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MONITORED NATURAL ATTENUATION REPORT FOR MINE FILL A SOLID WASTE MANAGEMENT UNIT 13 (SWMU 13) ROUND NUMBER 10 NSA CRANE IN
03/01/2011
TETRA TECH NUS INC

Monitored Natural Attenuation Report
for
Mine Fill A (SWMU 13)
Round No. 10

Naval Support Activity Crane
Crane, Indiana

Naval Facilities Engineering Command
Midwest

Contract Number N62467-04-D-0055

Contract Task Order 48

March 2011

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MARCH 2011

MONITORED NATURAL ATTENUATION REPORT
FOR
MINE FILL A (SWMU 13)
ROUND NO. 10

NAVAL SUPPORT ACTIVITY CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Midwest
201 Decatur Avenue
Building 1A, Code EV
Great Lakes, Illinois 60088

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CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 48

MARCH 2011

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LIST OF ACRONYMS

amsl	above mean sea level
CMS	Corrective Measures Study
CTO	Contract Task Order
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
mg/L	milligram per liter
MNA	monitored natural attenuation
MNX	hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine
mS/cm	milliSiemen per centimeter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NSA	Naval Support Activity
ORP	oxidation reduction potential
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
Plz	Pennsylvanian Lower Water Bearing Zone
Puz	Pennsylvania Upper Water Bearing Zone
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RDX	Royal Demolition Explosive
SOP	Standard Operating Procedures
SVOC	semivolatile organic compounds
SWMU	solid waste management unit
TNT	2,4,6-trinitrotoluene
TNX	hexahydro-1,3,5-trinitroso-1,3,5-triazine
TOC	Total organic carbon
TtNUS	Tetra Tech NUS, Inc.
U.S. EPA	United States Environmental Protection Agency
µg/L	micrograms per liter

1.0 INTRODUCTION

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) has been conducted at the Naval Support Activity (NSA) Crane Mine Fill B (MFB) solid waste management unit (SWMU), also known as SWMU 13. The main purpose of the RFI was to determine whether explosives contamination in groundwater, surface water or sediment, or residual explosives in soil present 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 determined that explosives and herbicide contamination remain in soil around buildings, and that residual explosives have migrated to groundwater and gully water. 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 rooftops and washed to the ground, resulting in the contamination of surface soils. In addition, wastewater containing explosives was previously discharged into ditches. These explosives migrated into subsurface soils, and into groundwater, and from groundwater into surface water. The Navy conducted a remedial action at MFB in which explosive-contaminated soil was remediated by composting procedures; thereby, largely removing, the source of explosives contamination. In the absence of a source, residual explosives remain in the soil and may be naturally degrading.

A corrective measures study (CMS) will be conducted at SWMU 13. Among the remedial alternatives expected to be evaluated will be the potential for natural attenuation to reduce concentrations of explosives in the groundwater. The United States Environmental Protection Agency (U.S. EPA) Region 5 has established a framework entitled “Region 5 Framework for Monitored Natural Attenuation Decisions for Groundwater” (U.S. EPA, 2000). This framework provides technical direction for the collection of adequate monitoring data to support evaluations of the effectiveness of monitored natural attenuation (MNA). In order to determine whether residual explosives are naturally degrading at SWMU 13, a long-term groundwater monitoring plan for explosives and explosives degradation products is being conducted. The initial long-term monitoring program consisted of nine rounds of sampling to provide information on trends in groundwater concentrations of explosives and explosives degradation by-products. To date, 10 rounds of groundwater and surface water sampling and analyses have been

completed at SWMU 13. Information regarding the results of Rounds 1 through 3 is presented in the SWMU 13 RFI (Tetra Tech NUS, Inc. [TtNUS], 2005a). The MNA monitoring results for Rounds 4 through 9 have been provided in previous reports (TtNUS, 2005b; 2006a; 2006b; 2007; and 2010).

The purpose of this report is to present the results of monitoring activities for Round 10, including field documentation, and to provide additional information for the evaluation of data for all rounds of sampling. Field documentation associated with Round 10 is provided in Appendices A, B, and C of this report. Analytical results for Round 10 are presented in Appendix D. Information obtained from the long term monitoring program will be used in the CMS to evaluate the potential effectiveness of MNA at SWMU 13. 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 10 field operations performed in 2010 for NSA Crane SWMU 13.

2.1 OVERVIEW

Field activities for Round 10 were conducted in April and May 2010, in accordance with the procedures and methodologies described in the U.S. EPA-approved Quality Assurance Project Plan (QAPP) Addendum No. 2 to the approved QAPP (TtNUS, 2004). Standard Operating Procedures (SOPs) that governed the field work are included in Appendix C of Addendum No. 2 to the approved QAPP.

All field activities were electronically recorded and copies of all field forms, records, daily activities, and health and safety documentation associated with the field investigation for Round 10 are provided in Appendices A through C of this document.

2.2 SAMPLING OPERATIONS

This section discusses the methodology for groundwater and surface water sampling activities performed at SWMU 13 during Round 10. Table 2-1 contains well construction information and water level/elevation data for Rounds 1 through 10. A listing of all SWMU 13 sample analytical fractions conducted for groundwater and surface water samples in Round 10 is provided in Table 2-2. Further discussion of the specific target analytes for each fraction is discussed in Section 3 of the QAPP Addendum No. 2. Instruments used in the field were calibrated daily prior to use, according to manufacturer's requirements and in accordance with all applicable SOPs. No nonconformances or suspected deficiencies occurred during sampling in Round 10 (see Appendix B).

2.2.1 Groundwater Purging and Sampling

During Round 10, the groundwater wells were sampled using previously installed dedicated bladder pumps. Groundwater quality parameters including pH, specific conductance, temperature, dissolved oxygen (DO), and oxidation reduction potential (ORP) were measured during purging at 5- to 10-minute intervals using a multi-parameter water quality meter and flow-through cell. Longer intervals were used for slower pumping wells. Water levels and pumping rates were also measured during purging at 5- to 10-minute intervals. Purging continued until a minimum of one well volume was removed and the above parameters stabilized, or until the well had been purged for 4 hours, in accordance with SOP Contact

Task Order (CTO) 166-15 and SOP CTO166-16. To the extent possible, the pumping rates were adjusted to prevent drawdown from exceeding 0.3-foot during purging. Immediately following the purging process and before sampling, the temperature, pH, specific conductance, DO, ORP, and turbidity were measured and recorded on the groundwater sample log sheets.

Sample containers were filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. All pertinent field data, including sampling methods, purge information, pump intake depths, and locations were recorded electronically on low-flow purge data forms and groundwater sample log forms (see Appendix A). See Figure 2-1 for all groundwater sampling locations included in the SWMU 13 MNA program.

Sixteen of the 17 proposed groundwater samples were collected at SWMU 13 during Round 10 (see Table 2-2). A groundwater sample was not collected at monitoring well 13MWT28 because the well was dry.

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 that 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 sample relocation for future sampling. Round 10 surface water samples were collected in accordance with Addendum No. 2 to the approved QAPP (TtNUS, 2004). All pertinent field data, including water quality parameters, sampling methods, and locations were recorded electronically on a surface water sample log sheet (see Appendix A). See Figure 2-2 for all surface water sampling locations.

All eight proposed surface water samples were collected at SWMU 13 during Round 10 (see Table 2-2).

2.3 QUALITY CONTROL SAMPLES

Quality assurance (QA)/quality control (QC) samples were generated and collected during Round 10 sampling activities to monitor both field and laboratory procedures. These procedures are detailed in the approved QAPP addendum. QA/QC samples for Round 10 included field duplicates, matrix spike/matrix spike duplicate (MS/MSD), and temperature blanks.

2.4 GROUNDWATER LEVEL MEASUREMENTS

A complete synoptic round of water levels for all SMWU 13 groundwater wells was taken prior to sampling activities in Round 10. The synoptic water level measurements were obtained within a 24 hour time period. Measurements were taken with an electrical water level indicator (M-scope), using the top of the riser pipe as the reference point to determine water depth for monitoring wells and using a surveyed mark for staff gauge measurements. All measurements were taken in accordance with the specific SOP contained in the QAPP addendum. A mark was placed at the top of the riser pipe to ensure that measurements were taken from a consistent reference point. Water level measurements and staff gauge measurements were recorded to the nearest 0.01-foot, and are provided in Appendix A of this document. Table 2-1 contains water level/elevation data.

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA

Well or Gauge Number	Northing (feet)	Easting (feet)	Top of Riser Elevation (feet amsl)	Total Depth[1] (feet bgs)	Water-Bearing Zone	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6		Round 7		Round 8		Round 9		Round 10	
						May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005		January 4, 2006		May 21, 2006		April 10, 2007		April 20, 2010	
						Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
MONITORING WELLS																									
13MWT01	1310541.57	3025015.94	715.34	15.00	Puz	6.21	709.13	5.82	709.52	7.55	707.79	7.56	707.78	7.71	707.63	9.79	705.55	7.20	708.14	6.70	708.64	7.05	708.29	8.54	706.80
13MWT02	1310776.56	3024743.55	704.72	27.00	Puz	17.15	687.57	17.10	687.62	16.24	688.48	15.88	688.84	16.19	688.53	16.00	688.72	15.37	689.35	16.91	687.81	17.13	687.59	17.41	687.31
13MWT03	1310240.95	3024891.66	721.10	15.00	Puz	8.79	712.31	8.88	712.22	9.98	711.12	12.17	708.93	9.72	711.38	11.18	709.92	9.63	711.47	8.45	712.65	NA[4]	NA[4]	9.68	711.42
13MWT04	1310383.40	3024546.11	706.84	15.00	Puz	12.98	693.86	12.75	694.09	14.09	692.75	15.42	691.42	14.27	692.57	15.83	691.01	14.31	692.53	13.82	693.02	13.80	693.04	13.80	693.04
13MWT05	1310758.93	3024380.03	696.44	16.00	Puz	5.42	691.02	4.13	692.31	5.78	690.66	8.73	687.71	5.96	690.48	8.31	688.13	5.75	690.69	5.06	691.38	6.15	690.29	6.24	690.20
13MWT06	1309916.18	3024495.27	717.93	15.00	Puz	15.11	702.82	15.62	702.31	11.91	706.02	14.78	703.15	11.66	706.27	14.95	702.98	13.91	704.02	11.20	706.73	11.60	706.33	11.82	706.11
13MWT07	1310539.32	3024094.13	687.22	15.00	Puz	3.12	684.10	3.10	684.12	4.21	683.01	4.84	682.38	3.44	683.78	3.35	683.87	4.32	682.90	3.02	684.20	3.15	684.07	3.05	684.17
13MWT08	1310247.86	3024337.56	700.56	15.00	Puz	3.17	697.39	2.92	697.64	3.88	696.68	3.87	696.69	4.85	695.71	8.77	691.79	3.35	697.21	3.81	696.75	NA[4]	NA[4]	7.40	693.16
13MWT09	1309662.07	3024049.03	705.90	20.00	Puz	7.74	698.16	7.40	698.50	8.77	697.13	8.64	697.26	9.15	696.75	10.40	695.50	8.10	697.80	7.96	697.94	8.71	697.19	9.90	696.00
13MWT10	1309979.69	3024001.26	700.15	25.00	Puz	13.65	686.50	13.11	687.04	14.96	685.19	16.11	684.04	13.68	686.47	15.32	684.83	15.14	685.01	13.00	687.15	NA[4]	NA[4]	14.86	685.29
13MWT11	1310233.72	3023750.09	682.29	15.00	Puz	7.87	674.42	7.00	675.29	8.76	673.53	8.82	673.47	9.03	673.26	10.14	672.15	8.64	673.65	8.56	673.73	NA[4]	NA[4]	9.51	672.78
13MWT12	1310080.21	3023574.95	682.12	20.00	Puz	7.88	674.24	7.78	674.34	10.75	671.37	11.50	670.62	10.14	671.98	11.93	670.19	11.27	670.85	9.87	672.25	9.64	672.48	10.00	672.12
13MWT13	1309441.27	3024163.61	701.98	19.00	Puz	3.62	698.36	3.18	698.80	4.93	697.05	4.40	697.58	5.13	696.85	6.04	695.94	4.49	697.49	3.91	698.07	4.93	697.05	5.90	696.08
13MWT14	1309142.23	3024110.17	705.50	23.00	Puz	13.25	692.25	13.08	692.42	14.17	691.33	14.69	690.81	14.10	691.40	16.09	689.41	14.00	691.50	13.46	692.04	13.80	691.70	14.31	691.19
13MWT15	1309565.52	3023717.80	696.65	25.00	Puz	12.88	683.77	12.63	684.02	14.59	682.06	15.49	681.16	13.88	682.77	15.89	680.76	14.92	681.73	13.22	683.43	13.47	683.18	13.72	682.93
13MWT16	1309854.28	3023341.92	684.35	15.00	Puz	8.49	675.86	8.61	675.74	11.01	673.34	14.29	670.06	12.33	672.02	14.76	669.59	13.39	670.96	9.72	674.63	10.95	673.40	12.41	671.94
13MWT17	1309605.27	3023123.97	693.01	18.00	Puz	8.70	684.31	8.09	684.92	8.89	684.12	9.04	683.97	9.91	683.10	11.23	681.78	8.48	684.53	8.52	684.49	9.94	683.07	9.68	683.33
13MWT18	1309326.98	3023293.42	702.92	30.00	Puz	19.06	683.86	19.04	683.88	20.21	682.71	20.52	682.40	19.41	683.51	20.31	682.61	20.02	682.90	18.76	684.16	18.90	684.02	19.10	683.82
13MWT19	1308893.97	3023834.57	705.82	19.00	Puz	8.31	697.51	6.80	699.02	10.96	694.86	11.31	694.51	10.40	695.42	12.08	693.74	10.78	695.04	9.14	696.68	10.15	695.67	11.08	694.74
13MWT20	1309066.76	3023527.23	702.07	20.00	Puz	4.22	697.85	4.00	698.07	5.00	697.07	5.23	696.84	4.94	697.13	4.96	697.11	4.76	697.31	4.34	697.73	4.90	697.17	5.03	697.04
13MWT21	1309391.01	3022916.22	690.74	15.00	Puz	7.69	683.05	7.34	683.40	9.09	681.65	9.20	681.54	9.30	681.44	10.37	680.37	8.30	682.44	8.02	682.72	NA[4]	NA[4]	9.90	680.84
13MWT22	1308936.34	3022785.67	671.96	15.00	Puz	7.44	664.52	7.25	664.71	8.18	663.78	9.13	662.83	8.21	663.75	9.92	662.04	8.40	663.56	7.84	664.12	8.12	663.84	8.55	663.41
13MWT23	1308708.02	3023245.12	699.14	22.00	Puz	7.45	691.69	7.17	691.97	8.50	690.64	9.25	689.89	8.60	690.54	9.39	689.75	8.90	690.24	8.06	691.08	8.52	690.62	8.93	690.21
13MWT24	1308397.23	3022916.48	693.93	22.00	Puz	8.45	685.48	8.23	685.70	9.25	684.68	10.04	683.89	9.27	684.66	10.52	683.41	9.41	684.52	8.68	685.25	9.10	684.83	9.43	684.50
13MWT25	1308625.62	3022677.44	681.57	15.00	Puz	16.00	665.57	16.61	664.96	7.05	674.52	6.79	674.78	6.65	674.92	9.27	672.30	5.86	675.71	5.80	675.77	6.61	674.96	7.84	673.73
13MWT26	1308232.69	3022690.14	687.49	20.00	Puz	9.10	678.39	8.93	678.56	10.05	677.44	11.09	676.40	9.81	677.68	10.79	676.70	10.51	676.98	9.44	678.05	9.97	677.52	10.14	677.35
13MWT27	1309786.55	3023829.07	698.13	21.00	Puz	NA	NA	NA	NA	9.31	688.82	9.86	688.27	9.27	688.86	10.97	687.16	8.80	689.33	8.35	689.78	9.00	689.13	9.98	688.15
13MWT28	1309678.62	3024066.67	705.55	88.00	Plz	NA	NA	NA	NA	79.63	625.92	78.38	627.17	77.88	627.67	71.76	633.79	77.21	628.34	77.29	628.26	77.11	628.44	Dry	NA
13MWT29	1309538.75	3024290.72	700.44	20.00	Puz	NA	NA	NA	NA	5.82	694.62	5.46	694.98	5.61	694.83	6.32	694.12	5.51	694.93	5.06	695.38	5.50	694.94	5.89	694.55
13MWT30	1309174.84	3024237.45	698.94	25.00	Puz	NA	NA	NA	NA	11.72	687.22	11.37	687.57	11.55	687.39	13.13	685.81	11.13	687.81	11.02	687.92	11.29	687.65	11.85	687.09
13MWT31	1308631.83	3023583.85	696.21	20.00	Puz	NA	NA	NA	NA	10.65	685.56	10.74	685.47	10.74	685.47	13.00	683.21	10.39	685.82	9.98	686.23	10.22	685.99	11.40	684.81

