. Ex. - call Laucks and leave message on same
8/13/05	18:00	Terry Rojahn	Leave B-3245 for motel. Sample Summary: purged and sampled 16MWT10 &12 and 16MW03 & 04

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/14/2005	**Weather/Temp**	Mostly Cloudy, Temp.90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/14/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/14/05	07:05	Terry Rojahn	Arrive @ B-3245: Prep to sample Ground water @ SWMU 16
8/14/05	08:50	Terry Rojahn	Arrive at SWMU 16
8/14/05	10:55	Terry Rojahn	Start collecting sample 16GWT0406.
8/14/05	14:20	Terry Rojahn	Arrive @ 16MWT15
8/14/05	14:30	Terry Rojahn	Start collecting sample 16GWT1505
8/14/05	14:41	Terry Rojahn	Security check by Crane Security Officer.
8/14/05	16:05	Terry Rojahn	Collect 16GWT1505 & depart @ SWMU 16 for SWMU 13.
8/14/05	16:15	Terry Rojahn	Arrive @ SWMU 13 - set up at 13MWT51.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/14/05	16:46	Terry Rojahn	Finish collecting Groundwater at 13MWT51 - leave SWMU 13 for B-3245.
8/14/05	16:55	Terry Rojahn	Arrive at B-3245: Secure eq. & samples.
8/14/05	17:23	Terry Rojahn	Leave B-3245 for Bloomington
8/14/05	17:25	Terry Rojahn	Sample Summary: Completed all ground water sampling at SWMU 16 this date.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/15/2005	**Weather/Temp**	Overcast, High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/15/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000	**Visitors**		**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/15/05	07:00	Terry Rojahn	Arrive at B-3245: Sedlmyer and asked him to track the shipment (was to be picked up at Fed. Ex. by Laucks Lab on Saturday).
8/15/05	10:30	Terry Rojahn	Arrive at SWMU13 (13MWT04)
8/15/05	13:53	Terry Rojahn	Finish collecting groundwater sample at monitoring well 13MWT04.
8/15/05	14:00	Terry Rojahn	Arrive at B3245:
[illegible]/05	18:10	Terry Rojahn	Leave B-3245 for Fed. Ex.
8/15/05	18:40	Terry Rojahn	Arrive at Fed. Ex - drop off samples
8/15/05	19:15	Terry Rojahn	Picked up supplies at Home Depo.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/16/2005	**Weather/Temp**	Lt. Rain /overcast, Mid 80s & Humid	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J.Wright;T. Rojahn	**Created Date**	8/16/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/16/05	07:00	Terry Rojahn	Arrive at B-3245:
8/16/05	10:20	Terry Rojahn	Arrived at SWMU 13.
8/16/05	10:30	Terry Rojahn	Collect surface water sample at location 13SW14.
8/16/05	10:50	Terry Rojahn	Collect surface water sample at location 13SW15.
8/16/05	11:15	Terry Rojahn	Collect surface water sample at location 13SW16.
8/16/05	11:30	Terry Rojahn	Collect surface water sample at location 13SW30. Also
8/16/05	11:50	Terry Rojahn	Pick up lunch at Subway.
8/16/05	12:00	Terry Rojahn	Arrive at B-3245:

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/16/05	12:55	Terry Rojahn	Return to SWMU 13.
8/16/05	13:05	Terry Rojahn	Check surface water location 13SW11 - DRY.
8/16/05	13:15	Terry Rojahn	Check surface water location 13SW22 - DRY.
8/16/05	13:30	Terry Rojahn	Collect surface water sample at location 13SW20.
8/16/05	13:45	Terry Rojahn	Collect surface water sample at location 13SW19.
8/16/05	14:05	Terry Rojahn	Check on JG at monitoring well 13MWT14 - got JG 's Toughbook to sync at B-3245.
8/16/05	14:15	Terry Rojahn	Arrive at B-3245:
8/16/05	18:30	Terry Rojahn	JW and TR left B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/17/2005	**Weather/Temp**	Hot and humid, Temp 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	8/17/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	
Task/Contract #		**Visitors**		**Modified Date**	
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/17/05	00:00	Terry Rojahn	For detailed information - see log under Phase 3 SWMU 9 project for this date.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/27/2005	**Weather/Temp**	Mostly cloudy, humid & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;T. Rojahn	**Created Date**	8/27/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/27/05	16:55	Terry Rojahn	07:05:00 - Arrive at B-3245:
8/27/05	16:56	Terry Rojahn	The above was copied from SWMU 12's (Round 4)Daily Activity Log for this date.
8/27/05	17:50	Terry Rojahn	Arrive at SWMU 13 to check on JG. JG almost done sampling at monitoring well 13MWT09.
8/27/05	18:00	Terry Rojahn	JG finished sampling at 13MWT09.
[illegible]/05	18:15	Terry Rojahn	Leave base for Bloomington. SAMPLE SUMMARY THIS DATE: Checked all surface water sampling locations at SWMU 16 - all 4 were dry. Also