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA

Well or Gauge Number	Northing (feet)	Easting (feet)	Top of Riser Elevation (feet amsl)	Total Depth[1] (feet bgs)	Water-Bearing Zone	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6		Round 7		Round 8		Round 9		Round 10	
						May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005		January 4, 2006		May 21, 2006		April 10, 2007		April 20, 2010	
						Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
13MWT32	1308214.11	3023162.00	696.04	25.00	Puz	NA	NA	NA	NA	9.52	686.52	10.55	685.49	9.02	687.02	10.16	685.88	10.00	686.04	8.30	687.74	8.51	687.53	8.80	687.24
13MWT33	1308749.27	3023868.77	701.97	20.00	Puz	NA	NA	NA	NA	10.63	691.34	11.54	690.43	10.41	691.56	13.92	688.05	12.21	689.76	9.60	692.37	9.40	692.57	10.23	691.74
13MWT34	1309304.31	3023084.25	695.93	20.50	Puz	NA	NA	NA	NA	5.42	690.51	6.45	689.48	5.26	690.67	5.81	690.12	5.64	690.29	4.86	691.07	8.40	687.53	5.08	690.85
13MWT35	1310254.91	3023773.29	681.73	69.00	Plz	NA	NA	NA	NA	63.96	617.77	64.40	617.33	63.94	617.79	63.98	617.75	63.65	618.08	63.65	618.08	63.85	617.88	63.89	617.84
13MWT36	1309053.39	3022677.86	667.21	26.00	Puz	NA	NA	NA	NA	19.26	647.95	19.56	647.65	18.83	648.38	18.80	648.41	18.61	648.60	18.55	648.66	18.39	648.82	18.58	648.63
13MWT37	1309402.93	3022617.27	662.29	25.00	Puz	NA	NA	NA	NA	14.37	647.92	14.71	647.58	13.64	648.65	13.56	648.73	14.14	648.15	13.29	649.00	13.46	648.83	13.61	648.68
13MWT38	1309376.76	3022619.53	661.04	80.00	Plz	NA	NA	NA	NA	61.90	599.14	62.33	598.71	61.81	599.23	61.63	599.41	61.41	599.63	61.58	599.46	61.47	599.57	61.17	599.87
13MWT39	1309804.48	3022589.03	654.44	25.00	Puz	NA	NA	NA	NA	14.25	640.19	13.84	640.60	13.36	641.08	16.31	638.13	3.47	650.97	12.88	641.56	12.91	641.53	13.19	641.25
13MWT40	1309622.33	3022833.33	667.18	25.50	Puz	NA	NA	NA	NA	18.55	648.63	18.74	648.44	18.15	649.03	17.93	649.25	18.16	649.02	17.96	649.22	17.79	649.39	17.70	649.48
13MWT41	1309645.20	3022819.00	665.67	66.00	Plz	NA	NA	NA	NA	66.58	599.09	67.05	598.62	65.52	600.15	66.21	599.46	66.03	599.64	66.28	599.39	66.05	599.62	65.78	599.89
13MWT42	1309862.28	3023113.22	670.31	25.00	Puz	NA	NA	NA	NA	21.14	649.17	21.21	649.10	20.38	649.93	20.28	650.03	20.77	649.54	20.23	650.08	20.18	650.13	20.13	650.18
13MWT43	1310558.56	3023939.45	690.90	21.00	Puz	NA	NA	NA	NA	8.50	682.40	9.70	681.20	8.17	682.73	10.05	680.85	8.77	682.13	7.85	683.05	7.92	682.98	8.34	682.56
13MWT44	1310621.14	3023530.33	683.82	88.00	Plz	NA	NA	NA	NA	64.57	619.25	64.80	619.02	64.36	619.46	64.47	619.35	64.13	619.69	64.06	619.76	64.19	619.63	64.23	619.59
13MWT45	1309373.68	3022901.38	690.59	84.00	Plz	NA	NA	NA	NA	72.75	617.84	69.83	620.76	70.76	619.83	70.55	620.04	70.39	620.20	70.85	619.74	70.15	620.44	69.18	621.41
13MWT46	1309812.02	3022565.94	653.61	68.00	Plz	NA	NA	NA	NA	58.10	595.51	58.25	595.36	56.61	597.00	57.12	596.49	57.34	596.27	56.23	597.38	55.95	597.66	55.83	597.78
13MWT47	1309389.47	3024437.45	677.23	21.00	Puz	NA	NA	NA	NA	7.32	669.91	7.02	670.21	7.15	670.08	3.95	673.28	7.68	669.55	6.84	670.39	7.30	669.93	7.41	669.82
13MWT48	1309618.82	3021409.02	548.67	10.50	Valley Fill[2]	NA	NA	NA	NA	NA	NA	10.02	538.65	10.29	538.38	12.21	536.46	9.78	538.89	9.88	538.79	10.18	538.49	10.35	538.32
13MWT49	1309795.96	3021713.21	553.90	9.50	Valley Fill[2]	NA	NA	NA	NA	NA	NA	7.21	546.69	7.25	546.65	8.65	545.25	7.19	546.71	7.20	546.70	7.39	546.51	8.02	545.88
13MWT50	1310002.40	3022085.22	560.49	26.00	Valley Fill[2]	NA	NA	NA	NA	NA	NA	7.02	553.47	7.90	552.59	8.76	551.73	7.43	553.06	7.33	553.16	8.00	552.49	8.53	551.96
13MWT51	1310206.30	3022381.03	571.36	16.00	Valley Fill[2]	NA	NA	NA	NA	NA	NA	3.77	567.59	5.80	565.56	14.00	557.36	5.80	565.56	5.62	565.74	10.69	560.67	14.00	557.36

STAFF GAUGES

13SG01	1310836.89	3024771.44	NA	NA	(3)	NA	NA	1.73	696.62	1.77	696.58	1.76	696.59	1.77	696.58	Dry	NA	1.77	696.58	1.77	696.58	1.75	696.60	Dry	NA
13SG02	1310746.57	3024854.37	NA	NA	Puz	NA	NA	3.64	698.31	3.68	698.27	3.71	698.24	3.73	698.22	Dry	NA	3.69	698.26	3.69	698.26	3.62	698.33	3.44	698.51
13SG03	1309585.70	3024436.89	NA	NA	Puz	NA	NA	1.96	694.28	1.87	694.37	1.95	694.29	1.96	694.28	Dry	NA	1.94	694.30	1.94	694.30	1.94	694.30	Dry	NA
13SG04	1309478.26	3024317.86	NA	NA	Puz	NA	NA	2.38	686.61	2.45	686.54	2.46	686.53	2.45	686.54	Dry	NA	2.42	686.57	2.43	686.56	2.46	686.53	2.39	686.60
13SG05	1309341.46	3024185.40	NA	NA	Puz	NA	NA	3.89	689.05	3.90	689.04	3.92	689.02	3.89	689.05	Dry	NA	3.90	689.04	3.89	689.05	3.89	689.05	3.85	689.09
13SG06	1308991.98	3023849.68	NA	NA	(3)	NA	NA	2.37	702.51	2.35	702.53	2.35	702.53	Dry	NA	Dry	NA	2.35	702.53	2.34	702.54	Dry	NA	Dry	NA
13SG07	1308164.25	3022622.07	NA	NA	Puz	NA	NA	1.50	678.80	1.47	678.83	1.55	678.75	1.69	678.61	Dry	NA	1.48	678.82	1.56	678.74	1.57	678.73	Dry	NA
13SG08	1308846.74	3022744.78	NA	NA	Puz	NA	NA	5.05	660.90	5.08	660.87	5.10	660.85	5.13	660.82	NM	NA	5.10	660.85	5.08	660.87	4.98	660.97	5.1	660.85
13SG09	1309868.61	3023412.15	NA	NA	Puz	NA	NA	4.15	671.15	4.15	671.15	4.18	671.12	4.21	671.09	NM	NA	4.15	671.15	4.14	671.16	5.48	669.82	4.2	671.10
13SG10	1310366.98	3023821.25	NA	NA	Puz	NA	NA	4.78	671.32	4.82	671.28	4.96	671.14	4.84	671.26	NM	NA	4.80	671.30	4.93	671.17	4.97	671.13	4.76	671.34
13SG11	1309388.01	3024416.84	NA	NA	Puz	NA	NA	NA	NA	2.74	672.62	2.30	673.06	2.51	672.85	NM	NA	2.15	673.21	2.24	673.12	2.19	673.17	NA	NA

TABLE 2-1

MONITORING WELL CONSTRUCTION INFORMATION AND WATER LEVEL MEASUREMENTS
SWMU 13 - MINE FILL B
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA

Well or Gauge Number	Northing (feet)	Easting (feet)	Top of Riser Elevation (feet amsl)	Total Depth[1] (feet bgs)	Water-Bearing Zone	Round 1		Round 2		Round 3		Round 4		Round 5		Round 6		Round 7		Round 8		Round 9		Round 10	
						May 5, 2003		May 11, 2003		January 19-20, 2004		November 14, 2004		May 3, 2005		August 9, 2005		January 4, 2006		May 21, 2006		April 10, 2007		April 20, 2010	
						Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)	Depth to Water (feet btor)	Water Elevation (feet amsl)
13SG12	1312371.18	3022662.06	NA	NA	Plz	NA	NA	NA	NA	NA	NA	6.87	588.41	6.85	588.43	NM	NA	6.81	588.47	6.88	588.40	6.81	588.47	6.89	588.39
13SG13	1311077.60	3022704.86	NA	NA	Plz	NA	NA	NA	NA	NA	NA	5.87	566.65	6.06	566.46	NM	NA	5.58	566.94	4.83	567.69	4.75	567.77	Dry	NA
13SG14	1310424.91	3022481.79	NA	NA	Plz	NA	NA	NA	NA	NA	NA	6.37	561.38	6.41	561.34	NM	NA	6.32	561.43	6.35	561.40	6.32	561.43	6.24	561.51
13SG15	1309660.62	3021524.54	NA	NA	Plz	NA	NA	NA	NA	NA	NA	9.97	534.21	5.24	538.94	NM	NA	Destroyed from Construction	NA	NA	NA	NA	NA	NA	NA
13SG16	1309270.46	3021074.88	NA	NA	Plz	NA	NA	NA	NA	NA	NA	Dry	Na	Dry	NA	NM	NA	Dry	NA	Dry	NA	NA	NA	Dry	NA
13SG17	1309034.25	3020747.93	NA	NA	Plz	NA	NA	NA	NA	NA	NA	Dry	Na	Dry	NA	NM	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA
13SG18	1308276.51	3019633.62	NA	NA	Plz	NA	NA	NA	NA	NA	NA	8.16	516.07	8.19	516.04	NM	NA	8.16	516.07	8.14	516.09	8.10	516.13	8.13	516.10

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 = PVC well riser had been pushed up inside the protective well casing assummingly by frost heave. A portion of the riser was cut off to allow for access to the well. The ground elevation, top of riser elevation, total depth, and screened intervals have been adjusted accordingly for these wells.
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.
NM = Not measured.
Puz = Upper Pennsylvanian water-bearing zone.

TABLE 2-2

SUMMARY OF GROUNDWATER AND SURFACE WATER SAMPLES AND LABORATORY ANALYSES
SWMU 13 - MINE FILL B MNA PROGRAM
ROUND 10
NSA CRANE
CRANE, INDIANA

Sample Number	Analytical Fraction		
	Explosives	RDX Degradation Products	Nitrate/Nitrite
Groundwater - Round 10			
13GWT0110	X	X	X
13GWT0910	X	X	X
13GWT1110	X	X	X
13GWT1310	X	X	X
13GWT1410	X	X	X
13GWT1510	X	X	X
13GWT1710	X	X	X
13GWT2110	X	X	X
13GWT28	Dry	Dry	Dry
13GWT3109	X	X	X
13GWT3409	X	X	X
13GWT3709	X	X	X
13GWT4009	X	X	X
13GWT4509	X	X	X
13GWT4609	X	X	X
13GWT4709	X	X	X
13GWT5108	X	X	X
GW TOTALS	**16**	**16**	**16**
Surface Water - Round 10			
13SW1107	X	X	X
13SW1410	X	X	X
13SW1510	X	X	X
13SW1610	X	X	X
13SW1910	X	X	X
13SW2009	X	X	X
13SW2209	X	X	X
13SW3010	X	X	X
SW TOTALS	**8**	**8**	**8**

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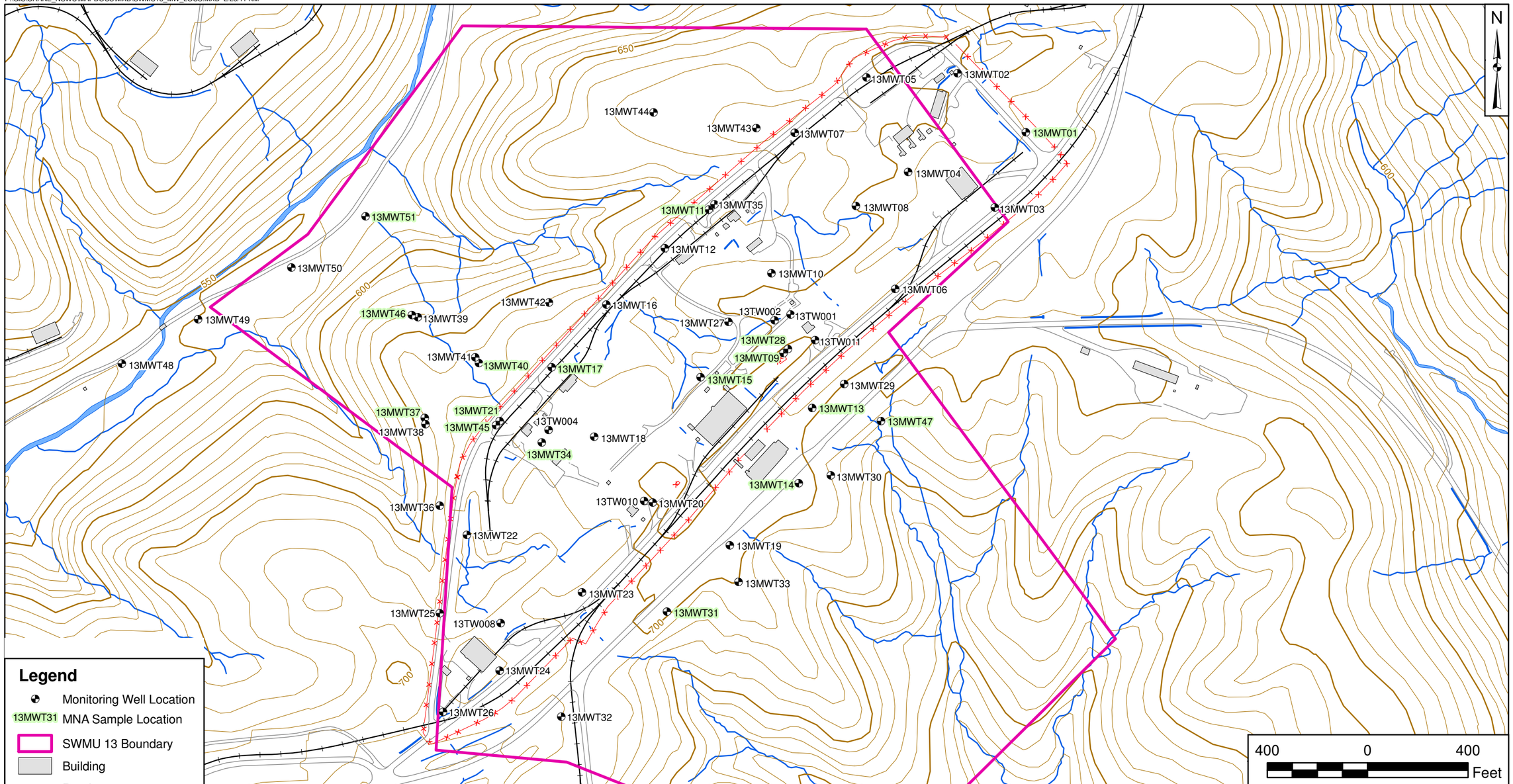

DRAWN BY	DATE
T. WHEATON	05/14/10
CHECKED BY	DATE
J. DUCAR	2/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

MONITORING WELL LOCATIONS
SWMU 13 - MINE FILL B
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 0048	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 2-1	REV 0

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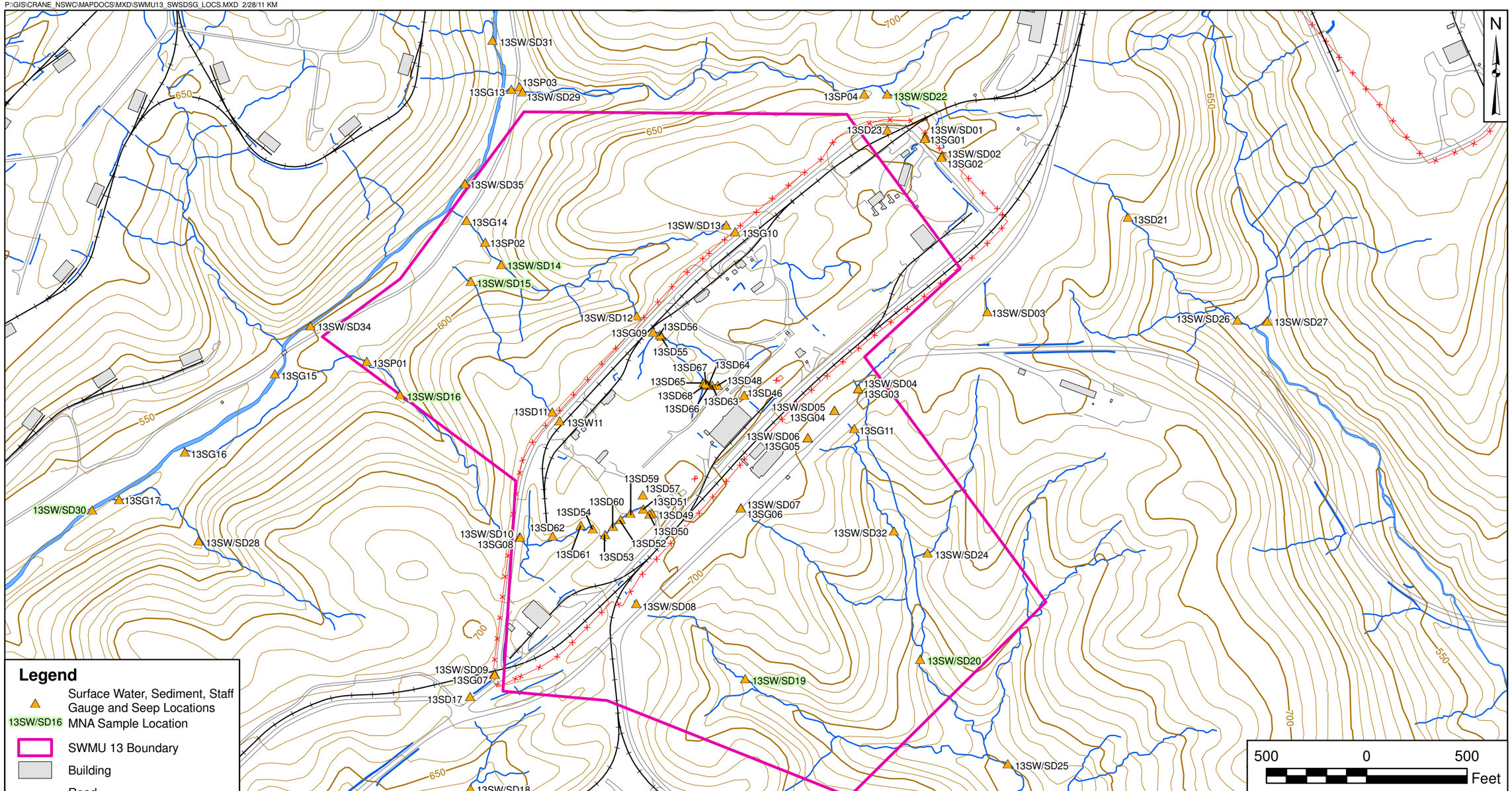

DRAWN BY	DATE
T. WHEATON	05/14/10
CHECKED BY	DATE
J. DUCAR	2/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

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

CONTRACT NUMBER 0048	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 2-2	REV 0

3.0 DATA PRESENTATION

This section presents the analytical results for groundwater and surface water sampling conducted in Round 10 at SMWU 13 (see Tables 3-1 through 3-6). The analytical results for Rounds 1 through 9 are also presented to support the data evaluation discussed in Section 4. Appendix D contains a summary of analytical results for groundwater and surface water samples collected in Round 10.

As stated previously, the SWMU 13 RFI indicated that explosives contamination remains in soil around SWMU 13 buildings and have migrated to groundwater, surface water, and gully water. RDX was identified as the most frequently detected explosive in groundwater, surface water, and surface soil. Therefore, RDX is considered a parent compound for evaluating the effectiveness of natural attenuation at SWMU 13. Over time, natural attenuation should reduce the mass or concentration of RDX in soil and groundwater and RDX should decompose in stages to other well-defined intermediate by-products, such as 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 by-products.

3.1 GROUNDWATER DATA

Tables 3-1 and 3-3 show the groundwater analytical results for Rounds 1 through 10 in the Upper and Lower Pennsylvania Water Bearing Zones, respectively. Both tables show summary listings of concentrations for explosives, explosive degradation by-products, and miscellaneous field parameters. Concentrations are presented in micrograms per liter (µg/L) along with data validation qualifiers, as applicable. The RDX degradation by-products were analyzed for Round 10. Due to the staggered nature of the groundwater sampling, not all wells were sampled in each of the previous nine rounds of sampling.

3.1.1 Pennsylvanian Upper Water Bearing Zone (Puz)

Analytical results for Round 10 sampling at the Pennsylvania Upper Water Bearing Zone (Puz) wells are presented in Table 3-1. A summary of descriptive statistics for Round 10 is shown in Table 3-2. In Round 10, explosives were detected at wells 13MWT09, 13MWT11, 13MWT13, 13MWT14, 13MWT17, 13MWT21, 13MWT31, 13MWT34, 13MWT37, 13MWT40, and 13MWT51. Explosives were not detected at wells 13MWT01, 13MWT15, or 13MWT47 (Table 3-1). Wells 13MWT01 and 13MWT15 are located upgradient, and well 13MWT47 is located downgradient of the RDX plume.

The most frequently detected explosives in Round 10 were RDX and HMX. The highest concentrations of RDX were reported at wells 13MWT37 (902 µg/L), 13MWT09 (559 µg/L), 13MWT17 (461 µg/L), and 13MWT11 (253 µg/L). The highest concentrations of HMX were reported at wells 13MWT37 (82.9 µg/L), 13MWT40 (81.2 µg/L), 13MWT09 (48.6 µg/L), and 13MWT21 (46.1 µg/L).

In addition to RDX and HMX, several additional energetic compounds were detected in Round 10, primarily at 13MWT09, 13MWT11, and 13MWT15. The additional explosives included 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, 2,4,6-trinitrotoluene (TNT), 2,6 dinitrotoluene, 2,4-dintrotoluene, 2-amino-4,6-dinitrotoluene, and 4-amino-2,6-dintrotoluene.

3.1.2 Pennsylvanian Lower Water Bearing Zone (Plz)

Analytical results for Round 10 sampling in the Pennsylvanian Lower Water Bearing Zone (Plz) wells are presented in Table 3-3. A summary of descriptive statistics for Round 10 is shown in Table 3-4. It should be noted that well 13MWT28 was dry at the time of sampling; therefore, no sample could be obtained. In Round 10, there were no positive detections of explosives in the Plz.

3.2 SURFACE WATER DATA

The surface water sampling results for Round 10 are presented in Table 3-5. A summary of descriptive statistics for Round 10 is shown in Table 3-6. In Round 10, explosives were detected at all surface water monitoring locations with the exception of 13SW19 and 13SW20. Analysis for RDX degradation by-products was conducted in Round 10. The most frequently detected explosive in Round 10 was RDX, followed by HMX. RDX concentrations ranged from 0.408 µg/L at 13SW22 to 73.1 µg/L at 13SW11. HMX was detected at all locations with the exception of 13SW19, 13SW20, and 13SW22. HMX concentrations ranged from 0.718 µg/L at 13SW30 to 12.7 µg/L at 13SW11. In addition to RDX and HMX, low concentrations of 4-amino-2,6-dinitrotolunene [0.563 µg/L (13SW14) and 0.46 µg/L (13SW16)] and 2-amino-4,6-dinitrotolunene [0.145 µg/L (13SW14) and 0.098 µg/L (13SW16)] were detected.

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS
AND MISCELANNEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 10
PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

LOCATION		13MWT01									
ROUND		1	2	3	4	5	6	7	8	9	10
DATE		04/26/2003	11/23/2003	08/01/2004	01/23/2005	05/03/2005	08/15/2005	01/23/2006	06/02/2006	04/27/2007	05/01/2010
EXPLOSIVES	**Units**										
1,3,5-TRINITROBENZENE	µG/L	0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
1,3-DINITROBENZENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.526 U								0.4 U
2,4,6-TRINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.263 U		0.264 U		0.27 U				0.2 U
2,4-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.263 U		0.264 U		0.27 U				0.2 U
2,6-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
2-NITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.4 U
3,5-DINITROANILINE			0.263 U		0.264 U		0.27 U				
3-NITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.4 U
4,4'-TN-AZOXY					0.528 U		0.54 U				
4-AMINO-2,6-DINITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
4-NITROTOLUENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.4 U
RDX		0.44 U	0.35 J	0.3 J	0.37 J	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.4 U
DNX			0.263 U		0.264 U		0.27 U				0.4 U
MNX			0.263 U		0.264 U		0.27 U				0.4 U
TNX			0.263 U		0.264 U		0.27 U				0.4 U
HMX		1	1	1.3	0.88	0.84	1	0.84	1	0.67	0.4 U
NITROBENZENE		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.2 U
TETRYL		0.47 U	0.263 U	0.25 U	0.264 U	0.278 U	0.27 U	0.26 U	0.25 U	0.24 U	0.4 U
FIELD PARAMETERS											
TEMPERATURE	C	12.59	17.04	18.75	9.98	11.12	20.97		14.1	10.87	13.23
ALKALINITY	MG/L										
CARBON DIOXIDE											
DISSOLVED OXYGEN				4.2	0.81				0.67	2.33	2.28
DISSOLVED OXYGEN - METER		1.28	1.4			0.96	0.73				
HYDROGEN SULFIDE (H2S)											
IRON(+2)											
MANGANESE(+2)											
NITRITE-N											
SULFIDE											
SPECIFIC CONDUCTANCE	MS/CM	0.229	0.233	0.255	0.192	0.17	188		0.255	0.255	0.203
OXIDATION REDUCTION POTENTIAL	MV	220	385.4	461.2	295	403.8	687.8		427	424	102.9
TURBIDITY	NTU	3.8	4.39	9.5	3	1	0.73		0	0	8.4
PH	S.U.	4.68	4.17	3.57	3.98	4.45	3.56		4.21	4.04	4.08
MISCELLANEOUS PARAMETERS											
PERCHLORATE										0.2 UJ	
AMMONIA-N	MG/L	0.01 U	0.005 UJ								
NITRITE/NITRATE-N		0.07	0.15 J	0.092	0.1 J		0.025 U		0.16		0.16
TOTAL ORGANIC CARBON							1 U				

LOCATION		13MWT09									
ROUND		1	2	3	4	5	6	7	8	9	10
DATE		04/28/2003	12/04/2003	07/31/2004	02/01/2005	05/03/2005	08/27/2005	01/09/2006	06/03/2006	04/28/2007	05/03/2010
EXPLOSIVES	**Units**										
1,3,5-TRINITROBENZENE	µG/L	0.215 U	1.3	1.1	0.94	0.94	1.2	1.2	1	0.81	0.216 J
1,3-DINITROBENZENE		1.4 J	2.4	2.1	2.2	2.1	2.2	2.3	1.7	1.5	0.942 J
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.505 U								0.4 U
2,4,6-TRINITROTOLUENE		19	25	24	22	21	23	22	17	14	5.07 J
2,4-DIAMINO-6-NITROTOLUENE			3.9		2.5 R		2.6 R				0.2 U
2,4-DINITROTOLUENE		0.215 U	0.253 U	1.4 J	0.25 U	0.288 U	0.26 U	1.2 J	1.2 J	0.85 J	0.458 J
2,6-DIAMINO-4-NITROTOLUENE			0.253 U		0.25 U		0.26 U				0.2 U
2,6-DINITROTOLUENE		0.215 U	9.9	8.8 J	0.25 U	8.3	8.9	7.4 J	7	5.1	3.42 J
2-AMINO-4,6-DINITROTOLUENE		8.6 J	13	15 J	13 J	15	18 J	17	12 J	18	5.38 J
2-NITROTOLUENE		0.215 U	0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U
3,5-DINITROANILINE			0.253 U		2.2 J		2.1 J				
3-NITROTOLUENE		0.215 U	0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U
4,4'-TN-AZOXY					0.5 U		0.52 U				
4-AMINO-2,6-DINITROTOLUENE		18	18	19	18	17	19	21	19	17	13.9 J
4-NITROTOLUENE		0.215 U	0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U
RDX		1100	1700	1500	1200	1300	1400	1300	1400	1100	559 J
DNX			4 J		0.27 R		0.27 R				0.4 U
MNX			7.1 J		4.2		2.8 J				0.4 U
TNX			1.5 J		1.3 J		0.26 U				0.4 U
HMX		84	130	140	99	91	110	110 J	120	96	48.6 J
NITROBENZENE		0.215 U	0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U
TETRYL		0.215 U	0.253 U	0.24 U	0.25 U	0.288 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U
FIELD PARAMETERS											
TEMPERATURE	C	13.33	12.82	18.15	12.15	12.47	17.69	12.22	14.5	12.65	17.14
ALKALINITY	MG/L		0								
CARBON DIOXIDE			48								
DISSOLVED OXYGEN			1.5	0.2	0.74			0.73	0.53	2.52	0.66
DISSOLVED OXYGEN - METER		1.69	1.14			1.5	0.065				
HYDROGEN SULFIDE (H2S)			0								
IRON(+2)			0								
MANGANESE(+2)			0.4								
NITRITE-N			0.023								
SULFIDE			0.01								
SPECIFIC CONDUCTANCE	MS/CM	0.829	0.64	0.773	0.57	0.576	0.427	0.784	0.818	0.98	0.875
OXIDATION REDUCTION POTENTIAL	MV	205.6	251	88.1	29.9	250.1	544.3	302	254	260	109.9
TURBIDITY	NTU	3	4.07	3.8	1.6	0.15	1.1	7.8	0	0	2.3
PH	S.U.	5.36	5.32	6.27	5.49	5.29	4.73	5.62	5.67	5.46	5.54
MISCELLANEOUS PARAMETERS											
PERCHLORATE										0.2 UJ	
AMMONIA-N	MG/L	3.3	3.4								
NITRITE/NITRATE-N		92	54 J		77 J		59		62		50
TOTAL ORGANIC CARBON							2.3				

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 10
PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

LOCATION		13MWT11										13MWT13									
ROUND		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
DATE		04/27/2003	11/20/2003	07/23/2004	01/23/2005	05/04/2005	08/11/2005	01/24/2006	06/02/2006	04/29/2007	05/01/2010	05/07/2003	11/25/2003	08/01/2004	02/02/2005	05/05/2005	08/15/2005	01/08/2006	05/23/2006	04/25/2007	05/02/2010
EXPLOSIVES	**Units**																				
1,3,5-TRINITROBENZENE	µG/L	0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.2 U
1,3-DINITROBENZENE		0.83 J	0.258 U	0.46 J	1.2	0.248 U	0.55	1.4	0.89	0.24 U	0.272 J	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.515 U								0.4 U		0.515 U								0.4 U
2,4,6-TRINITROTOLUENE		31	9.5	11	44	47	16	49	30	31	9.9	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			1.4 J		1.6 R		0.77 J				0.2 U		0.258 U		0.245 U		0.26 U				0.2 U
2,4-DINITROTOLUENE		0.43 U	1.2	1.6	4	4.3	1.9	4.1 J	3.3	2.9	1.18	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.4 U
2,6-DIAMINO-4-NITROTOLUENE			1.8 J		0.269 U		0.26 U				0.2 U		0.258 U		0.245 U		0.26 U				0.2 U
2,6-DINITROTOLUENE		0.43 U	1.2 J	2.1 J	5.7 J	6.5	3.2	0.26 U	4.5 J	3.3	1.11 J	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.2 U
2-AMINO-4,6-DINITROTOLUENE		6 J	4.4 J	6.6 J	12 J	20	11 J	14 J	12 J	15	4.67 J	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.2 U
2-NITROTOLUENE		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.4 U
3,5-DINITROANILINE			0.258 U		0.269 U		0.26 U						0.258 U		0.245 U		0.26 U				
3-NITROTOLUENE		0.43 U	0.258 U	0.58 J	0.45 R	0.47 J	0.26 U	1.3 J	0.25 U	0.24 U	0.4 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.4 U
4,4'-TN-AZOXY					0.538 U		0.52 U								0.49 U		0.52 U				
4-AMINO-2,6-DINITROTOLUENE		19	9.8	14	27	29	18	29	21	19	11	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.2 U
4-NITROTOLUENE		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.4 U
RDX		560	520	490	830	830	620	760	740	600	253	12	20	17	18	15	21	17	16	18 J	10.2
DNX			0.258 U		0.269 U		0.26 U				0.4 U		0.258 U		0.245 U		0.26 U				0.4 U
MNX			1.2		0.74 J		0.75 J				0.4 U		0.258 U		0.245 U		0.26 U				0.4 U
TNX			0.258 U		0.269 U		0.26 U				0.4 U		0.258 U		0.245 U		0.26 U				0.4 U
HMX		34	44	45	68	70	66	80	84	68	25.6	9.5	12	12	8.4	8.8	11	9.7 J	10	8.1 J	4.31
NITROBENZENE		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.2 U
TETRYL		0.43 U	0.258 U	0.27 U	0.269 U	0.248 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U	0.37 U	0.258 U	0.24 U	0.245 U	0.255 U	0.26 U	0.26 U	0.25 U	0.24 UJ	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C	15.73	16.35	21.2	10.8	15.27	23	9.55	15.3	15.87	14.90	13.82	12.33	20.61	9.87	13.3	19.47	12.32		11.6	12.60
ALKALINITY	MG/L		10 U										10 U								
CARBON DIOXIDE			165										120								
DISSOLVED OXYGEN			1.5	4.95	0.71			0.82	0.64	4.67	0.3		11	0.73	5.31			3.12		2.81	5.42
DISSOLVED OXYGEN - METER		0.85	3.49			0.73	0.39					3.37	3.26			3.67	3.3				
HYDROGEN SULFIDE (H2S)			0										0								
IRON(+2)			3.3 >										0.03								
MANGANESE(+2)			0.3										0.5								
NITRITE-N			0.009										0								
SULFIDE			0.01										0								
SPECIFIC CONDUCTANCE	MS/CM	0.251	0.238	0.262	0.222	0.224	0.253	0.307	0.286	0.278	0.207	0.106	0.113	0.131	1.01	0.085	97	0.127		0.148	0.098
OXIDATION REDUCTION POTENTIAL	MV	265	355	127	284	401	154.1	290	288	316	157.4	268.2	385.1	132	392.7	421.6	688.9	396		382	316.8
TURBIDITY	NTU	10	4.52	2.5	10	6.1	6.3	8.8	1.7	1.1	6.8	5.8	0.38	0.7	7.2	1	0	4.3		0.42	2.2
PH	S.U.	3.64	3.93	3.85	3.8	3.2	4.09	4.19	4.16	3.83	3.93	4.2	3.56	4.31	3.94	4.52	3.58	4.28		4.45	3.93
MISCELLANEOUS PARAMETERS																					
PERCHLORATE										0.2 UJ										0.2 U	
AMMONIA-N	MG/L	0.1	0.1 J									0.03	0.01								
NITRITE/NITRATE-N		0.02 U	0.19 J		0.1 J		0.025 U		0.11		0.092	1.1	1 J		1.1 J		0.025 U		0.51		0.36
TOTAL ORGANIC CARBON							1.7										1 U				

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 10
PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

LOCATION		13MWT14										13MWT15									
ROUND		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
DATE		04/29/2003	11/24/2003	07/27/2004	01/25/2005	05/05/2005	08/16/2005	01/09/2006	05/23/2006	04/25/2007	04/30/2010	05/06/2003	11/25/2003	07/29/2004	02/03/2005	05/05/2005	08/11/2005	01/19/2006	06/04/2006	04/27/2007	05/03/2010
EXPLOSIVES	**Units**																				
1,3,5-TRINITROBENZENE	µG/L	0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
1,3-DINITROBENZENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.5 U								0.4 U		0.515 U								0.4
2,4,6-TRINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.25 U		0.242 U		0.24 U				0.2 U		0.258 U		0.238 U		0.27 U				0.2
2,4-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.25 U		0.242 U		0.24 U				0.2 U		0.258 U		0.238 U		0.27 U				0.2
2,6-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
2-NITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.4 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.4 U
3,5-DINITROANILINE			0.25 U		0.242 U		0.24 U						0.258 U		0.238 U		0.27 U				
3-NITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.4 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.4 U
4,4'-TN-AZOXY					0.485 U		0.48 U								0.475 U		0.53 U				
4-AMINO-2,6-DINITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
4-NITROTOLUENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.4 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.4 U
RDX		1.6	4.7	2	2.8	2.2	2.7	3.7	2.5	5.4 J	1.26 J	0.46 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.4 U
DNX			0.25 U		0.242 U		0.24 U				0.4 U		0.258 U		0.238 U		0.27 U				0.4 U
MNX			0.25 U		0.242 U		0.24 U				0.4 U		0.258 U		0.238 U		0.27 U				0.4 U
TNX			0.25 U		0.242 U		0.24 U				0.4 U		0.258 U		0.238 U		0.27 U				0.4 U
HMX		0.345 U	0.89 J	0.34 J	0.54 J	0.38 J	0.52	0.76 J	0.57	1.2 J	0.4 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.4 U
NITROBENZENE		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.2 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.2 U
TETRYL		0.345 U	0.25 U	0.25 U	0.242 U	0.258 U	0.24 U	0.25 U	0.25 U	0.27 UJ	0.4 U	0.485 U	0.258 U	0.25 U	0.238 U	0.252 U	0.27 U	0.264 U	0.25 U	0.25 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C	14.34	10.77	17.41	14.39	15.29	19.15	10.98		17.2	14.69	15.89	12.28	15.66	13.29	13.95	18.4	13.6		12	14.33
ALKALINITY	MG/L												10 U								
CARBON DIOXIDE													137								
DISSOLVED OXYGEN				6.74	0.91			1.43		1.23	1.19		0.07	0.53	1.57			0.58		2.23	1.06
DISSOLVED OXYGEN - METER		1.2	0.52			1.69	0.54					0.53	7.79			1	0.91				
HYDROGEN SULFIDE (H2S)													0								
IRON(+2)													3.3 >								
MANGANESE(+2)													0.9								
NITRITE-N													0.001								
SULFIDE													0.14								
SPECIFIC CONDUCTANCE	MS/CM	0.885	0.623	0.714	0.595	0.704	586	1.03		0.97	0.960	0.391	0.34	0.352	0.314	0.313	0.309	0.449		0.402	0.396
OXIDATION REDUCTION POTENTIAL	MV	23.2	100.5	71	62.4	134.8	526.8	97		118	65.0	286.8	322	6.85	373.3	401	342	326		358	422.5
TURBIDITY	NTU	1.6	0	3	3.3	2.6	0.8	4.1		3.57	4.9	7.3	45.4	10	8.31	15	4.4	10		3.1	10
PH	S.U.	5.5	5.48	6.86	5.58	5.84	5.48	5.77		6.16	5.41	3.74	3.98	3.26	3.65	3.02	3.14	3.92		3.79	3.43
MISCELLANEOUS PARAMETERS																					
PERCHLORATE										0.2 U										0.2 UJ	
AMMONIA-N	MG/L	0.08	0.06 J									1	1.3								
NITRITE/NITRATE-N		0.13	0.05 J		0.025 UJ		0.025 U		0.079		0.1	0.02 U	0.05 U		0.025 U		0.025 U		0.14		0.11
TOTAL ORGANIC CARBON							4.2						1.1				1.1				

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 10
PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