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/29/2005	**Weather/Temp**	Mostly cloudy, hunid & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	Goerdt;Rojahn	**Created Date**	8/29/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/29/05	15:00	Terry Rojahn	See SWMU 12 Round 4 Daily Log for this date's (8/29/05) activities.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	09/29/2005	**Weather/Temp**	Mostly sunny & 60's	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Westerhoff;D. Hickey;J. Wright;T. Rojahn	**Created Date**	9/29/05
TtNUS Project #	112G00041			**Modified By**	
Task/Contract #		**Subcontractor Personnel**	EFS;Jay McFall;Capitol Drilling & Sawing ;David Cribbs	**Modified Date**	
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
9/29/05	08:30	Terry Rojahn	Arrive at SWMU 8 with DW - meet with Ted Butler & Pam Hock (Army H&S) receive Safety & Building Availability Permit.
9/29/05	09:50	Terry Rojahn	Fire Inspector arrived on site - DW received Hot Work Permit.
9/29/05	10:10	Terry Rojahn	D. Cribbs began coring concrete.
9/29/05	10:45	Terry Rojahn	Start drilling at 09SB25.
9/29/05	12:40	Terry Rojahn	Finish coring inside B106 and completed 09SB22
9/29/05	13:00	Terry Rojahn	Lunch
9/29/05	13:35	Terry Rojahn	Return to SWMU 8 - start coring inside B107 and continued drilling inside B-106. DW over seeing H& S at B106 and TR over seeing coring activites at B-107. B-107 active - checked w/ Tom Hess for permission to core. OK to core 4 of 5 while workers are in the bldg. Workers are done at 1500Hrs.
9/29/05	15:30	Terry Rojahn	Completed the 4 of 5 corings at B107 and moved back to B-106 - SB30 drilling rig hit refusal only a couple inches below the floor. Believe rig hit an old sump moved SB30 about 5' from the wall.

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
9/29/05	16:07	Terry Rojahn	2inches to refusal - abandoned hole - will pick another location W/T. Brent.
9/29/05	07:00	Terry Rojahn	Arrive at B-3245 - pick up H&S equipment and check in with Tom Brent.
9/29/05	08:00	Terry Rojahn	Do building walk through with bldg. supervisor (Tom Hess) - showed Mr Hess all boring locations in bldgs 106 &107. Mr Hess showed TTNUS how to turn on overhead exhaust fans. Objects blocking boring locations were already moved.
9/29/05	14:45	Terry Rojahn	Complete coring - sump confirmed - SB30 right on east edge of sump - 4' void below floor.
9/29/05	15:07	Terry Rojahn	2inches to refusal - abandoned hole - will pick another location W/T. Brent to place the last boring (SB30) in B106.

- End of Report -

APPENDIX C

SWMU 13

HEALTH AND SAFETY DOCUMENTATION

ROUNDS 5 AND 6

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220
Tel 412.921.7090 • Fax 412.921.4040 • www.tetratech.com

PITT-04-5-067

April 29, 2005

Project Nos. 1245, 7448, 6878, 00042

Mr. William Gates (Code ES31)
Commander, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29119-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order Nos. 0331, 0343, 0357, 0376

Subject: Personnel Clearance for Site Visit

Dear Mr. Gates:

The purpose of this letter is to inform you of upcoming site activities to be performed by Tetra Tech NUS, Inc. (TtNUS) employees under the CLEAN contract, and to attest that the individuals identified herein are in compliance with applicable OSHA regulations. This information is being submitted as specified in Section H.14 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62467-94-D-0888. The specific OSHA regulations involved for this project pertain to employee health and safety training and medical surveillance requirements, as identified in OSHA 29 CFR 1910.120.

The subject project and planned activities include staking locations of intrusive sampling; installation/development and sampling of monitoring wells; surface water, seep and sediment sampling; and soil sampling using DPT and hand augering techniques at the NSWC Crane site in Indiana. This is scheduled to be conducted from May 2, 2005 through June 8, 2005. The individuals that will perform these tasks are employees of TtNUS. In performing these activities, the field team will adhere to the following Health and Safety Plans (HASPs):

- HASP for RCRA Facility Investigation at Building 106 Pond (SWMU 8) and Roads and Grounds Area (SWMU 15), dated November 2004, prepared under CTO 0331.
- HASP for Cast High Explosives Fill and B-146 Incinerator, dated August 2004, prepared under CTO 0343.
- HASP for Mine Fill A (SWMU 12), Revision 1, dated August 2004, prepared under CTO 0357.
- HASP for Risk Assessment and Corrective Measures Study (SWMU 9), dated February 2005, prepared under CTO 0376.

The following individuals will participate in the planned activities described above:

Jim Goerdt
Terry Rojahn
John Wright
Jeff Schubert

TETRA TECH NUS, INC.

In addition, Roger Clark will also visit Tetra Tech NUS, Inc. work sites at NWSC Crane during this period. However, he will be not participating in any intrusive activities (e.g., drilling, sampling, etc.) and will be restricted from approaching work areas while any intrusive activities are performed.

If you have any questions, concerns, or if I can be of further assistance, please do not hesitate to contact me.

Very truly yours,

Matthew M. Soltis, CIH, CSP
CLEAN Health and Safety Manager

MMS/mlg

cc: Mr. B. Gorman (Code ES34)
Ms. Debra Humbert, TtNUS, Inc.
Mr. Mark Perry, TtNUS, Inc.
Mr. Keith Henn, TtNUS, Inc.
Mr. Terry Rojahn, TtNUS, Inc.
Mr. Roger Clark, TtNUS, Inc.
File copy CTO 0331, 0343, 0357, 0376

NUS CORPORATION

Certificate of Training

THIS CERTIFIES THAT

TERRY ROJAHN

has successfully completed a course of instruction on

SUPERFUND TRAINING CLASS

prepared and conducted by the
NUS Corporation, Pittsburgh, Pennsylvania

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

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

E. Dennis Escher, P.E.
Vice President

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Terry R. Rojahn

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 25, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

Basinski, Ralph

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

Ralph:

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

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

If there are any questions, let me know.