LOCATION		13MWT17										13MWT21									
ROUND		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
DATE		05/07/2003	11/05/2003	07/29/2004	01/23/2005	05/04/2005	08/11/2005	01/24/2006	06/04/2006	04/26/2007	05/01/2010	04/25/2003	11/05/2003	07/28/2004	01/22/2005	05/04/2005	08/10/2005	01/19/2006	06/01/2006	04/28/2007	04/30/2010
EXPLOSIVES	**Units**																				
1,3,5-TRINITROBENZENE	µG/L	0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U	0.28 U	1.3 J	0.4 J	0.36 J	0.41 J	0.47 J	0.26 U	0.25 U	0.24 U	0.2 U
1,3-DINITROBENZENE		0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U	0.28 U	1.8 J	0.8	0.78	0.26 U	0.96	0.26 U	0.6	0.24 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.5 U								0.4 U		0.481 U								0.4 U
2,4,6-TRINITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.091 J	26 J	69 J	26	24	29	30	0.48 J	15	3	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.25 U		0.248 U		0.26 U				0.2 U		0.77 J		0.29 R		0.3 J				0.2 U
2,4-DINITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U	0.28 U	1.4 J	0.65 J	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U	0.24 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.25 U		0.248 U		0.26 U				0.2 U		0.24 U		0.238 U		0.28 U				0.2 U
2,6-DINITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U	0.28 U	5.8 J	2.8	2.6 J	2.9	2.8	0.26 U	2	0.37 J	0.2 U
2-AMINO-4,6-DINITROTOLUENE		0.43 U	0.28 J	0.37 J	0.27 J	0.271 U	0.31 J	0.4 J	0.25 U	0.24 U	0.2 U	0.28 U	0.24 UJ	3.8 J	1.9 J	0.26 U	8.1 J	0.76 J	2.1 J	0.8	0.0814 J
2-NITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U	0.28 U	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U	0.24 U	0.4 U
3,5-DINITROANILINE			0.25 U		0.248 U		0.26 U						0.24 U		0.238 U		0.31 J				
3-NITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U	0.28 U	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U	0.24 U	0.4 U
4,4'-TN-AZOXY					0.495 U		0.51 U								0.475 U		0.56 U				
4-AMINO-2,6-DINITROTOLUENE		0.6 J	0.71	0.84	0.54	0.44 J	0.56	0.41 J	0.25 U	0.36 J	0.289 J	0.28 U	0.24 U	2.9 J	3.2	3 J	5	1.1	3.4	1.1	0.181 J
4-NITROTOLUENE		0.43 U	0.25 UJ	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U	0.5 J	0.24 UJ	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U	0.24 U	0.4 U
RDX		430	580	490	480	390	560	500	560	470	461 J	2700	7700	4000	3200	4500	4200	180	3800	960	24.7
DNX			2.2 J		0.41 J		0.44 J				0.4 U		50 J		0.238 U		0.28 U				0.4 U
MNX			11		6.2		6.5				0.4 U		9.3 J		3.3 R		0.28 U				0.4 U
TNX			1.2		0.248 U		0.3 J				0.4 U		1.4 J		0.238 U		0.28 U				0.4 U
HMX		92 J	140	120	100	80	110	92	100	82	50.1 J	390	640	460	410	430	560	230	540	290	46.1 J
NITROBENZENE		0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.2 U	0.28 U	0.24 U	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U	0.24 U	0.2 U
TETRYL		0.43 U	0.25 U	0.25 U	0.248 U	0.271 U	0.26 U	0.26 U	0.25 U	0.24 U	0.4 U	0.28 U	0.24 U	0.24 U	0.238 U	0.26 U	0.28 U	0.26 U	0.25 U	0.24 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C	15.7	15.97	18.57	11.51	13.52	21.81	12.05		15.4	13.39	13.01	15.17	20.07	9.15	13.1	22.3	10.7		13	15.60
ALKALINITY	MG/L		10 U										10 U								
CARBON DIOXIDE			170										125								
DISSOLVED OXYGEN			0.9	2.01	0.35			0.48		0.187	0.28		1	2.94	1.56			6.41		2.09	3.04
DISSOLVED OXYGEN - METER		0.53	0.84			0.18	0.96					1.45	2.09			0.42	0.65				
HYDROGEN SULFIDE (H2S)			0										0								
IRON(+2)			0.06										0.1								
MANGANESE(+2)			0										0.6								
NITRITE-N			0.006										0.031								
SULFIDE			0.02										0.04								
SPECIFIC CONDUCTANCE	MS/CM	0.17	0.153	0.159	0.118	0.135	0.233	0.368		0.656	0.567	0.212	0.195	0.298	0.148	0.176	171	0.371		0.48	0.403
OXIDATION REDUCTION POTENTIAL	MV	112	338	129.4	4	289.6	517	230		176	162.2	193.6	247.2	107.3	56.1	283.7	748.2	259		148	86.3
TURBIDITY	NTU	10	3.74	4.1	15	0.4	0	1.1		8.7	0.55	8.2	2.61	4	4	2.8	4.2	5		3.66	8.7
PH	S.U.	5.35	5.38	5.28	5.4	5.16	4.43	5.28		6.32	4.38	5.46	5.59	7.32	5.71	5.42	5	6.83		6.61	6.93
MISCELLANEOUS PARAMETERS																					
PERCHLORATE										0.2 UJ										0.2 UJ	
AMMONIA-N	MG/L	0.01	0.005 U									0.05	0.02								
NITRITE/NITRATE-N		0.86	0.65		1.7 J		0.22		0.52		0.15	0.64	1.2		0.81 J		0.45		0.49		0.1
TOTAL ORGANIC CARBON							3.4										2.3				

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 10
PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

LOCATION		13MWT31										13MWT34									
ROUND		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
DATE		No Sample	11/24/2003	07/26/2004	02/01/2005	05/05/2005	08/29/2005	01/10/2006	06/04/2006	04/29/2007	04/30/2010	No Sample	12/04/2003	07/29/2004	01/23/2005	05/05/2005	08/11/2005	01/10/2006	06/03/2006	04/29/2007	05/02/2010
EXPLOSIVES	**Units**																				
1,3,5-TRINITROBENZENE	µG/L		0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.2 U
1,3-DINITROBENZENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.581 U								0.4 U		0.5 U								0.4 U
2,4,6-TRINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.291 U		0.242 U		0.25 U				0.2 U		0.25 U		0.242 U		0.26 U				0.2 U
2,4-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.291 U		0.242 U		0.25 U				0.2 U		0.25 U		0.242 U		0.26 U				0.2 U
2,6-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.2 U
2-NITROTOLUENE			0.291 U	0.37 J	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.4 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.4 U
3,5-DINITROANILINE			0.291 U		0.242 U		0.25 U						0.25 U		0.242 U		0.26 U				
3-NITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.4 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.4 U
4,4'-TN-AZOXY					0.485 U		0.5 U								0.485 U		0.52 U				
4-AMINO-2,6-DINITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.29 J	0.26 J	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.221 J
4-NITROTOLUENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.4 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.4 U
RDX			9.3	22	19	18	14	21	24	20	12.1		460	400	440	340	380	500	340	340	213 J
DNX			0.291 U		0.242 U		0.25 U				0.4 U		1		0.242 U		0.26 U				0.4 U
MNX			0.291 U		0.242 U		0.25 U				0.4 U		4.5		3.3		2.8				0.4 U
TNX			0.291 U		0.242 U		0.25 U				0.4 U		0.25 U		0.242 U		0.26 U				0.4 U
HMX			4.5	8.1	7.5	7.5	7.9	9.6 J	11	9.5	7.07		29	28	29	24	28	38 J	26	25	18.5 J
NITROBENZENE			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.2 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.2 U
TETRYL			0.291 U	0.27 U	0.242 U	0.248 U	0.25 U	0.26 U	0.25 U	0.25 U	0.4 U		0.25 U	0.24 U	0.242 U	0.245 U	0.26 U	0.242 U	0.25 U	0.24 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C		10.09	15.98	11.08	13.77	19.09	8.65		12.4	14.73		10.94	18.58	12.06	15.29	16.85	10.75		12.76	14.10
ALKALINITY	MG/L												10 U								
CARBON DIOXIDE													32								
DISSOLVED OXYGEN				23.4	1.52			1.93		3.88	2.36		1	13.42	1.3			0.84		2.52	0.25
DISSOLVED OXYGEN - METER			5.66			2.39	0.98						2.35			0.62	0.36				
HYDROGEN SULFIDE (H2S)													0								
IRON(+2)													0.18								
MANGANESE(+2)													0.8								
NITRITE-N													0.005								
SULFIDE													0								
SPECIFIC CONDUCTANCE	MS/CM		0.793	1.444	1228	1.119	0.749	1.58		1.17	1.075		0.312	0.347	0.271	0.311	0.289	0.391		0.427	0.393
OXIDATION REDUCTION POTENTIAL	MV		246.7	518.6	51.9	271.8	126	272		238	108.8		276	149.6	99.9	640	244.6	329		368	144.9
TURBIDITY	NTU		4.69	6.1	5.2	3.4	4.4	8.8		7.6	9.6		6.07	21	5.5	28	1.1	5.2		0.3	4.1
PH	S.U.		5.67	5.39	5.42	5.74	5.5	5.56		5.63	5.08		4.97	5.06	5.05	3.87	4.49	5.12		4.72	4.78
MISCELLANEOUS PARAMETERS																					
PERCHLORATE										0.11 J										0.2 UJ	
AMMONIA-N	MG/L		0.005 UJ										0.04								
NITRITE/NITRATE-N			0.13 J		0.06 J		0.025 U		0.22		0.11		0.3 J		0.24 J		0.19		0.27		0.24
TOTAL ORGANIC CARBON							1 U										1 U				

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 10
PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

LOCATION		13MWT37										13MWT40									
ROUND		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
DATE		No Sample	11/06/2003	07/30/2004	02/02/2005	05/04/2005	08/11/2005	01/06/2006	05/21/2006	04/24/2007	04/30/2010	No Sample	11/05/2003	07/30/2004	02/02/2005	05/04/2005	08/11/2005	01/05/2006	06/01/2006	04/30/2007	004/30/2010
EXPLOSIVES	**Units**																				
1,3,5-TRINITROBENZENE	µG/L		0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.2 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.2 U
1,3-DINITROBENZENE			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.2 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.52 U								0.4 U		0.51 UJ								0.4 U
2,4,6-TRINITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.2 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.26 U		0.24 U		0.26 J				0.2 U		0.26 U		0.264 U		0.28 U				0.2 U
2,4-DINITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.2 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.26 U		0.24 U		0.26 U				0.2 U		0.26 U		0.264 U		0.28 U				0.2 U
2,6-DINITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.2 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.293 J		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.415 J
2-NITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.4 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.4 U
3,5-DINITROANILINE			0.26 U		0.24 U		0.26 U						0.26 U		0.264 U		0.28 U				
3-NITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.4 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.4 U
4,4'-TN-AZOXY					0.48 U		0.52 U								0.528 U		0.56 U				
4-AMINO-2,6-DINITROTOLUENE			0.04 U	0.5	0.31 J	0.58	0.51 J	0.36 J	0.61	0.59 J	0.2 U		0.52 J	1.1	0.39 J	0.81	1.1	1.1	1	0.7	0.2 U
4-NITROTOLUENE			0.04 UJ	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.4 U		0.04 UJ	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.4 U
RDX			650	2100	1500	2300	2100	2100	2500	2000 J	902		140	230	110	200	250	250	240	190	116 J
DNX			1.5 J		0.47 J		0.41 J				0.4 U		0.9 J		0.264 U		0.33 J				0.4 U
MNX			5.2		6.9		7.8				0.4 U		3.3		3.2		3.6				0.4 U
TNX			0.73		0.24 U		0.26 U				0.4 U		0.26 U		0.264 U		0.28 U				0.4 U
HMX			25	140	110	160	160	170 J	210	200 J	82.9 J		14	22	270	100	31	31 J	43	100	81.2 J
NITROBENZENE			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.2 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.2 U
TETRYL			0.04 U	0.24 U	0.24 U	0.248 U	0.26 U	0.24 U	0.25 U	0.26 UJ	0.4 U		0.04 U	0.25 U	0.264 U	0.271 U	0.28 U	0.258 U	0.25 U	0.27 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C		13.32	17.35	10.9	13.5	16.53	9.61		12	12.43		13.28	15.02	11.71	11.87	15.03	11.65		14.7	13.48
ALKALINITY	MG/L																				
CARBON DIOXIDE																					
DISSOLVED OXYGEN				2.9	4.2			9.29		3.88	6.24			0.39	13.39			8.46		7.55	10.06
DISSOLVED OXYGEN - METER			4.82			4.64	4.39						6.28			8.41	7.84				
HYDROGEN SULFIDE (H2S)																					
IRON(+2)																					
MANGANESE(+2)																					
NITRITE-N																					
SULFIDE																					
SPECIFIC CONDUCTANCE	MS/CM		0.307	0.174	0.24	0.127	127	0.309		0.196	0.167		0.273	0.329	0.314	0.287	248	0.383		0.576	0.675
OXIDATION REDUCTION POTENTIAL	MV		-144.9	133.5	64.2	300.8	472.7	235		357	238.9		100.3	538	168.9	256.7	588.7	269		193	164.9
TURBIDITY	NTU		3.2	5	1.3	2.8	1.6	4.3		2.03	2.6		6.2	1.28	6.5	2.3	1.4	6.4		5.9	1.5
PH	S.U.		5.75	6.26	5.65	5.37	5	5.6		4.82	5.19		5.53	5.04	6.51	6.1	6	5.68		5.99	6.29
MISCELLANEOUS PARAMETERS																					
PERCHLORATE										0.2 U										0.233 J	
AMMONIA-N	MG/L		0.005 U										0.11 J								
NITRITE/NITRATE-N			0.28		0.25 J		0.22		0.29		0.45		0.28		0.33 J		0.37		0.53		0.41
TOTAL ORGANIC CARBON							1 U										1 U				

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS
AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER
ROUNDS 1 THROUGH 10
PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

LOCATION		13MWT47										13MWT51									
ROUND		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
DATE		No Sample	12/09/2003	08/01/2004	01/25/2005	05/05/2005	08/15/2005	01/05/2006	05/23/2006	04/29/2007	04/30/2010	No Sample	No Sample	08/01/2004	02/03/2005	05/05/2005	08/11/2005	01/20/2006	06/03/2006	04/26/2007	05/02/2010
EXPLOSIVES	**Units**																				
1,3,5-TRINITROBENZENE	µG/L		0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.2 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
1,3-DINITROBENZENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.2 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.521 U								0.4 U										0.4 U
2,4,6-TRINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.2 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.26 U		0.242 U		0.27 U				0.2 U				0.264 U		0.38 J				0.2 U
2,4-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.2 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.26 U		0.242 U		0.27 U				0.2 U				0.264 U		0.26 UJ				0.2 U
2,6-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.2 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.2 U			0.39 J	0.264 U	0.39 J	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
2-NITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.4 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.4 U
3,5-DINITROANILINE			0.26 U		0.242 U		0.27 U								0.264 U		0.26 UJ				
3-NITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.4 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.4 U
4,4'-TN-AZOXY					0.485 U		0.54 U								0.528 U		0.51 UJ				
4-AMINO-2,6-DINITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.3 U			0.27 U	0.5 J	0.72	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
4-NITROTOLUENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.4 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.4 U
RDX			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.4 U			250	320	230	27 J	58	350	70	26
DNX			0.26 U		0.242 U		0.27 U				0.4 U				0.64 J		0.44 J				0.4 U
MNX			0.26 U		0.242 U		0.27 U				0.4 U				9.3		0.26 UJ				0.4 U
TNX			0.26 U		0.242 U		0.27 U				0.4 U				0.91 J		0.26 UJ				0.4 U
HMX			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.4 U			120	69	80	86 J	18	95	28	5 J
NITROBENZENE			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.2 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.2 U
TETRYL			0.26 U	0.24 U	0.242 U	0.291 U	0.27 U	0.242 U	0.25 U	0.24 U	0.4 U			0.27 U	0.264 U	0.269 U	0.26 UJ	0.242 U	0.25 U	0.24 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C		12.42	18.41	8.87	11.59	19.16	8.66		13	13.79			20.57	5.07	11.07	17.78	8.22		16.8	12.88
ALKALINITY	MG/L																				
CARBON DIOXIDE																					
DISSOLVED OXYGEN				0.51	0.81			0.64		4.58	0.37			8.32	10.19			5.48		0.225	4.44
DISSOLVED OXYGEN - METER			1.5			0.07										0.17	0.52				
HYDROGEN SULFIDE (H2S)																					
IRON(+2)																					
MANGANESE(+2)																					
NITRITE-N																					
SULFIDE																					
SPECIFIC CONDUCTANCE	MS/CM		1634	1.056	0.673	0.075	0.793	1.32		1.02	1.068			0.278	0.14	0.131	344	0.231		0.72	0.195
OXIDATION REDUCTION POTENTIAL	MV		409.9	181.2	353.3	320.1	353	303		269	157.2			299	254.4	249.6	356.2	208		118	207.9
TURBIDITY	NTU		5.4	7	10	0.18	10	10		9.5	7.4			33	9.7	8.3	110	8.9		13.28	18
PH	S.U.		3.46	3.4	3.63	3.41	3.38	3.79		4.04	3.38			5.94	6.2	5.93	6	7.17		5.45	6.71
MISCELLANEOUS PARAMETERS																					
PERCHLORATE										0.2 UJ										0.0797 J	
AMMONIA-N	MG/L		0.44																		
NITRITE/NITRATE-N			0.05 U		0.025 UJ		0.025 U		0.079		0.05 U				1.5		0.025 U		0.51		0.28
TOTAL ORGANIC CARBON							2.1										5.4				

A blank cell indicates that no sample was collected or analysis was conducted for the parameter.
U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner.
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.
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
> - Indicates that the true value is probably greater than the reported value. This "qualifier flag" is used to identify reported values that exceed the calibration range of field measurements but could not be re-analyzed for various reasons.
R – Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in
UG/L - micrograms per liter
C - degrees centigrade
MG/L - milligrams per liter
MS/CM - millisiemens per centimeter
MV - millivolts
NTU - nephelometric turbidity units
S.U. - standard units

TABLE 3-2

DESCRIPTIVE STATISTICS FOR
SWMU 13 (MINE FILL B) ROUND 10 GROUNDWATER IN THE PENNSYLVANIA UPPER WATER BEARING ZONE
NSA CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	1/14	0.22 J	0.22 J	0.2 - 0.2	0.11	0.22	13GWT0911
1,3-DINITROBENZENE	2/14	0.27 J	0.94 J	0.2 - 0.2	0.17	0.61	13GWT0911
2,4,6-TRINITROTOLUENE	3/14	0.09 J	9.90	0.2 - 0.2	1.15	5.02	13GWT1110
2,4-DINITROTOLUENE	2/14	0.46 J	1.18	0.2 - 0.2	0.20	0.82	13GWT1110
2,6-DINITROTOLUENE	2/14	1.11 J	3.42 J	0.2 - 0.2	0.41	2.27	13GWT0911
2-AMINO-4,6-DINITROTOLUENE	5/14	0.08 J	5.38 J	0.2 - 0.2	0.84	2.17	13GWT0911
4-AMINO-2,6-DINITROTOLUENE	5/14	0.18 J	13.90 J	0.2 - 0.2	1.89	5.12	13GWT0911
HMX	10/14	4.31	82.90 J	0.4 - 0.4	26.44	36.93	13GWT3709
RDX	11/14	1.26 J	902.00	0.4 - 0.4	184.15	234.32	13GWT3709
Field Parameters							
CONDUCTIVITY	14/14	0.098	1.075	-	0.52	0.52	13GWT3109
DISSOLVED OXYGEN	14/14	0.25	10.06	-	2.71	2.71	13GWT4009
OXIDATION REDUCTION POTENTIAL	14/14	65	422.5	-	174.69	174.69	13GWT1510
PH	14/14	3.38	6.93	-	4.93	4.93	13GWT2110
TEMPERATURE	14/14	12.43	17.14	-	14.09	14.09	13GWT0911
TURBIDITY	14/14	0.55	18	-	6.22	6.22	13GWT5108
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	13/14	0.09	50	0.05 - 0.05	3.76	4.05	13GWT0911

Associated Samples

13GWT0110
13GWT0911
13GWT1110
13GWT1310
13GWT1410
13GWT1510
13GWT1710
13GWT2110
13GWT3109
13GWT3409
13GWT3709
13GWT4009
13GWT4709
13GWT5108
13GWT5108-D

TABLE 3-3

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER ROUNDS 1 THROUGH 10 PENNSYLVANIAN LOWER WATER BEARING ZONE NSA CRANE CRANE, INDIANA

LOCATION		13MWT28										13MWT45									
ROUND		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
DATE		No Sample	12/07/2003	07/31/2004	02/01/2005	05/03/2005	08/09/2005	01/10/2006	06/04/2006	04/29/2007	No Sample	No Sample	12/08/2003	07/29/2004	01/23/2005	05/05/2005	08/10/2005	01/19/2006	06/02/2006	04/28/2007	05/02/2010
EXPLOSIVES	**UNITS**																				
1,3,5-TRINITROBENZENE	µg/L		0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
1,3-DINITROBENZENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.515 U										0.515 U								0.4 U
2,4,6-TRINITROTOLUENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.258 U		0.275 U		0.27 U						0.258 U		0.24 U		0.27 U				0.2 U
2,4-DINITROTOLUENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.258 U		0.275 U		0.27 U						0.258 U		0.24 U		0.27 U				0.2 U
2,6-DINITROTOLUENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
2-NITROTOLUENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.4 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	0.242 U	0.25 U	0.24 U			0.34 J	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.4 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	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
4-NITROTOLUENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.4 U
RDX			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.4 U
DNX			0.258 U		0.275 U		0.27 U						0.258 U		0.24 U		0.27 U				0.4 U
MNX			0.258 U		0.275 U		0.27 U						0.258 U		0.24 U		0.27 U				0.4 U
TNX			0.258 U		0.275 U		0.27 U						0.258 U		0.24 U		0.27 U				0.4 U
HMX			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 UJ	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.4 U
NITROBENZENE			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.2 U
TETRYL			0.258 U	0.25 U	0.275 U	0.269 U	0.27 U	0.242 U	0.25 U	0.24 U			0.258 U	0.24 U	0.24 U	0.252 U	0.27 U	0.252 U	0.28 U	0.27 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C		13.59	17.98	13.87	14.09	16.4	11.52		15.43			13.36	25.29	10.13	16.63	17.09	9.1		16.8	16.96
ALKALINITY	mg/L		150																		
CARBON DIOXIDE			10 U																		
DISSOLVED OXYGEN			0.5	0.26	8.87			1.78		2.28				7.97	0.56			0.94		1.25	1.52
DISSOLVED OXYGEN - METER			0.57			0.59	0.49						0.55			0.91	0.72				
HYDROGEN SULFIDE (H2S)			0																		
IRON(+2)			0.01																		
MANGANESE(+2)			0																		
NITRITE-N			0.007																		
SULFIDE			0																		
SPECIFIC CONDUCTANCE	MS/CM		0.495	1.217	0.918	0.771	808	1.23		1.02			0.357	0.703	0.491	0.518	505	0.733		0.758	0.499
OXIDATION REDUCTION POTENTIAL	MV		-34.1	73.5	144.6	191.3	564.4	112		205			55.5	116.5	-48	71	580.3	146		17	99.8
TURBIDITY	NTU		260	65	50	42	11	54		10			75	19	14	13	34	14		11.6	9.6
PH	S.U.		9.15	8.08	7.78	7.58	4.14	7.75		7.46			8.19	6.78	7.08	6.7	4.76	7.17		6.69	6.64
MISCELLANEOUS PARAMETERS																					
AMMONIA-N	mg/L		0.46 J										0.26								
NITRITE/NITRATE-N			0.66 J		0.15 J		0.77		0.44				0.05 U		0.06 J		0.025 U		0.4		0.074
TOTAL ORGANIC CARBON							1 U										1 U				
PERCHLORATE	µg/L									0.2 UJ										0.2 UJ	

TABLE 3-3

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND MISCELLANEOUS PARAMETERS FOR SWMU 13 GROUNDWATER ROUNDS 1 THROUGH 10 PENNSYLVANIAN LOWER WATER BEARING ZONE NSA CRANE CRANE, INDIANA

	LOCATION	**13MWT46**									
	ROUND	1	2	3	4	5	6	7	8	9	10
	DATE	No Sample	12/09/2003	07/30/2004	02/02/2005	05/04/2005	08/10/2005	01/06/2006	05/21/2006	04/24/2007	04/30/2010
EXPLOSIVES	**UNITS**										
1,3,5-TRINITROBENZENE	µg/L		0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.2 U
1,3-DINITROBENZENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.556 U								0.4 U
2,4,6-TRINITROTOLUENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.278 U		0.245 U		0.28 U				0.2 U
2,4-DINITROTOLUENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.278 U		0.245 U		0.28 U				0.2 U
2,6-DINITROTOLUENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.2 U
2-NITROTOLUENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.4 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	0.252 U	0.25 U	0.31 UJ	0.4 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	0.252 U	0.25 U	0.31 UJ	0.2 U
4-NITROTOLUENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.4 U
RDX			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.4 U
DNX			0.278 U		0.245 U		0.28 U				0.4 U
MNX			0.278 U		0.245 U		0.28 U				0.4 U
TNX			0.278 U		0.245 U		0.28 U				0.4 U
HMX			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.4 U
NITROBENZENE			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.2 U
TETRYL			0.278 U	0.26 U	0.245 U	0.252 U	0.28 U	0.252 U	0.25 U	0.31 UJ	0.4 U
FIELD PARAMETERS											
TEMPERATURE	C		12.45	14.1	10.45	13.64	15.05	10.28		13.3	13.27
ALKALINITY	mg/L										
CARBON DIOXIDE											
DISSOLVED OXYGEN				0.05	1.3			2.64		0	0.48
DISSOLVED OXYGEN - METER			0.99			0.92	0.84				
HYDROGEN SULFIDE (H2S)											
IRON(+2)											
MANGANESE(+2)											
NITRITE-N											
SULFIDE											
SPECIFIC CONDUCTANCE	MS/CM		1.021	0.786	0.731	0.596	554	1.07		0.761	0.652
OXIDATION REDUCTION POTENTIAL	MV		-32.5	131	-21.4	64.7	597.6	-31		111	89.4
TURBIDITY	NTU		8.72	2.81	1.65	3.5	0.35	6.2		17.3	9.6
PH	S.U.		6.6	6.25	6.45	6.44	0	6.56		5.59	6.19
MISCELLANEOUS PARAMETERS											
AMMONIA-N	mg/L		0.12								
NITRITE/NITRATE-N			0.05 U		0.025 UJ		0.025 U		0.025 U		0.059
TOTAL ORGANIC CARBON							1 U				
PERCHLORATE	µg/L									0.2 U	

A blank cell indicates that no sample was collected or analysis was conducted for the parameter.

U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner.

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.

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

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

TABLE 3-4

DESCRIPTIVE STATISTICS FOR
SWMU 13 (MINE FILL B) ROUND 10 GROUNDWATER IN THE PENNSYLVANIA LOWER WATER BEARING ZONE
NSA CRANE
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							
CONDUCTIVITY	2/2	0.449	0.652	-	0.55	0.55	13GWT4609
DISSOLVED OXYGEN	2/2	0.48	1.52	-	1	1	13GWT4509
OXIDATION REDUCTION POTENTIAL	2/2	89.4	99.8	-	94.6	94.6	13GWT4509
PH	2/2	6.19	6.64	-	6.41	6.41	13GWT4509
TEMPERATURE	2/2	13.27	16.96	-	15.12	15.12	13GWT4509
TURBIDITY	2/2	9.6	9.6	-	9.6	9.6	13GWT4609
TURBIDITY	2/2	9.6	9.6	-	9.6	9.6	13GWT4509
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	2/2	0.059	0.074	-	0.07	0.07	13GWT4509

Associated Samples:

13GWT4509
13GWT4609

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA

		13SW11										13SW/SD14									
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
		05/08/2003	11/18/2003	No Sample	02/02/2005	No Sample	No Sample	01/05/2006	05/22/2006	No Sample	No Sample	No Sample	10/22/2003	10/27/2004	02/02/2005	05/08/2005	08/16/2005	01/05/2006	05/22/2006	04/17/2007	05/03/2010
EXPLOSIVES	**UNITS**																				
1,3,5-TRINITROBENZENE	µG/L	0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.2 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.2 U
1,3-DINITROBENZENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.2 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.575 U								0.4 U		0.94								0.4 U
2,4,6-TRINITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.2 U		0.48	0.42 J	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.287 U								0.2 U		0.48	0.248 U							0.2 U
2,4-DINITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.2 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.287 U								0.2 U		0.48	0.248 U							0.2 U
2,6-DINITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.2 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE		0.25 R	0.9 J		0.242 U			0.242 U	0.25 U		0.2 U		2.7 UR	1 J	0.252 U	0.82 J	0.89 J	0.84 J	0.25 U	0.61	0.145 J
2-NITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.4 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.4 U
3,5-DINITROANILINE			0.287 U										0.48	0.248 U							
3-NITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.4 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.4 U
4,4'-TN-AZOXY														0.495 U							
4-AMINO-2,6-DINITROTOLUENE		1 J	4.5 J		0.34 J			0.242 U	0.25 U		0.2 U		5.9 UJ	2.5	1.3	1.9	2.2	1.9	0.25 U	1.2	0.563 J
4-NITROTOLUENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.4 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.4 U
RDX		610	5500		1100			1500	220		73.1 J		174 UJ	97	60	46	47	76	120	47	10.3
DNX			35								0.4 U		6.2 BU	1							0.4 U
MNX			72								0.4 U		9.1 BU	1.9							0.4 U
TNX			4								0.4 U		1.72 BU	0.248 U							0.4 U
HMX		93	730		130			210 J	210		12.7 J		44 UJ	18	21	30	18	25 J	62	26	3.23
NITROBENZENE		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.2 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.2 U
TETRYL		0.21 U	0.287 U		0.242 U			0.242 U	0.25 U		0.4 U		0.48	0.248 U	0.252 U	0.25 U	0.24 U	0.248 U	0.25 U	0.27 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C	16.45	15.2		2.72			5.22	14.4		20.6		12.14	14.69	2.88	15.05	21.68	5.21	13.2	9.2	16.79
DISSOLVED OXYGEN	MG/L				12.46			10.18	9.61					10.3	13.8			10.91	9.9	11.41	
DISSOLVED OXYGEN - METER		4.35	4.99								3.9		5.93			11.85	7.78				6.43
SPECIFIC CONDUCTANCE	MS/CM	2.743	1.024		1.439			2.34	2.06		1.038		0.365	0.702	0.278	0.223	0.323	0.605	0.451	0.326	0.279
OXIDATION REDUCTION POTENTIAL	MV	152.9	216		282			200	-9999		299.0		224.7	81.7	178	208	78.6	233	-9999	324	279.2
TURBIDITY	NTU	85	242		7.6			14	14		130		4.4	12.8	4.1	10 U	9.1	6.5	19	17.8	25
PH	S.U.	7.67	6.9		7.76			7.49	8.54		7.15		7.33	7.45	7.91	7.51	8.23	6.63	7.02	6.91	7.67
MISCELLANEOUS PARAMETERS																					
AMMONIA-N	MG/L	3.4	0.26 J										0.01 UJ								
NITRITE/NITRATE-N		23	8.5 J										1.09 BU	7.4							0.86
TOTAL ORGANIC CARBON																					
PERCHLORATE	µG/L																			0.2 U	

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA

		13SW/SD15										13SW/SD16									
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
		No Sample	10/27/2003	10/27/2004	02/02/2005	05/08/2005	08/16/2005	01/05/2006	05/22/2006	04/17/2007	05/03/2010	No Sample	10/22/2003	10/27/2004	02/02/2005	05/08/2005	08/16/2005	01/05/2006	05/22/2006	04/17/2007	05/03/2010
EXPLOSIVES	**UNITS**																				
1,3,5-TRINITROBENZENE	µG/L		0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.2 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.2 U
1,3-DINITROBENZENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.2 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.49 U								0.4 U		0.5 U								0.4 U
2,4,6-TRINITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.2 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.24 U	0.25 U							0.2 U		0.25 U	0.24 U							0.2 U
2,4-DINITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.2 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.24 U	0.25 U							0.2 U		0.25 U	0.24 U							0.2 U
2,6-DINITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.2 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.24 U	0.26 J	0.24 U	0.25 U	0.29 U	0.25 U	0.74	0.3 U	0.2 U		0.8 J	0.35 J	0.24 U	0.36 J	1 J	0.28 J	0.5	0.28 U	0.098 J
2-NITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.4 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.4 U
3,5-DINITROANILINE			0.24 U	0.25 U									0.25 U	0.24 U							
3-NITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.4 U		0.29 J	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.4 U
4,4'-TN-AZOXY				0.5 U										0.48 U							
4-AMINO-2,6-DINITROTOLUENE			0.24 U	0.62	0.29 J	0.32 J	0.29 U	0.25 U	1.8	0.3 U	0.2 U		1.6	0.83	0.37 J	0.87 J	2.2	0.59	1.25 UJ	0.38 J	0.46 J
4-NITROTOLUENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.4 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.4 U
RDX			1500	1000	390	100	200	450	50	190	35.3 J		50	43	29	37 J	41	34	66 UJ	25	8.85
DNX			23 J	1.8 J							0.4 U		3.6 J	0.24 U							0.4 U
MNX			47	22							0.4 U		3	1.2							.4U
TNX			4	0.74 J							0.4 U		0.48 J	0.24 U							0.4 U
HMX			210	160	81	60	47	94 J	30	67	10.9 J		21	15	13	22 J	23	17 J	39 UJ	13	2.7
NITROBENZENE			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.2 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.2 U
TETRYL			0.24 U	0.25 U	0.24 U	0.25 U	0.29 U	0.25 U	0.25 U	0.3 U	0.4 U		0.25 U	0.24 U	0.24 U	0.29 UJ	0.29 U	0.242 U	0.5	0.28 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C		8.93	14.22	2.44	16.88	21.47	4.88	12.8	7.8	16.11		12.18	14.56	1.43	14.24	21.08	5	12.6	8.7	16.47
DISSOLVED OXYGEN	MG/L			11.97	13.38			11.02	8.7	11.41				11.63	13.88			10.67	9.83	11.4	
DISSOLVED OXYGEN - METER			10.59			10.43	8.56				5.75		8.48			11.35	5.4				6.28
SPECIFIC CONDUCTANCE	MS/CM		0.251	0.361	0.132	0.14	0.181	0.276	0.222	0.173	0.179		0.254	0.297	0.106	0.134	0.215	0.614	0.257	0.199	0.176
OXIDATION REDUCTION POTENTIAL	MV		290.5	101.4	195	194	74.6	209	-9999	320	273.5		213.7	71.5	188	173	92.3	244	-9999	302	266.9
TURBIDITY	NTU		10.4	23.8	85	10 U	655	34	75	36.5	32		6.5	12.7	10	10 U	24.5	12	19	6.58	17
PH	S.U.		7.43	7.41	8.13	7.4	8.6	6.98	6.96	7.07	7.37		7.17	7.61	8.29	7.53	7.91	6.87	7.21	6.71	7.55
MISCELLANEOUS PARAMETERS																					
AMMONIA-N	MG/L		0.01										0.005 UJ								
NITRITE/NITRATE-N			0.14	3.4							0.15		0.66 J	1.3							0.23
TOTAL ORGANIC CARBON																					
PERCHLORATE	µG/L									0.2 U										0.2 U	

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER ROUNDS 1 THROUGH 10 NSA CRANE CRANE, INDIANA

		13SW/SD19										13SW/SD20									
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
		No Sample	10/23/2003	No Sample	02/02/2005	05/08/2005	08/16/2005	01/05/2006	05/21/2006	04/17/2007	05/003/2010	No Sample	10/23/2003	No Sample	02/02/2005	05/08/2005	08/16/2005	01/05/2006	05/21/2006	04/17/2007	05/03/2010
EXPLOSIVES	**UNITS**																				
1,3,5-TRINITROBENZENE	µG/L		0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
1,3-DINITROBENZENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.49 U								0.4 U		0.54 U								0.4 U
2,4,6-TRINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.24 U								0.2 U		0.27 U								0.2 U
2,4-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.24 U								0.2 U		0.27 U								0.2 U
2,6-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
2-NITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.4 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.4 U
3,5-DINITROANILINE			0.24 U										0.27 U								
3-NITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.4 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.4 U
4,4'-TN-AZOXY																					
4-AMINO-2,6-DINITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
4-NITROTOLUENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.4 U
RDX			0.24 U		0.92	0.41 J	0.29 U	0.84	0.83	0.67	0.4 U		0.46 J		0.38 J	0.26 U	0.29 U	0.31 J	0.25 U	0.25 U	0.4 U
DNX			0.24 U								0.4 U		0.27 U								0.4 U
MNX			0.24 U								0.4 U		0.27 U								0.4 U
TNX			0.24 U								0.4 U		0.27 U								0.4 U
HMX			0.24 U		0.54	0.51	0.29 U	0.55 J	0.77	0.57	0.4 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.4 U
NITROBENZENE			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.2 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.2 U
TETRYL			0.24 U		0.264 U	0.25 U	0.29 U	0.238 U	0.25 U	0.25 U	0.4 U		0.27 U		0.24 U	0.26 U	0.29 U	0.242 U	0.25 U	0.25 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C		11.69		2.64	15.03	21.35	4.9	14.43	13.4	15.40		13.22		2.24	14.94	21.73	5.4	14.36	11.4	15.61
DISSOLVED OXYGEN	MG/L				13.12			9.91	-9999	983					13.25			10.44	-9999	9.96	7.32
DISSOLVED OXYGEN - METER			6.03			11.58	12.02				7.89		4.39			11.18	2.54				
SPECIFIC CONDUCTANCE	MS/CM		0.566		0.236	0.316	0.376	0.562	0.474	0.345	0.600		0.3		0.154	0.174	0.231	0.396	0.296	0.243	0.198
OXIDATION REDUCTION POTENTIAL	MV		203.5		220	213	134.2	136	-9999	285	207.0		158.3		205	214	103.3	163	-9999	280	219.9
TURBIDITY	NTU		1.93		36	10 U	12	0.5	3.83	2.96	5.3		6.25		6.1	10 U	3.71	3.3	11.1	6.47	12
PH	S.U.		7.25		7.9	7.13	8.51	7.67	5.57	6.81	7.30		7.75		8.17	7.21	7.58	8.11	5.84	6.67	7.64
MISCELLANEOUS PARAMETERS																					
AMMONIA-N	MG/L		0.04 J										0.005 UJ								
NITRITE/NITRATE-N			0.13 U								0.34		0.11 U								0.092
TOTAL ORGANIC CARBON																					
PERCHLORATE	µG/L									0.2 U										0.2 U	

TABLE 3-5

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS, AND MISCELLANEOUS PARAMETERS FOR SWMU 13 SURFACE WATER
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA

		13SW/SD22										13SW/SD30									
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
		No Sample	10/22/2003	10/27/2004	02/02/2005	05/08/2005	No Sample	01/05/2006	05/22/2006	04/17/2007	05/03/2010	No Sample	10/22/2003	10/26/2004	02/02/2005	05/08/2005	08/16/2005	01/05/2006	05/22/2006	04/17/2007	05/003/2010
EXPLOSIVES	**UNITS**																				
1,3,5-TRINITROBENZENE	µG/L		0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
1,3-DINITROBENZENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE			0.52 U								0.4 U		0.5 U								0.4 U
2,4,6-TRINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE			0.26 U								0.2 U		0.25 U	0.24 U							0.2 U
2,4-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE			0.26 U								0.2 U		0.25 U	0.24 U							0.2 U
2,6-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
2-NITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.4 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.4 U
3,5-DINITROANILINE			0.26 U										0.25 U	0.24 U							
3-NITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.4 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.4 U
4,4'-TN-AZOXY														0.48 U							
4-AMINO-2,6-DINITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
4-NITROTOLUENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.4 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.4 U
RDX			1.6		1.1	0.33 J		1	0.78	4.2 BU	0.408		6.2	9.9	6	4.9	10.2 UJ	13.5 UJ	5.8	4.1	2.31 J
DNX			0.26 U								0.4 U		0.25 U	0.24 U							0.4 U
MNX			0.26 U								0.4 U		0.28 J	0.31 J							0.4 U
TNX			0.26 U								0.4 U		0.25 U	0.24 U							0.4 U
HMX			0.26 U		0.36 J	0.27 U		0.258 U	0.25 U	0.8275 R	0.4 U		3.2 J	2.9	2	2.6	4.8 UJ	4.8 BU	3.3	1.8	0.718
NITROBENZENE			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.2 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.2 U
TETRYL			0.26 U		0.266 U	0.27 U		0.258 U	0.25 U	0.84 J	0.4 U		0.25 U	0.24 U	0.252 U	0.25 U	0.51	0.518	0.25 U	0.25 U	0.4 U
FIELD PARAMETERS																					
TEMPERATURE	C		13.65	15.14	2.02	13.53		5.12	13	10.2	16.24		13.09	14.39	1.63	19.29	45.04 UJ	4.91	14.1	9.1	18.95
DISSOLVED OXYGEN	MG/L			10.84	8.25			9.72	7.95	10.87	6.10			9.44	14.1			11.18	11.11	12.56	6.01
DISSOLVED OXYGEN - METER			3.71			6.86							9.63			11.3	20.42 UJ				
SPECIFIC CONDUCTANCE	MS/CM		0.434	0.205	0.151	0.184		0.342	0.406	0.337	0.291		0.395	0.359	0.168	0.234	0.728 UJ	0.389	0.371	0.306	0.257
OXIDATION REDUCTION POTENTIAL	MV		264.7	74.1	139	199		188	-9999	328	226.9		222.1	39.6	201	165	71	199	-9999	235	242.8
TURBIDITY	NTU		1.5	21.3	3.1	10 U		6.7	5.6	6.65	17		2.6	5.69	4.5	3.5	4.36 UJ	40	4.2	2.98	9.6
PH	S.U.		7.02	7.7	8.18	7.03		7.24	7.88	6.98	7.59		7.84	7.52	8.07	8.06	17.18 UJ	7.15	8.11	6.54	7.75
MISCELLANEOUS PARAMETERS																					
AMMONIA-N	MG/L		0.005 UJ										0.005 UJ								
NITRITE/NITRATE-N			0.025 U								0.05		0.025 U	0.26							0.054
TOTAL ORGANIC CARBON																	2.2				
PERCHLORATE	µG/L									0.4										0.2 U	

A blank cell indicates that no sample was collected or analysis was conducted for the parameter.
U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner.

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

J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate.
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.
-9999 - Data not available
µG/L - micrograms per liter
C - degrees centigrade
MG/L - milligrams per liter
MS/CM - millisiemens per centimeter
MV - millivolts
NTU - nephelometric turbidity units
S.U. - standard units

TABLE 3-6

DESCRIPTIVE STATISTICS FOR
SWMU 13 (MINE FILL B) ROUND 10 SURFACE WATER
NSA CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Energetics (ug/L)							
2-AMINO-4,6-DINITROTOLUENE	2/8	0.10 J	0.15 J	0.2 - 0.2	0.11	0.12	13SW1409
4-AMINO-2,6-DINITROTOLUENE	2/8	0.46 J	0.56 J	0.2 - 0.2	0.20	0.51	13SW1409
HMX	5/8	0.48	12.60 J	0.4 - 0.4	3.83	6.01	13SW1106
RDX	6/8	0.41	73.10 J	0.4 - 0.4	16.26	21.62	13SW1106
Field Parameters							
CONDUCTIVITY	8/8	0.18	1.04	-	0.38	0.38	13SW1106
DISSOLVED OXYGEN	8/8	3.90	7.89	-	6.21	6.21	13SW1908
OXIDATION REDUCTION POTENTIAL	8/8	207.00	299.00	-	251.90	251.90	13SW1106
PH	8/8	7.15	7.75	-	7.50	7.50	13SW3009
TEMPERATURE	8/8	15.40	20.60	-	17.02	17.02	13SW1106
TURBIDITY	8/8	5.30	130.00	-	30.99	30.99	13SW1106
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	7/8	0.05	11.00	0.05 - 0.05	1.59	1.82	13SW1106

Associated Samples
13SW1106
13SW1409
13SW1509
13SW1609
13SW1908
13SW2008
13SW2208
13SW3009
13SW3009-D

4.0 DATA EVALUATION

Section 4 presents an evaluation of groundwater and surface water monitoring data for Rounds 1 through 10. The information presented includes temporal plots of RDX and degradation by-product concentration results by round for each groundwater and surface sampling location included in the SWMU 13 long term monitoring program. Also presented in this section are potentiometric surface maps showing groundwater elevations at all SWMU 13 wells in Round 10. The objective of the long term monitoring program at SWMU 13 is to collect enough monitoring data (up to 10 rounds) to determine the nature and extent of contamination, whether residual explosives are naturally degrading, and provide data for making remedy decisions for residual explosives contamination to complete the CMS.

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

The primary MNA monitoring information requirements are identified below in bold type followed by supporting information being provided by the SWMU 13 long term monitoring program:

- **Monitoring data should include analytical results for the contaminants of concern and their degradation products from nine or more rounds of samples collected under non-pumping conditions over a period of 3 to 5 years.** The SWMU 13 long term monitoring program is providing analytical results for select explosives and degradation by-products. As indicated in the SWMU 13 RFI, RDX is considered the principal chemical of concern because it is a site related contaminant and has been detected more frequently and at higher concentrations than any other explosive compound. The degradation by-products for RDX are DNX, MNX, and TNX. The long-term monitoring program includes 10 rounds of sampling, under non-pumping conditions, to provide information on trends in groundwater concentrations of explosives and degradation by-products. To date, 10 rounds of groundwater sampling have been conducted on the following dates: April-May 2003, October-December 2003, July-August 2004, January-February 2005, May 2005, August 2005, January 2006, May 2006, April 2007, and April 2010.

- **There should be at least 2 years of quarterly sampling to evaluate seasonal effects on the contaminant concentrations.** At the completion of the tenth 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 Puz and Plz water bearing zones to evaluate if contamination is migrating to the lower aquifer. In addition, the monitoring program includes monitoring wells positioned upgradient and downgradient of the source area, within the source plume, and along the outside area of the groundwater contamination. The location of each well relative to the contamination plume is discussed in Section 4.1 below.

- **The most recent analytical data on groundwater should be no more than 2 years old at the time of evaluation.** This report evaluates the MNA program through 10 rounds of sampling. As a result, the most recent analytical data will be no more than 1 year old.

- **Demonstration of a trend of decreasing contamination concentration must be clear and meaningful and be based on statistical tests that indicate a high degree of confidence in the apparent trend line.** The SWMU 13 Final MNA report (TtNUS, 2010) presented data for nine rounds of sampling, including temporal plots of RDX and degradation by-product concentrations, along with a detailed statistical evaluation. This MNA Report presents temporal plots of RDX and degradation by-product concentrations for 10 rounds of sampling.

- **Additional rounds of samples, beyond nine rounds, may be required to demonstrate the decreasing trend.** The SWMU 13 Final MNA report (TtNUS, 2010) recommended that the natural attenuation monitoring program at SWMU 13 continue on an annual or semi-annual basis to evaluate MNA as an alternative remedy for RDX contaminated groundwater. Therefore, a decision was made to collect additional data in Round 10.

The secondary MNA monitoring information requirements are identified below in bold type followed by supporting information provided by the SWMU 13 long term monitoring program:

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

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

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

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

  - **Routine and Other Indicator Parameters.** The monitoring data 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 the 10 rounds of sampling are evaluated and used to characterize vertical and horizontal hydraulic conductivity.

  - **Water levels should be measured to determine groundwater flow direction.** Groundwater elevations were measured at each well during each of the 10 sampling rounds and the results, and are presented in the MNA reports 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 involved quarterly monitoring to measure RDX and degradation by-product concentrations and routine indicator parameters by season. The MNA reports include the presentation of temporal plots to discern any seasonal trends of RDX and degradation by-product concentrations, as well as routine indicator parameters.

4.1 GROUNDWATER MONITORING PROGRAM

MNA groundwater sampling has been conducted at 17 select well locations across SWMU 13 (see Figure 2-1). Fourteen wells are located in the Puz aquifer, while the remaining three wells are in the Plz aquifer. These wells have been established in accordance with U.S. EPA Region 5 MNA guidance (U.S. EPA 2000). The monitoring wells have a specific role in the monitoring program and represent locations within the plume source area, within the center and leading edges of the plume, and from points located vertically (above and below) and horizontally (upgradient and downgradient) outside the area of groundwater contamination. The selected wells are distributed as follows in the Puz and Plz:

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

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

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

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

In Rounds 4 through 10, all groundwater samples were analyzed for explosives and well stabilization parameters with occasional analyses for routine indicator MNA parameters and RDX degradation by-products. Groundwater elevations were also collected during each sampling round.

4.2 SURFACE WATER MONITORING PROGRAM

In support of the MNA evaluation, surface water samples were collected at eight select locations (see Figure 2-2). These locations include 13SW11, 13SW14, 13SW15, 13SW16, 13SW19, 13SW20, 13SW22, and 13SW30. The samples collected from these locations were analyzed for explosives and nitrite/nitrate in Round 10.

4.3 POTENTIOMETRIC SURFACES

Groundwater elevations were measured at all Puz and Plz monitoring wells in Round 10. The potentiometric surface maps for Round 10 are shown on Figures 4-1 and 4-2, based on groundwater measurements presented in Table 2-1.

The Round 10 water level elevations were measured in the Puz monitoring wells on April 20, 2010. The potentiometric surface for Puz aquifer wells in Round 10 is shown in Figure 4-1. In general, Puz groundwater elevations measured in Round 10 were approximately the same or slightly lower than reported in Round 9. Groundwater elevations in Round 10 ranged from 641.25 feet above mean sea level (amsl) in well 13MWT39 to 711.42 feet amsl in well 13MWT03. Groundwater flow directions in the Puz aquifer in Round 10 were the same as reported in Round 9.

The potentiometric surface map for groundwater elevations measured in the Plz aquifer wells in Round 10 is presented on Figure 4-2. Groundwater elevations measured in Round 10 were generally the same as reported in Round 9, and ranged from 597.78 feet amsl in well 13MWT46 to 621.41 feet amsl in well 13MWT45. The Plz groundwater flow directions in Round 10 were essentially the same as in Round 9.

4.4 GROUNDWATER AND SURFACE TEMPORAL PLOTS

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

Puz Aquifer

Temporal plots of groundwater concentration data collected for the Puz aquifer wells during the SWMU 13 MNA program are presented on Figures 4-3 through 4-7 for each spatial location group (i.e., source area, RDX plume, edge of the plume, upgradient, and downgradient). The figures show temporal plots of RDX and degradation by-product (DNX, MNX, and TNX) concentrations for Rounds 1 through 10. A review of analytical results for Rounds 1 through 10 indicates some evidence of potential concentration trends for RDX at selected wells. Potential current trends in RDX or degradation by-product concentrations after 10 rounds are indicated at the following wells:

- 13MWT09, 13MWT11, 13MWT17, and 13MWT21 (source area wells) – decrease in RDX and MNX
- 13MWT13, 13MWT34, 13MWT37, and 13MWT40 (RDX plume wells) – decrease in RDX and MNX
  13MWT14, 13MWT31, and 13MWT51 (plume leading edge wells) – decrease in RDX

Plz Aquifer

Figure 4-8 shows temporal plots of RDX and degradation by-products for Rounds 1 through 10 at Plz well locations. Through Round 10, 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 4-9 shows temporal plots of explosive and degradation by-product surface water concentrations for Rounds 1 through 10. RDX has been detected at all surface water monitoring locations in all 10 rounds, with the exception of locations 13SW19 and 13SW20. At 13SW19, RDX was not detected in Rounds 2, 6, and 10. At 13SW20, RDX was not detected in Rounds 5, 6, 9, and 10. Through 10 rounds of sampling, RDX concentrations at locations 13SW14, 13SW15, 13SW16, and 13SW19 show a potential downward trend.

Only very limited sampling (Rounds 2, 3, and 10) has been conducted for DNX, MNX, and TNX in surface water, and does not provide sufficient data to discern potential trends. No detectable concentrations of DNX, MNX, and TNX were identified in the Round 10 samples.

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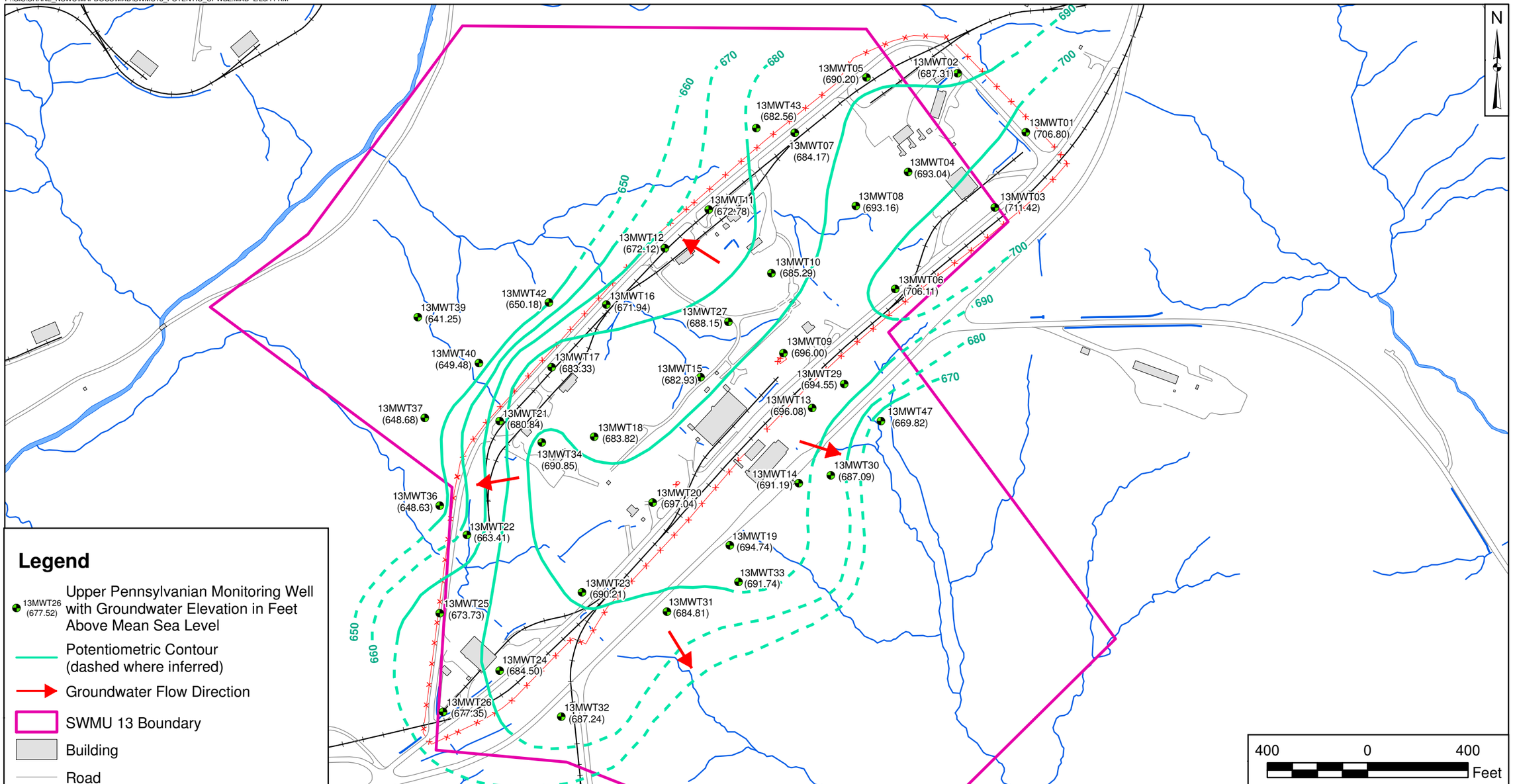

DRAWN BY	DATE
T. WHEATON	05/17/10
CHECKED BY	DATE
J. DUCAR	2/28/11
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP
FOR THE UPPER PENNSYLVANIAN
WATER-BEARING ZONE - ROUND 10 - APRIL 20, 2010
SWMU 13 - MINE FILL B
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 0048	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 4-1	REV 0