Matt

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

NOTICE OF CONFIDENTIALITY

This e-mail message and its attachments (if any) are intended solely for the use of the addressees hereof. In addition, this message and the attachments (if any) may contain information that is confidential, privileged and exempt from disclosure under applicable law. If you are not the intended recipient of this message, you are prohibited from reading, disclosing, reproducing, distributing, disseminating or otherwise using this transmission. Delivery of this message to any person other than the intended recipient is not intended to waive any right or privilege. If you have received this message in error, please promptly notify the sender by reply e-mail and immediately delete this message from your system.

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

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

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

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

STATUS

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

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

3. ☐ **NOT QUALIFIED**

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

COMMENTS:

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

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

Signature: Peter P Greaney MD

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

APPLIED EDUCATIONAL SERIES

James D. Goerdt

APPLIED ASSOCIATES INTERNATIONAL INC.

CERTIFICATE

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

ISSUE DATE: December 13, 1991

EXPIRATION: December 13, 1992

CERTIFICATE: HAZ9112001058

STEVEN L. WILLIAMS
President

THOMAS O. MURRAY
Certified Industrial Hygenist

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

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Jim Goerdt

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

October 22, 2004

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Goerdt, James	COMPANY:	TT/NUS
SSN:	481-86-2691	POSITION:	Environmental Scientist
DATE OF EXAM:	11/07/2003	LOCATION:	TT/NUS-Pittsburgh
EXPIRATION DATE:	11/07/2005	SITE:	Pittsburgh

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

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

STATUS

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

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

3. ☐ **NOT QUALIFIED**

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

COMMENTS:

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

Name of Physician: Scott Hardy, M.D. Date: 11/11/03

Signature: Scott Hardy MD

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

CERTIFICATE OF TRAINING

CHMR

Center for Hazardous Materials Research

University of Pittsburgh Applied Research Center
320 William Pitt Way • Pittsburgh, PA 15238

(412) 826-5320 or 1-800-334-CHMR

THIS CERTIFIES THAT

JOHN S. WRIGHT

has successfully completed a course of instruction in

OCCUPATIONAL
HEALTH AND SAFETY

40-Hour Basic Health and Safety Training
Complying with 29 CFR 1910.120(e)(3)(i)

prepared and conducted by the

Center for Hazardous Materials Research

A Subsidiary of the University of Pittsburgh Trust.
Pittsburgh, Pennsylvania

July 19, 1991

Date of Award

Edgar Berkey

Edgar Berkey, Ph.D.
President

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

John S. Wright

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

February 25, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORKCARE™

A Trademark of WorkCare, Inc.

RELEASE TO DUTY

CLINIC INSTRUCTIONS: Complete and give to employee before they leave the facility. This is a requirement of Tetra-Tech.

Employee Name: John Wright

Office Location: _____

Yes	No	
☑	☐	To work with hazardous materials in accordance with 29 CFR 1910.120.
☑	☐	To use respiratory protective equipment in accordance with 29 CFR 1910.134.

Based on the limited information available to me at this time, I find no necessity for immediate restrictions and I release this employee for duty. It is understood and agreed upon by the employer or potential employer of this examinee that subsequent comprehensive review of all laboratory and other test data by WorkCare may detect health conditions not apparent to me. It is further agreed and understood that such health conditions may necessitate the need for workplace restrictions. Examination has been performed in compliance with 1910.120 and 1910.134.

Signed: Walter Dreyer, M.D.

Date: 4/29/05

Employee

Bring this form back to the office and fax it to:
Matt Soltis, Corporate Health & Safety (412) 921-4040

333 S. Anita Drive, Suite 630, Orange, CA 92868 • (714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154
E-mail: info@workcare.com • Website: www.workcare.com

APPENDIX D

SWMU 13
ANALYTICAL DATA

D.1.1 SWMU 13
GROUNDWATER ANALYTICAL DATA
ROUND 5

TABLE D-1
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Classification	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
Location	13MWT09	13MWT11	13MWT13	13MWT14	13MWT17	13MWT21	13MWT31	13MWT34
Sample Number	13GWT0906	13GWT1105	13GWT1305	13GWT1405	13GWT1705	13GWT2105	13GWT3104	13GWT3404
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
Sample Date	5/3/2005	5/4/2005	5/5/2005	5/5/2005	5/4/2005	5/4/2005	5/5/2005	5/5/2005
Energetics (ug/L)								
1,3,5-TRINITROBENZENE	0.94	0.248 U	0.255 U	0.258 U	0.271 U	0.41 J	0.248 U	0.245 U
1,3-DINITROBENZENE	2.1	0.248 U	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
2,4,6-TRINITROTOLUENE	21	47	0.255 U	0.258 U	0.271 U	29	0.248 U	0.245 U
2,4-DINITROTOLUENE	0.288 U	4.3	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
2,6-DINITROTOLUENE	8.3	6.5	0.255 U	0.258 U	0.271 U	2.9	0.248 U	0.245 U
2-AMINO-4,6-DINITROTOLUENE	15	20	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
2-NITROTOLUENE	0.288 U	0.248 U	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
3-NITROTOLUENE	0.288 U	0.47 J	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
4-AMINO-2,6-DINITROTOLUENE	17	29	0.255 U	0.258 U	0.44 J	3 J	0.248 U	0.245 U
4-NITROTOLUENE	0.288 U	0.248 U	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
HMX	91	70	8.8	0.38 J	80	430	7.5	24
NITROBENZENE	0.288 U	0.248 U	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
RDX	1300	830	15	2.2	390	4500	18	340
TETRYL	0.288 U	0.248 U	0.255 U	0.258 U	0.271 U	0.26 U	0.248 U	0.245 U
Field Parameters								
DISSOLVED OXYGEN - METER (mg/L)	1.5	0.73	3.67	1.69	0.18	0.42	2.39	0.62
OXIDATION REDUCTION POTENTIAL (MV)	250.1	401	421.6	134.8	289.6	283.7	271.8	640
PH (S.U.)	5.29	3.2	4.52	5.84	5.16	5.42	5.74	3.87
SPECIFIC CONDUCTANCE (MS/CM)	0.576	0.224	0.085	0.704	0.135	0.176	1.119	0.311
TEMPERATURE (C)	12.47	15.27	13.3	15.29	13.52	13.1	13.77	15.29
TURBIDITY (NTU)	0.15	6.1	1	2.6	0.4	2.8	3.4	28