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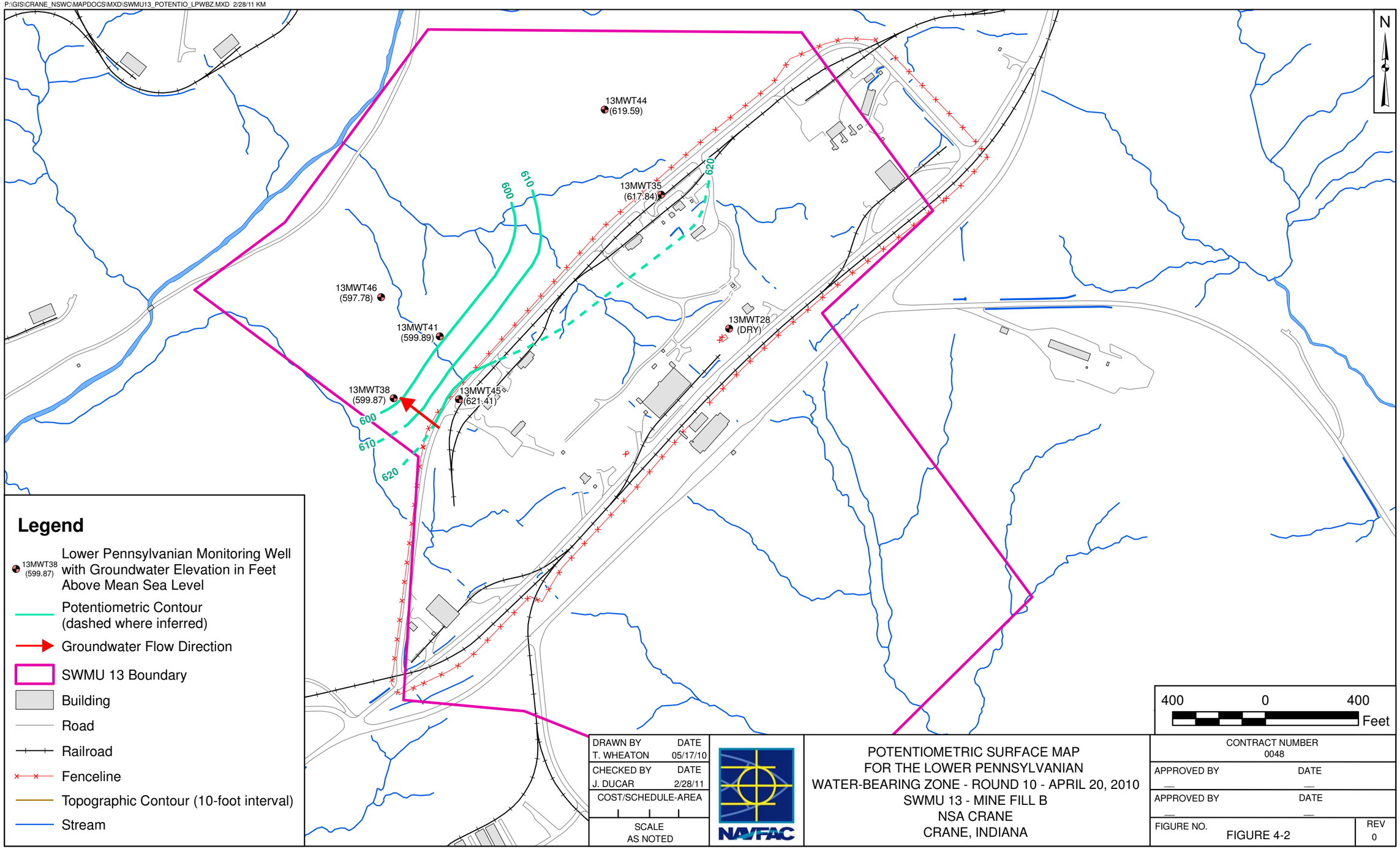


FIGURE 4−3

TEMPORAL PLOTS OF RDX AND DEGRADATION BY−PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 13
ROUNDS 1 THROUGH 10
SOURCE AREA WELLS
NSA CRANE
CRANE, INDIANA

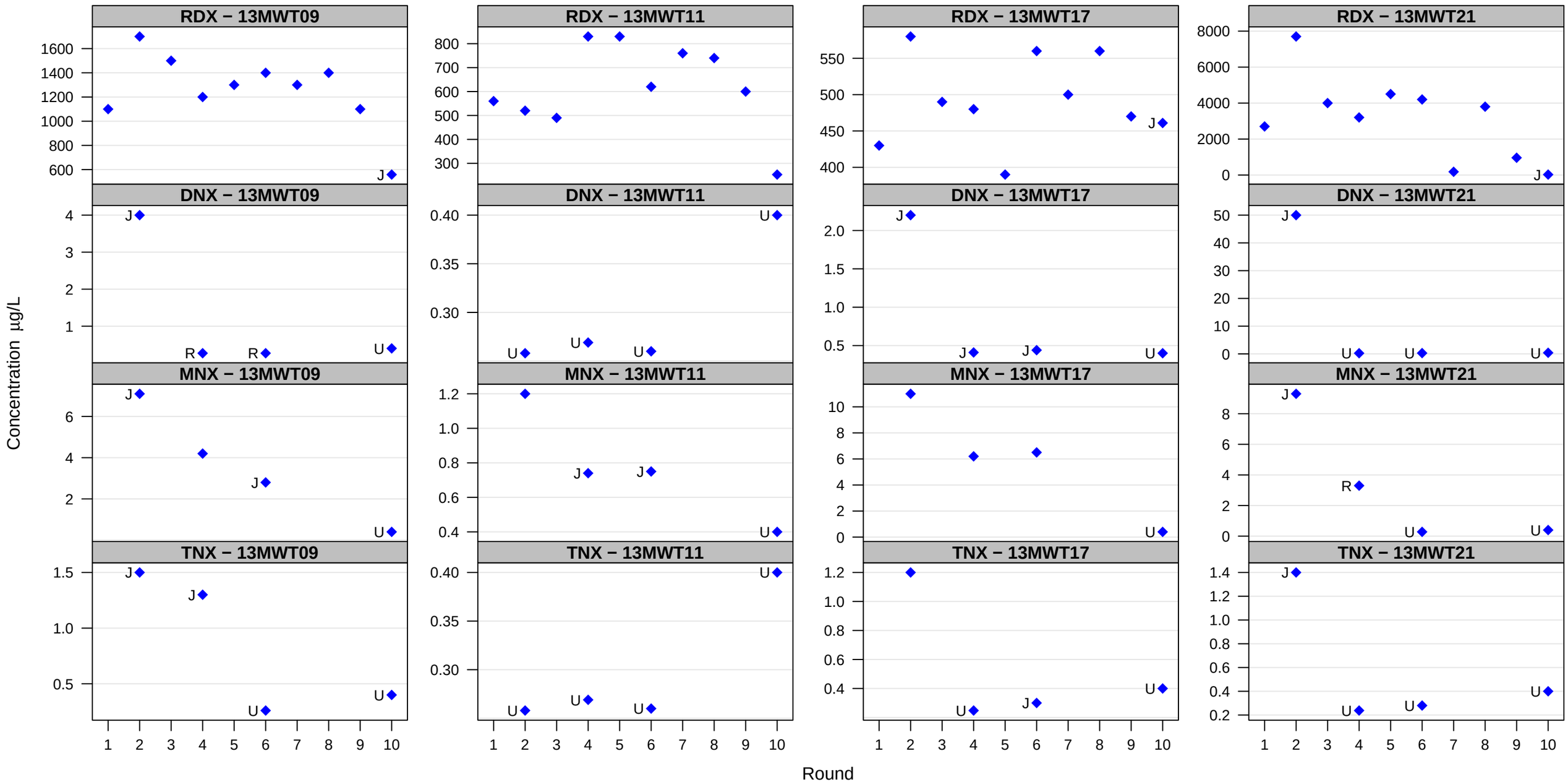


FIGURE 4–4

TEMPORAL PLOTS OF RDX AND DEGRADATION BY–PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 13
ROUNDS 1 THROUGH 10
RDX PLUME WELLS
NSA CRANE
CRANE, INDIANA

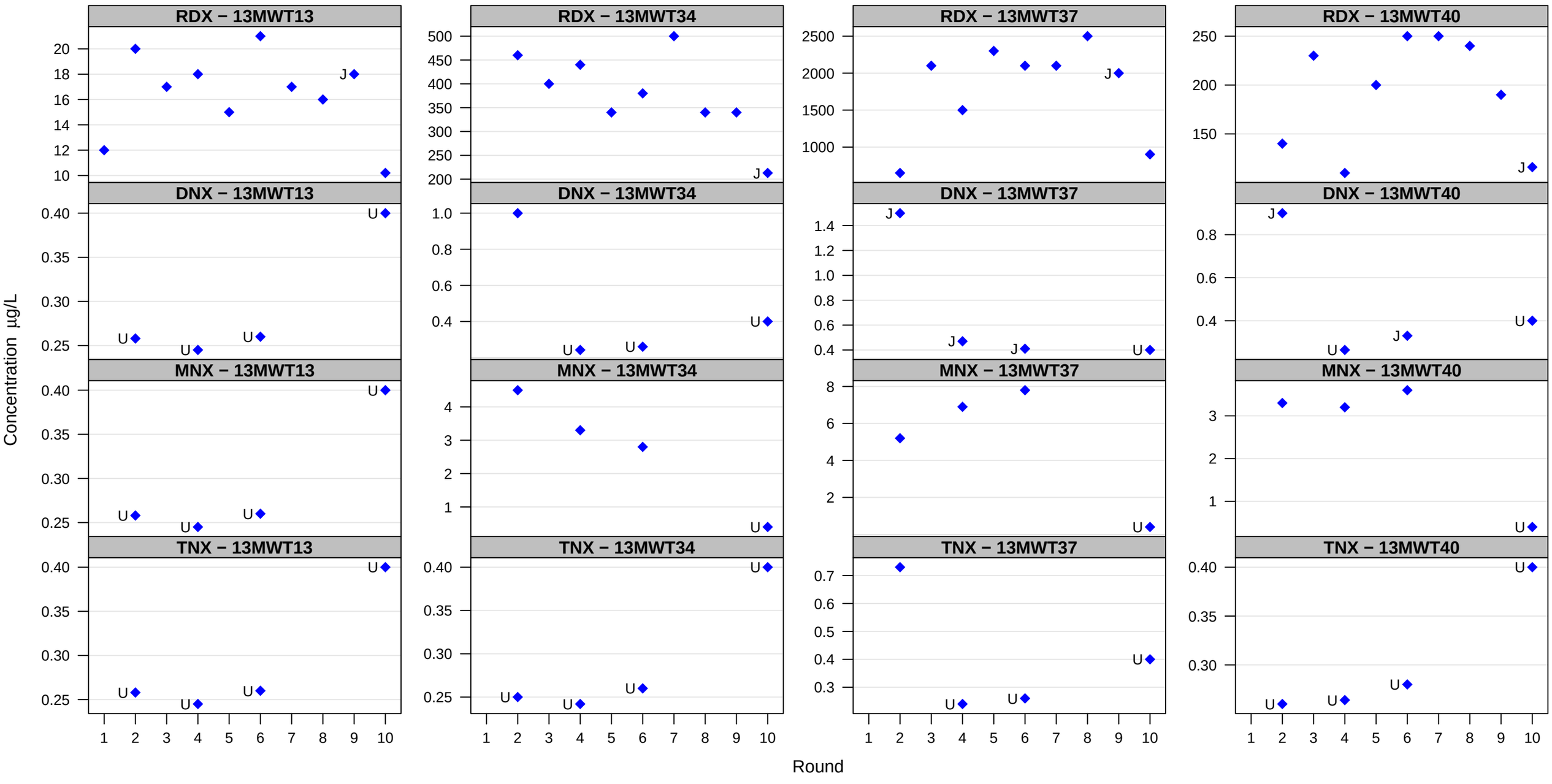


FIGURE 4–5

TEMPORAL PLOTS OF RDX AND DEGRADATION BY–PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 13
ROUNDS 1 THROUGH 10
LEADING EDGE WELLS
NSA CRANE
CRANE, INDIANA

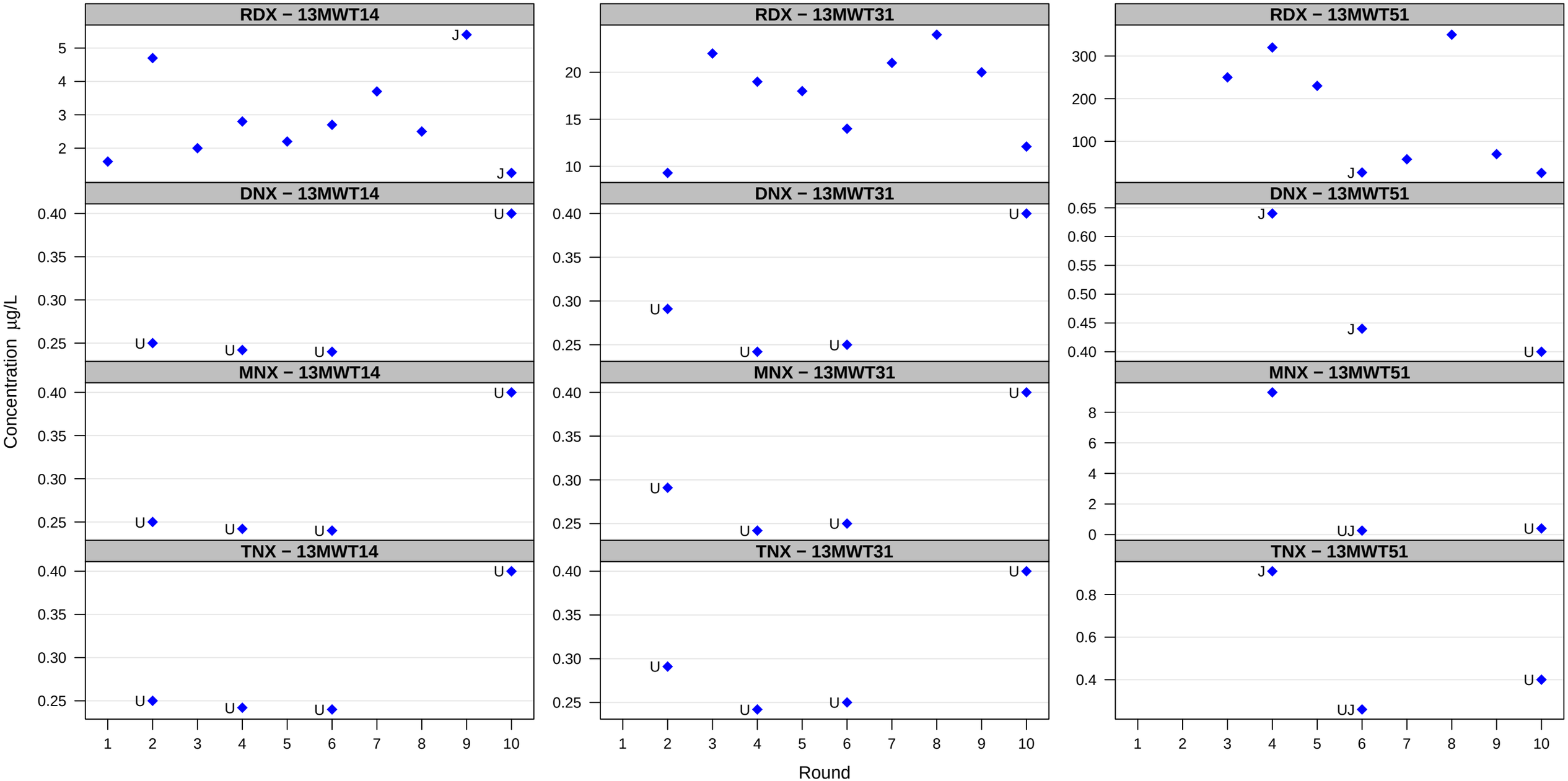


FIGURE 4−6

TEMPORAL PLOTS OF RDX AND DEGRADATION BY−PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 13
ROUNDS 1 THROUGH 10
UPGRADIENT WELLS
NSA CRANE
CRANE, INDIANA

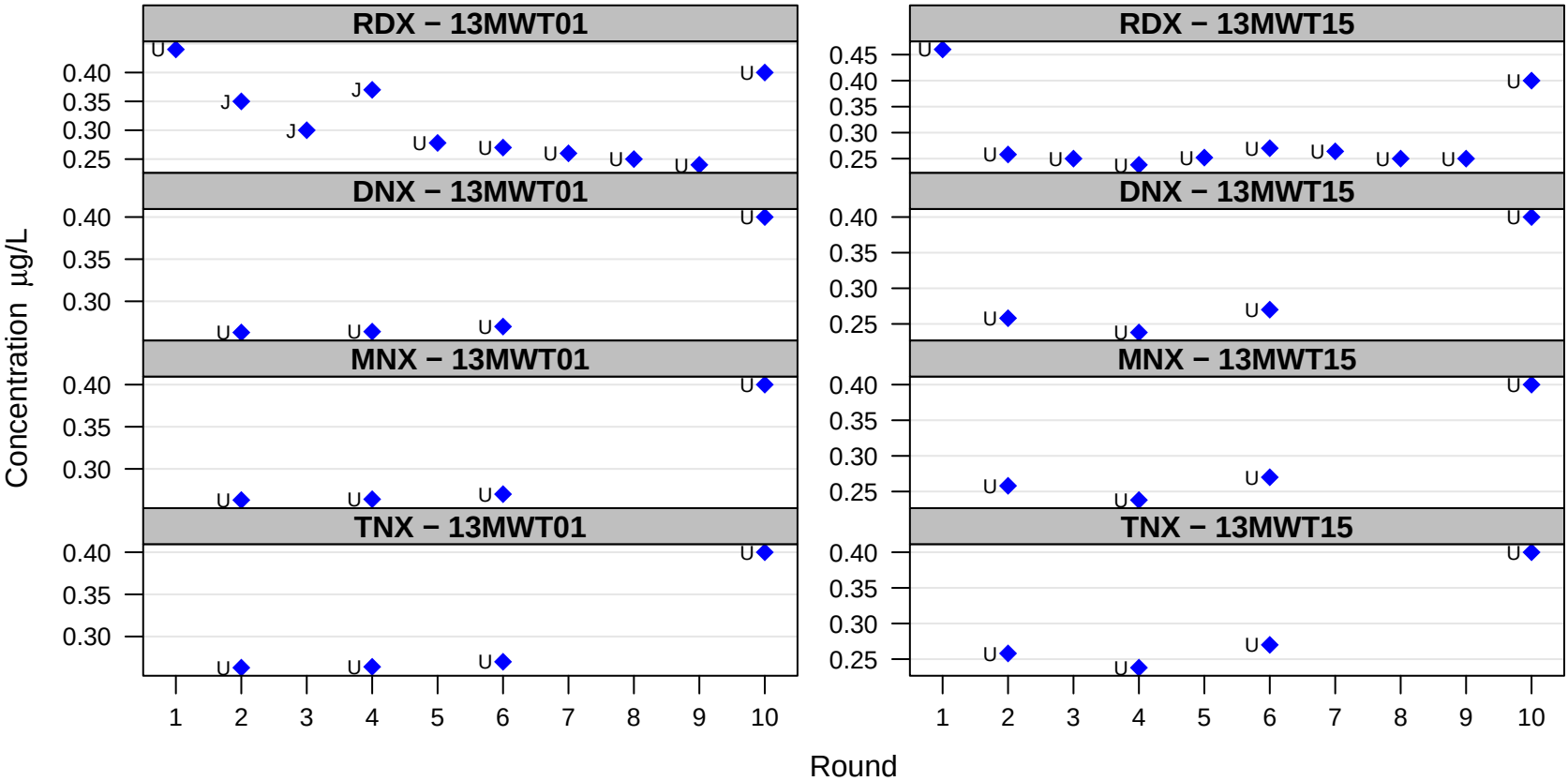


FIGURE 4−7

TEMPORAL PLOTS OF RDX AND DEGRADATION BY−PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA UPPER WATER BEARING ZONE AT SWMU 13
ROUNDS 1 THROUGH 10
DOWNGRADIENT WELL
NSA CRANE
CRANE, INDIANA