TABLE D-1
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Classification	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Upgradient	Upgradient
Location	13MWT34	13MWT37	13MWT40	13MWT47	13MWT51	13MWT01	13MWT15
Sample Number	13GWT3404-D	13GWT3704	13GWT4004	13GWT4704	13GWT5103	13GWT0105	13GWT1505
Sample Code	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	5/5/2005	5/4/2005	5/4/2005	5/5/2005	5/5/2005	5/3/2005	5/5/2005
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
1,3-DINITROBENZENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
2,4,6-TRINITROTOLUENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
2,4-DINITROTOLUENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
2,6-DINITROTOLUENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
2-AMINO-4,6-DINITROTOLUENE	0.252 U	0.248 U	0.271 U	0.291 U	0.39 J	0.278 U	0.252 U
2-NITROTOLUENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
3-NITROTOLUENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
4-AMINO-2,6-DINITROTOLUENE	0.252 U	0.58	0.81	0.291 U	0.72	0.278 U	0.252 U
4-NITROTOLUENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
HMX	26	160	100	0.291 U	80	0.84	0.252 U
NITROBENZENE	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
RDX	380	2300	200	0.291 U	230	0.278 U	0.252 U
TETRYL	0.252 U	0.248 U	0.271 U	0.291 U	0.269 U	0.278 U	0.252 U
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)		4.64	8.41	0.07	0.17	0.96	1
OXIDATION REDUCTION POTENTIAL (MV)		300.8	256.7	320.1	249.6	403.8	401
PH (S.U.)		5.37	6.1	3.41	5.93	4.45	3.02
SPECIFIC CONDUCTANCE (MS/CM)		0.127	0.287	0.075	0.131	0.17	0.313
TEMPERATURE (C)		13.5	11.87	11.59	11.07	11.12	13.95
TURBIDITY (NTU)		2.8	2.3	0.18	8.3	1	15

TABLE D-2
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	13MWT28 13GWT2804 NORMAL 5/3/2005	13MWT45 13GWT4504 NORMAL 5/5/2005	13MWT46 13GWT4604 NORMAL 5/4/2005
Energetics (ug/L)			
1,3,5-TRINITROBENZENE	0.269 U	0.252 U	0.252 U
1,3-DINITROBENZENE	0.269 U	0.252 U	0.252 U
2,4,6-TRINITROTOLUENE	0.269 U	0.252 U	0.252 U
2,4-DINITROTOLUENE	0.269 U	0.252 U	0.252 U
2,6-DINITROTOLUENE	0.269 U	0.252 U	0.252 U
2-AMINO-4,6-DINITROTOLUENE	0.269 U	0.252 U	0.252 U
2-NITROTOLUENE	0.269 U	0.252 U	0.252 U
3-NITROTOLUENE	0.269 U	0.252 U	0.252 U
4-AMINO-2,6-DINITROTOLUENE	0.269 U	0.252 U	0.252 U
4-NITROTOLUENE	0.269 U	0.252 U	0.252 U
HMX	0.269 U	0.252 U	0.252 U
NITROBENZENE	0.269 U	0.252 U	0.252 U
RDX	0.269 U	0.252 U	0.252 U
TETRYL	0.269 U	0.252 U	0.252 U
Field Parameters			
DISSOLVED OXYGEN - METER (mg/L)	0.59	0.91	0.92
OXIDATION REDUCTION POTENTIAL (MV)	191.3	71	64.7
PH (S.U.)	7.58	6.7	6.44
SPECIFIC CONDUCTANCE (MS/CM)	0.771	0.518	0.596
TEMPERATURE (C)	14.09	16.63	13.64
TURBIDITY (NTU)	42	13	3.5

D.1.2 SWMU 13
GROUNDWATER ANALYTICAL DATA
ROUND 6

TABLE D-3
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Classification	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
Location	13MWT09	13MWT11	13MWT13	13MWT14	13MWT17	13MWT21	13MWT31	13MWT34
Sample Number	13GWT0907	13GWT1106	13GWT1306	13GWT1406	13GWT1706	13GWT2106	13GWT3105	13GWT3405
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	ORIG
Sample Date	8/27/2005	8/11/2005	8/15/2005	8/16/2005	8/11/2005	8/10/2005	8/29/2005	8/11/2005
Energetics (ug/L)								
1,3,5-TRINITROBENZENE	1.2	0.26 U	0.26 U	0.24 U	0.26 U	0.47 J	0.25 U	0.26 U
1,3-DINITROBENZENE	2.2	0.55	0.26 U	0.24 U	0.26 U	0.96	0.25 U	0.26 U
2,4,6-TRINITROTOLUENE	23	16	0.26 U	0.24 U	0.26 U	30	0.25 U	0.26 U
2,4-DIAMINO-6-NITROTOLUENE	2.6 R	0.77 J	0.26 U	0.24 U	0.26 U	0.3 J	0.25 U	0.26 U
2,4-DINITROTOLUENE	0.26 U	1.9	0.26 U	0.24 U	0.26 U	0.28 U	0.25 U	0.26 U
2,6-DIAMINO-4-NITROTOLUENE	0.26 U	0.26 U	0.26 U	0.24 U	0.26 U	0.28 U	0.25 U	0.26 U
2,6-DINITROTOLUENE	8.9	3.2	0.26 U	0.24 U	0.26 U	2.8	0.25 U	0.26 U
2-AMINO-4,6-DINITROTOLUENE	18 J	11 J	0.26 U	0.24 U	0.31 J	8.1 J	0.25 U	0.26 U
2-NITROTOLUENE	0.26 U	0.26 U	0.26 U	0.24 U	0.26 U	0.28 U	0.25 U	0.26 U
3,5-DINITROANILINE	2.1 J	0.26 U	0.26 U	0.24 U	0.26 U	0.31 J	0.25 U	0.26 U
3-NITROTOLUENE	0.26 U	0.26 U	0.26 U	0.24 U	0.26 U	0.28 U	0.25 U	0.26 U
4,4'-TN-AZOXY	0.52 U	0.52 U	0.52 U	0.48 U	0.51 U	0.56 U	0.5 U	0.52 U
4-AMINO-2,6-DINITROTOLUENE	19	18	0.26 U	0.24 U	0.56	5	0.25 U	0.26 U
4-NITROTOLUENE	0.26 U	0.26 U	0.26 U	0.24 U	0.26 U	0.28 U	0.25 U	0.26 U
DNX	0.27 R	0.26 U	0.26 U	0.24 U	0.44 J	0.28 U	0.25 U	0.26 U
HMX	110	66	11	0.52	110	560	7.9	28
MNX	2.8 J	0.75 J	0.26 U	0.24 U	6.5	0.28 U	0.25 U	2.8
NITROBENZENE	0.26 U	0.26 U	0.26 U	0.24 U	0.26 U	0.28 U	0.25 U	0.26 U
RDX	1400	620	21	2.7	560	4200	14	380
TETRYL	0.26 U	0.26 U	0.26 U	0.24 U	0.26 U	0.28 U	0.25 U	0.26 U
TNX	0.26 U	0.26 U	0.26 U	0.24 U	0.3 J	0.28 U	0.25 U	0.26 U
Field Parameters								
DISSOLVED OXYGEN - METER (mg/L)	0.065	0.39	3.3	0.54	0.96	0.65	0.98	0.36
PH (S.U.)	4.73	4.09	3.58	5.48	4.43	5	5.5 *	4.49
SPECIFIC CONDUCTANCE (MS/CM)	0.427	0.253	97	586	0.233	171	0.749	0.289
TEMPERATURE (C)	17.69	23	19.47	19.15	21.81	22.3	19.09	16.85
TURBIDITY (NTU)	1.1	6.3	0	0.8	0	4.2	4.4	1.1
Miscellaneous Parameters (mg/L)								
NITRITE/NITRATE-N	59	0.025 U	0.025 U	0.025 U	0.22	0.45	0.025 U	0.19
TOTAL ORGANIC CARBON	2.3	1.7	1 U	4.2	3.4	2.3	1 U	1 U

TABLE D-3
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Classification	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Upgradient	Upgradient
Location	13MWT34	13MWT37	13MWT40	13MWT47	13MWT51	13MWT01	13MWT15
Sample Number	13GWT3405-D	13GWT3705	13GWT4005	13GWT4705	13GWT5104	13GWT0106	13GWT1506
Sample Code	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	8/11/2005	8/11/2005	8/11/2005	8/15/2005	8/11/2005	8/15/2005	8/11/2005
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
1,3-DINITROBENZENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
2,4,6-TRINITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
2,4-DIAMINO-6-NITROTOLUENE	0.27 U	0.26 J	0.28 U	0.27 U	0.38 J	0.27 U	0.27 U
2,4-DINITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
2,6-DIAMINO-4-NITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
2,6-DINITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
2-AMINO-4,6-DINITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
2-NITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
3,5-DINITROANILINE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
3-NITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
4,4'-TN-AZOXY	0.54 U	0.52 U	0.56 U	0.54 U	0.51 UJ	0.54 U	0.53 U
4-AMINO-2,6-DINITROTOLUENE	0.27 U	0.51 J	1.1	0.27 U	0.26 UJ	0.27 U	0.27 U
4-NITROTOLUENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
DNX	0.27 U	0.41 J	0.33 J	0.27 U	0.44 J	0.27 U	0.27 U
HMX	28	160	31	0.27 U	86 J	1	0.27 U
MNX	2.7	7.8	3.6	0.27 U	0.26 UJ	0.27 U	0.27 U
NITROBENZENE	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
RDX	380	2100	250	0.27 U	27 J	0.27 U	0.27 U
TETRYL	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
TNX	0.27 U	0.26 U	0.28 U	0.27 U	0.26 UJ	0.27 U	0.27 U
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	0.36	4.39	7.84		0.52	0.73	0.91
PH (S.U.)	4.49	5	6	3.38	6	3.56	3.14
SPECIFIC CONDUCTANCE (MS/CM)	0.289	127	248	0.793	344	188	0.309
TEMPERATURE (C)	16.85	16.53	15.03	19.16	17.78	20.97	18.4
TURBIDITY (NTU)	1.1	1.6	1.4	10	110	0.73	4.4
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	0.2	0.22	0.37	0.025 U	0.025 U	0.025 U	0.025 U
TOTAL ORGANIC CARBON	1 U	1 U	1 U	2.1	5.4	1 U	1.1

TABLE D-4
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	13MWT28 13GWT2805 NORMAL 8/9/2005	13MWT45 13GWT4505 NORMAL 8/10/2005	13MWT46 13GWT4605 NORMAL 8/10/2005
Energetics (ug/L)			
1,3,5-TRINITROBENZENE	0.27 U	0.27 U	0.28 U
1,3-DINITROBENZENE	0.27 U	0.27 U	0.28 U
2,4,6-TRINITROTOLUENE	0.27 U	0.27 U	0.28 U
2,4-DIAMINO-6-NITROTOLUENE	0.27 U	0.27 U	0.28 U
2,4-DINITROTOLUENE	0.27 U	0.27 U	0.28 U
2,6-DIAMINO-4-NITROTOLUENE	0.27 U	0.27 U	0.28 U
2,6-DINITROTOLUENE	0.27 U	0.27 U	0.28 U
2-AMINO-4,6-DINITROTOLUENE	0.27 U	0.27 U	0.28 U
2-NITROTOLUENE	0.27 U	0.27 U	0.28 U
3,5-DINITROANILINE	0.27 U	0.27 U	0.28 U
3-NITROTOLUENE	0.27 U	0.27 U	0.28 U
4,4'-TN-AZOXY	0.54 U	0.54 U	0.55 U
4-AMINO-2,6-DINITROTOLUENE	0.27 U	0.27 U	0.28 U
4-NITROTOLUENE	0.27 U	0.27 U	0.28 U
DNX	0.27 U	0.27 U	0.28 U
HMX	0.27 U	0.27 U	0.28 U
MNX	0.27 U	0.27 U	0.28 U
NITROBENZENE	0.27 U	0.27 U	0.28 U
RDX	0.27 U	0.27 U	0.28 U
TETRYL	0.27 U	0.27 U	0.28 U
TNX	0.27 U	0.27 U	0.28 U
Field Parameters			
DISSOLVED OXYGEN - METER (mg/L)	0.49	0.72	0.84
PH (S.U.)	4.14	4.76	0
SPECIFIC CONDUCTANCE (MS/CM)	808	505	554
TEMPERATURE (C)	16.4	17.09	15.05
TURBIDITY (NTU)	11	34	0.35
Miscellaneous Parameters (mg/L)			
NITRITE/NITRATE-N	0.77	0.025 U	0.025 U
TOTAL ORGANIC CARBON	1 U	1 U	1 U

D.2.1 SMWU 13

SURFACE WATER ANALYTICAL DATA

ROUND 5

TABLE D-5
SUMMARY OF ANALYTIC RESULTS
ROUND 5 SURFACE WATER SAMPLES
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Location	13SW/SD14	13SW/SD15	13SW/SD16	13SW/SD19	13SW/SD20	13SW/SD22	13SW/SD30
Sample Number	13SW1404	13SW1504	13SW1604	13SW1903	13SW2003	13SW2204	13SW3004
Sample Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Sample Date	5/8/2005	5/8/2005	5/8/2005	5/8/2005	5/8/2005	5/8/2005	5/8/2005
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
1,3-DINITROBENZENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
2,4,6-TRINITROTOLUENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
2,4-DINITROTOLUENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
2,6-DINITROTOLUENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
2-AMINO-4,6-DINITROTOLUENE	0.82 J	0.25 U	0.36 J	0.25 U	0.26 U	0.27 U	0.25 U
2-NITROTOLUENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
3-NITROTOLUENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
4-AMINO-2,6-DINITROTOLUENE	1.9	0.32 J	0.87 J	0.25 U	0.26 U	0.27 U	0.25 U
4-NITROTOLUENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
HMX	30	60	22 J	0.51	0.26 U	0.27 U	2.6
NITROBENZENE	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
RDX	46	100	37 J	0.41 J	0.26 U	0.33 J	4.9
TETRYL	0.25 U	0.25 U	0.29 UJ	0.25 U	0.26 U	0.27 U	0.25 U
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	11.85	10.43	11.35	11.58	11.18	6.86	11.3
OXIDATION REDUCTION POTENTIAL (MV)	208	194	173	213	214	199	165
PH (S.U.)	7.51	7.4	7.53	7.13	7.21	7.03	8.06
SPECIFIC CONDUCTANCE (MS/CM)	0.223	0.14	0.134	0.316	0.174	0.184	0.234
TEMPERATURE (C)	15.05	16.88	14.24	15.03	14.94	13.53	19.29
TURBIDITY (NTU)	10 U	10 U	10 U	10 U	10 U	10 U	3.5

D.2.2 SWMU 13

SURFACE WATER ANALTYICAL DATA

ROUND 6

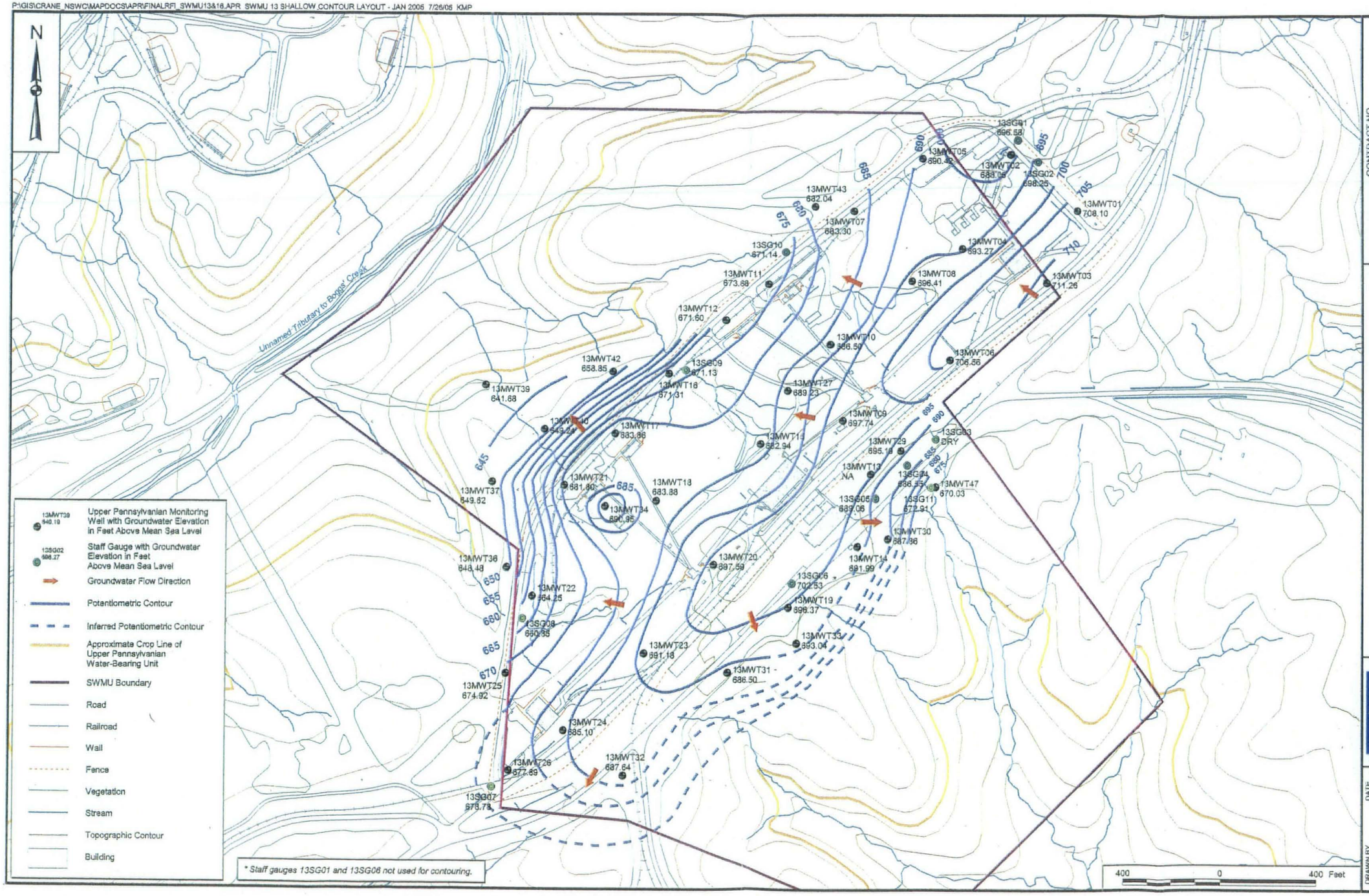
TABLE D-6
SUMMARY OF ANALYTIC RESULTS
ROUND 6 SURFACE WATER SAMPLES
SWMU 13 (MINE FILL B)
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	13SW/SD14 13SW1405 NORMAL 8/16/2005	13SW/SD15 13SW1505 NORMAL 8/16/2005	13SW/SD16 13SW1605 NORMAL 8/16/2005	13SW/SD19 13SW1904 NORMAL 8/16/2005	13SW/SD20 13SW2004 NORMAL 8/16/2005	13SW/SD30 13SW3005 ORIG 8/16/2005	13SW/SD30 13SW3005-D DUP 8/16/2005
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
1,3-DINITROBENZENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
2,4,6-TRINITROTOLUENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
2,4-DINITROTOLUENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
2,6-DINITROTOLUENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
2-AMINO-4,6-DINITROTOLUENE	0.89 J	0.29 U	1 J	0.29 U	0.29 U	0.25 U	0.26 U
2-NITROTOLUENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
3-NITROTOLUENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
4-AMINO-2,6-DINITROTOLUENE	2.2	0.29 U	2.2	0.29 U	0.29 U	0.25 U	0.26 U
4-NITROTOLUENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
HMX	18	47	23	0.29 U	0.29 U	2.4	2.4
NITROBENZENE	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
RDX	47	200	41	0.29 U	0.29 U	5.3	4.9
TETRYL	0.24 U	0.29 U	0.29 U	0.29 U	0.29 U	0.25 U	0.26 U
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	7.78	8.56	5.4	12.02	2.54	10.21	10.21
PH (S.U.)	8.23	8.6	7.91	8.51	7.58	8.59	8.59
SPECIFIC CONDUCTANCE (MS/CM)	0.323	0.181	0.215	0.376	0.231	0.364	0.364
TEMPERATURE (C)	21.68	21.47	21.08	21.35	21.73	22.52	22.52
TURBIDITY (NTU)	9.1	655	24.5	12	3.71	2.18	2.18
Miscellaneous Parameters (mg/L)							
TOTAL ORGANIC CARBON							2.2

APPENDIX E

POTENTIOMETRIC SURFACE MAPS
ROUND 4

P:\GIS\CRANE_NSWC\MAPDOCS\APR\FINAL\RFI_SWMU13&16_APR_SWMU 13 SHALLOW CONTOUR LAYOUT - JAN 2005 7/26/05 KMP



CONTRACT NO. 7448

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4 - 1

REV 0

POTENTIOMETRIC SURFACE ELEVATION MAP
FOR THE UPPER PENNSYLVANIAN
WATER-BEARING ZONE - JANUARY 19, 2005
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

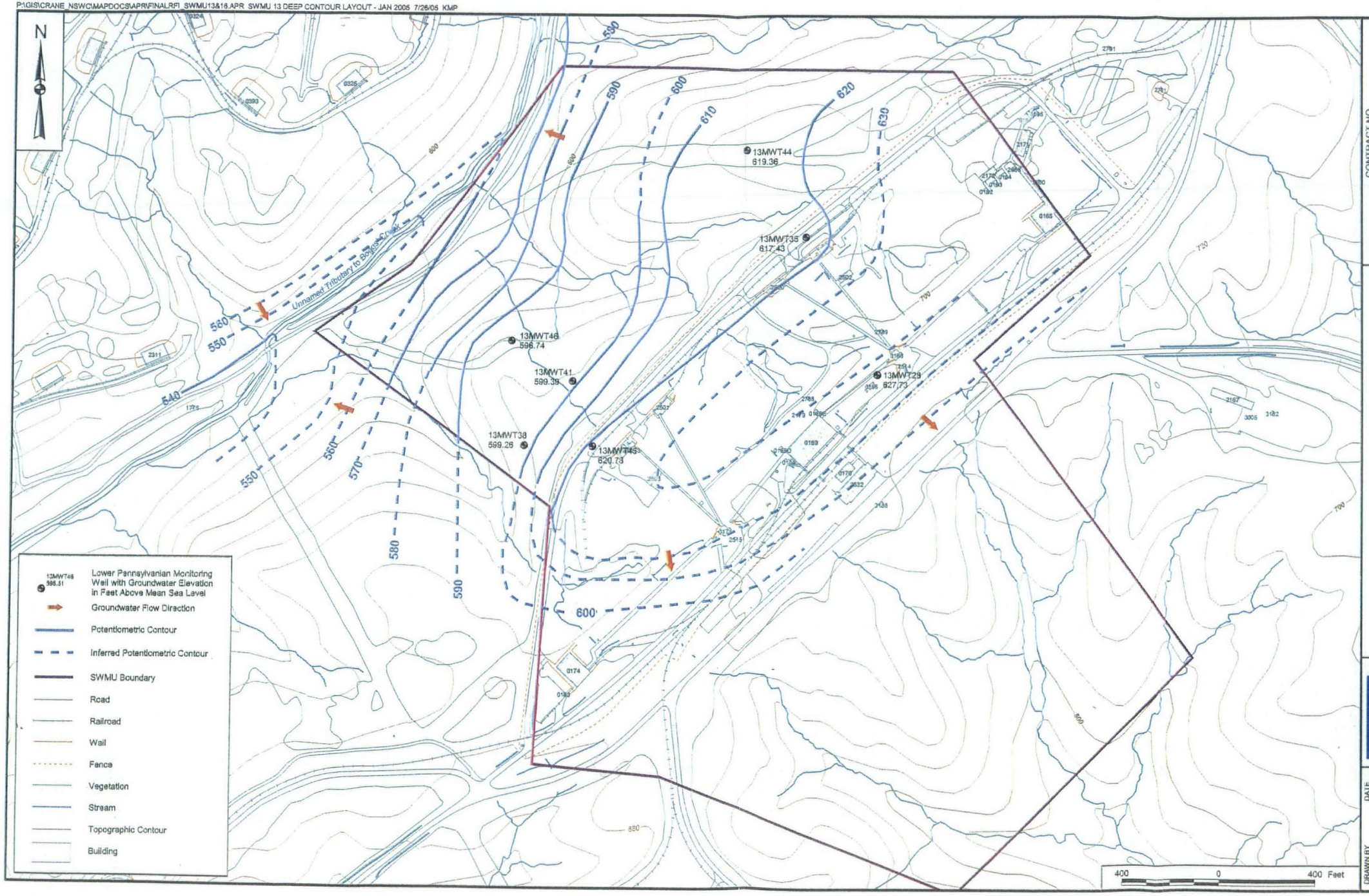
DRAWN BY A. JANOCHA DATE 2/23/04

CHECKED BY J. LUCAS DATE ___

COST/SCHED-AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\FINALRFI_SWMU13&16.APR SWMU 13 DEEP CONTOUR LAYOUT - JAN 2005 7/26/05 KMP



CONTRACT NO.
7448

APPROVED BY ____ DATE ____

APPROVED BY ____ DATE ____

DRAWING NO. FIGURE 4 - 2

REV 0

POTENTIOMETRIC SURFACE ELEVATION MAP
FOR THE LOWER PENNSYLVANIAN
WATER-BEARING ZONE - JANUARY 19, 2005
SWMU 13 MINE FILL B
NSWC CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY A. JANOCHA DATE 2/23/04

CHECKED BY J. LUCAS DATE ____

COST/SCHED-AREA ____

SCALE AS NOTED