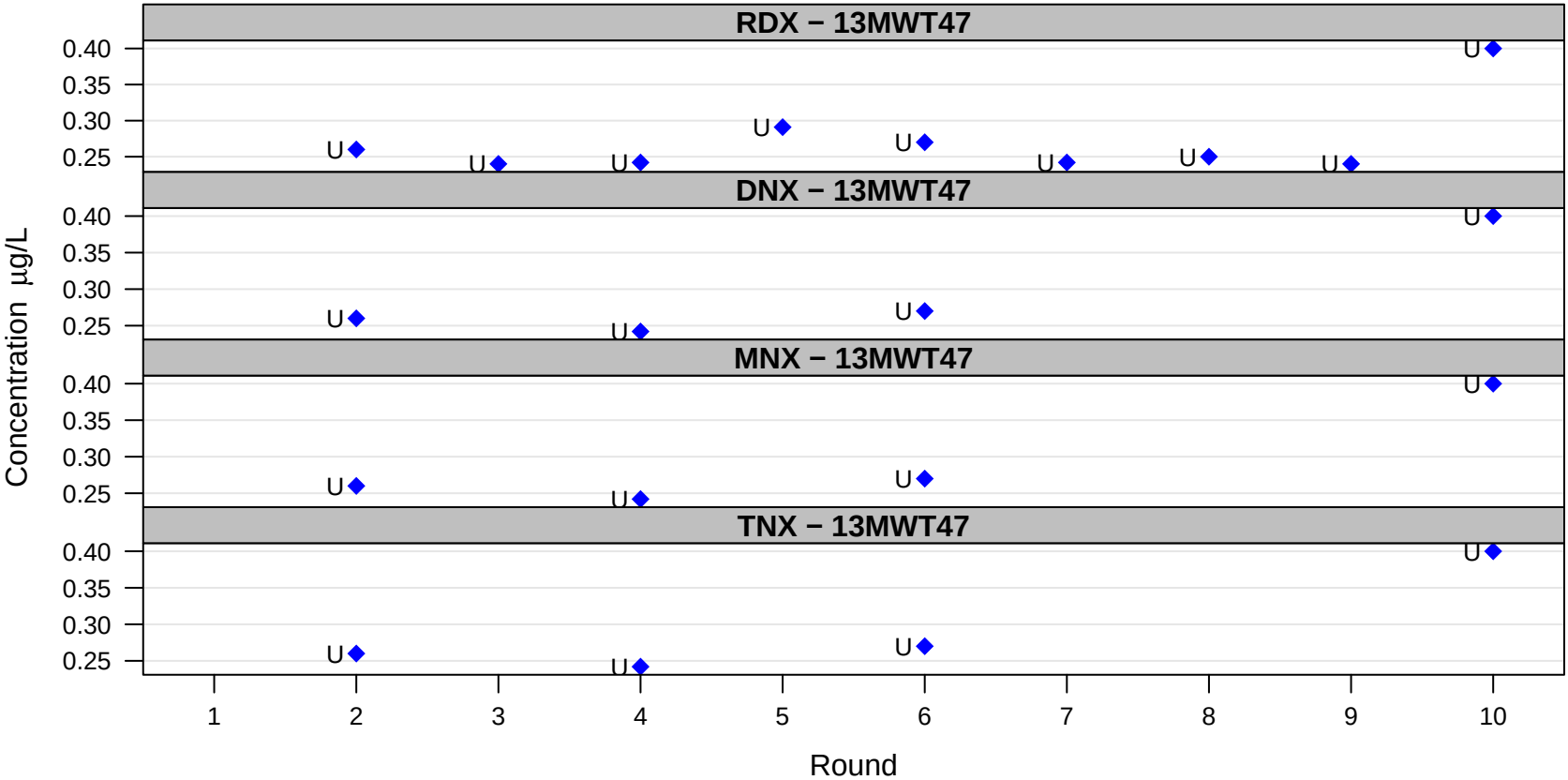


FIGURE 4−8

TEMPORAL PLOTS OF RDX AND DEGRADATION BY−PRODUCT CONCENTRATIONS
IN THE PENNSYLVANIA LOWER WATER BEARING ZONE AT SWMU 13
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA

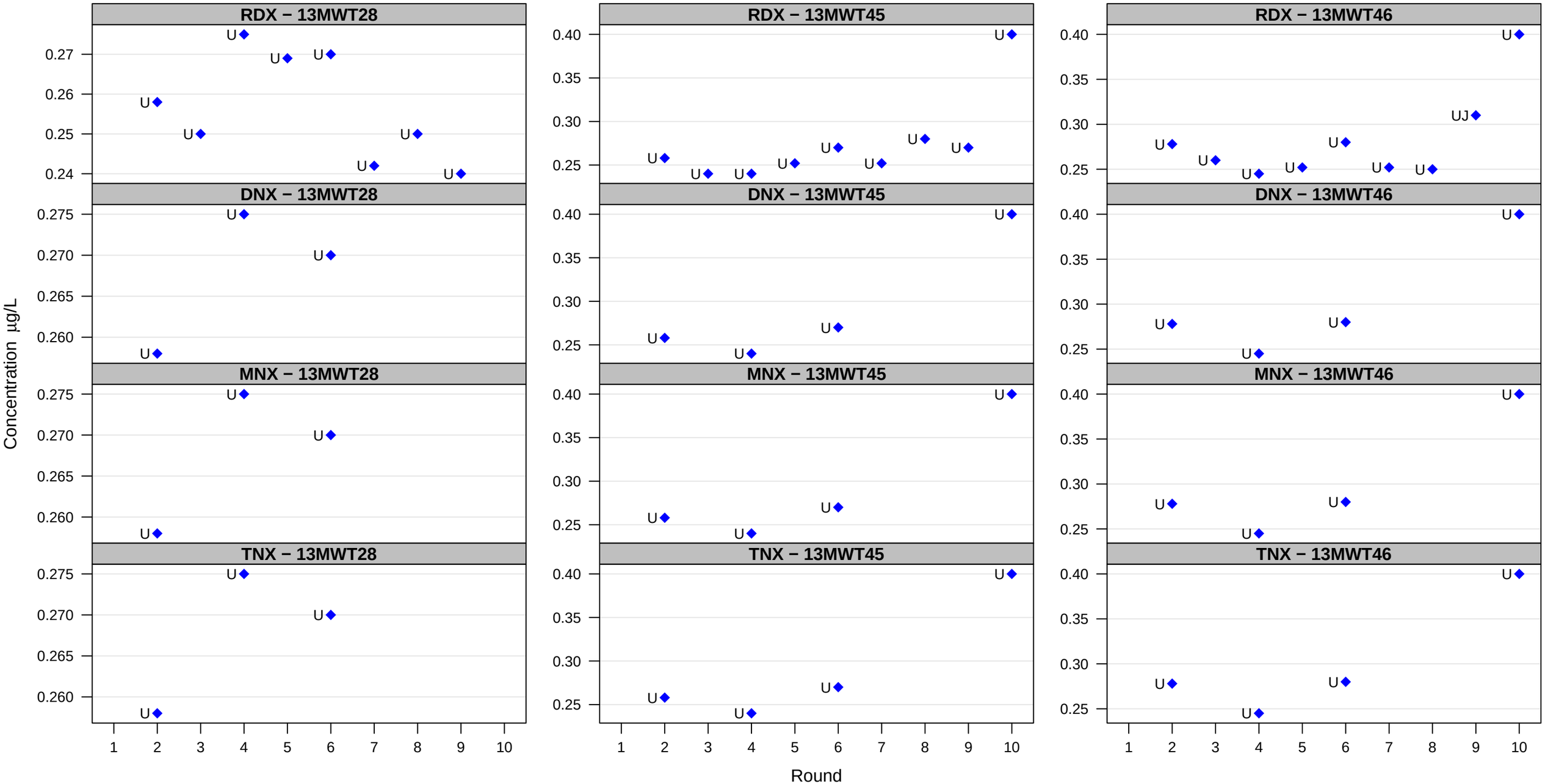


FIGURE 4–9

TEMPORAL PLOTS OF RDX AND DEGRADATION BY–PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA
PAGE 1 OF 3

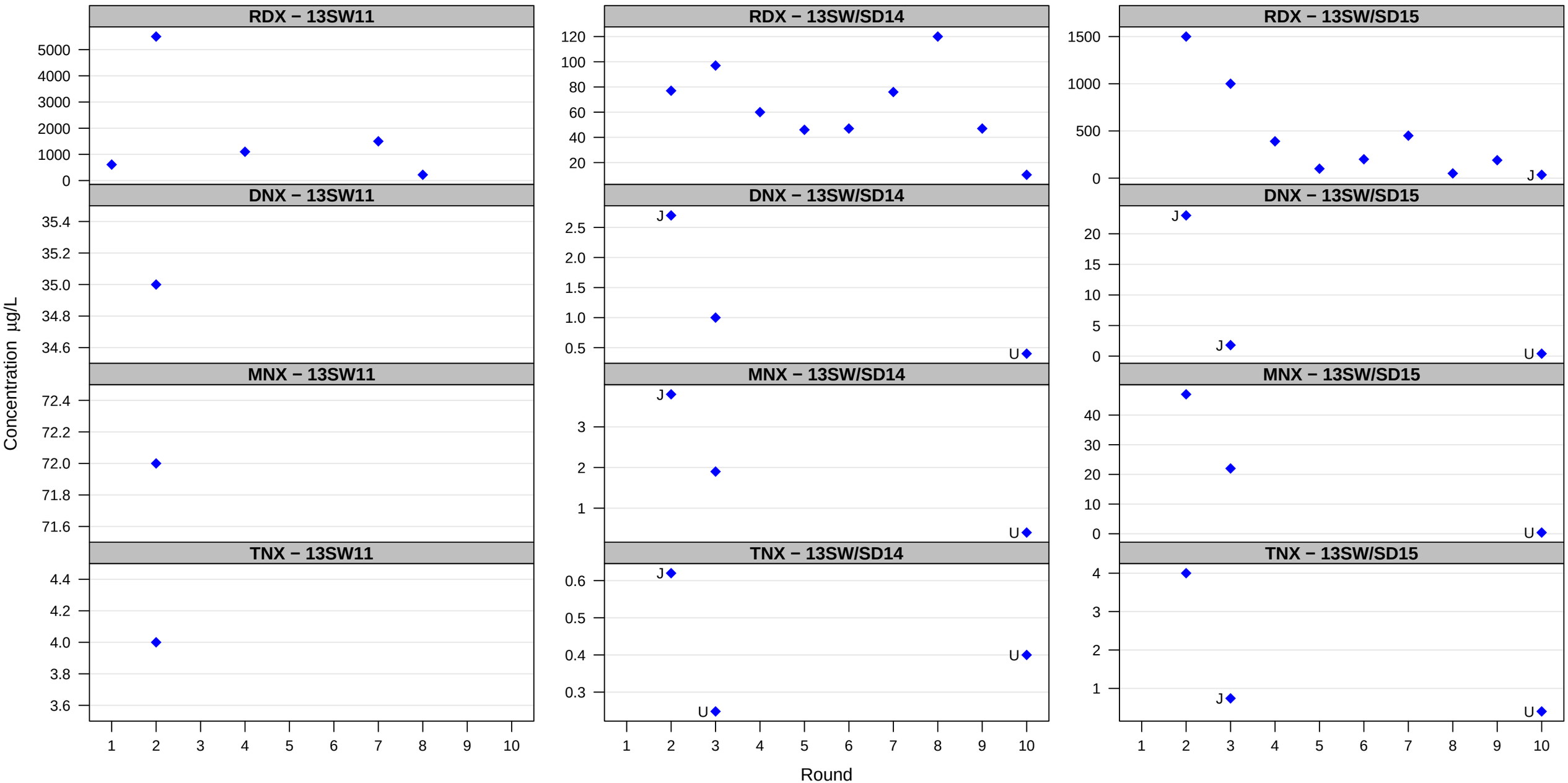


FIGURE 4–9

TEMPORAL PLOTS OF RDX AND DEGRADATION BY–PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA
PAGE 2 OF 3

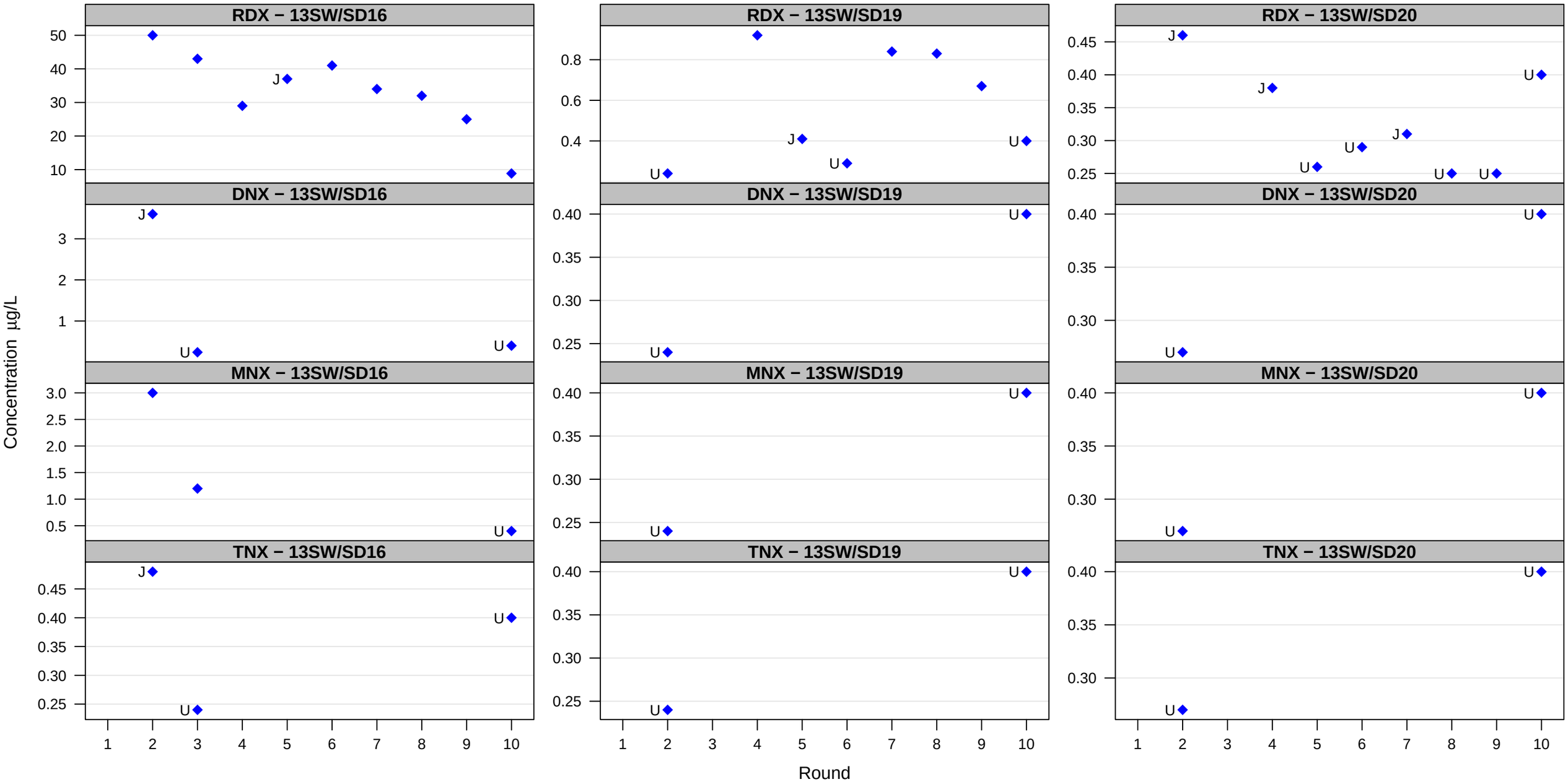
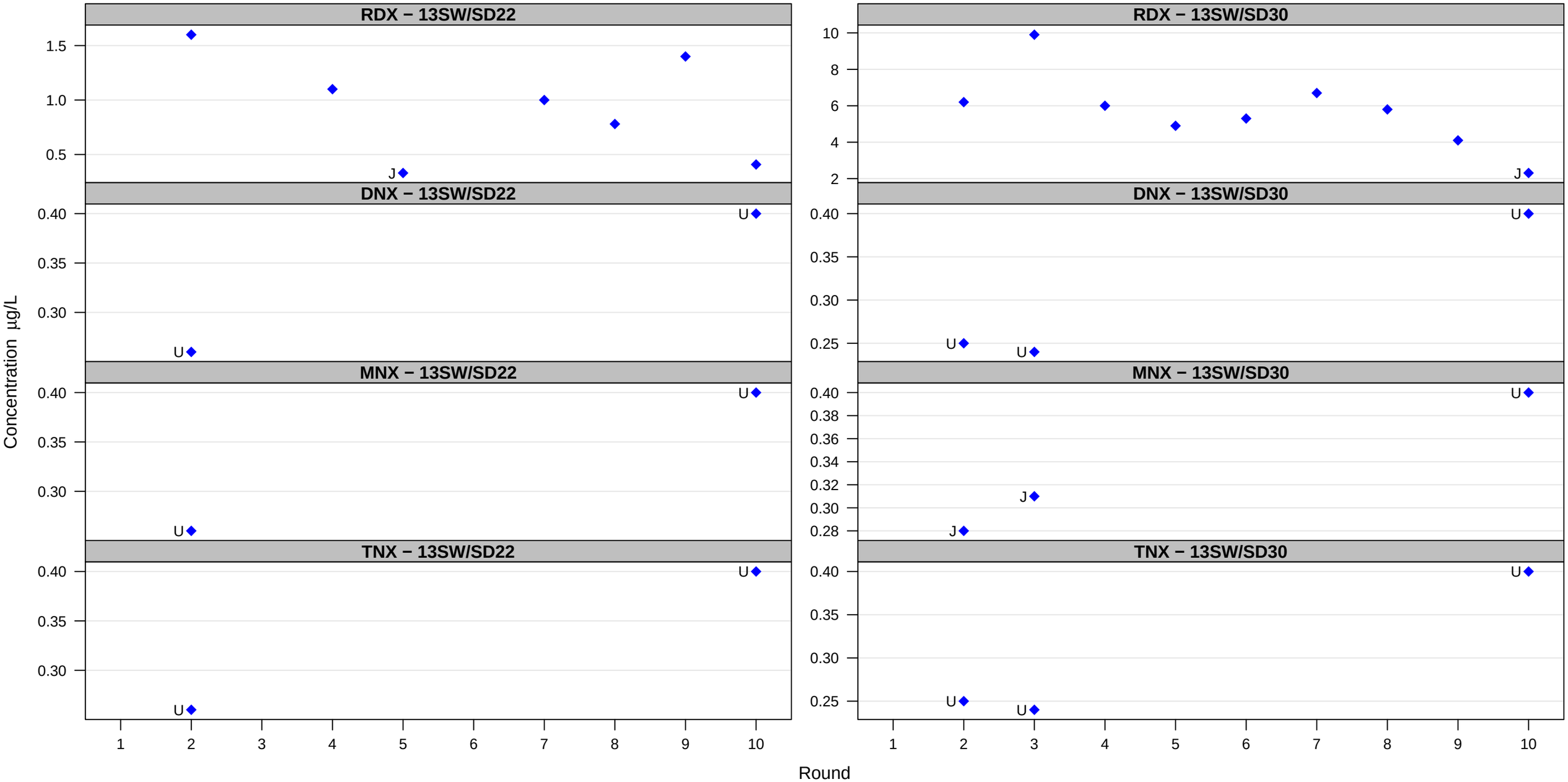


FIGURE 4–9

TEMPORAL PLOTS OF RDX AND DEGRADATION BY–PRODUCT CONCENTRATIONS
IN SURFACE WATER AT SWMU 13
ROUNDS 1 THROUGH 10
NSA CRANE
CRANE, INDIANA



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APPENDIX A

SWMU 13
SAMPLE LOG SHEETS AND OTHER FIELD FORMS
ROUND 10

APPENDIX A.1

SWMU 13

GROUNDWATER SAMPLE LOG SHEETS

ROUND 10

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT0110	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT01	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	5/2/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/1/10	10:30	7.53	100	Clear	4.28	0.204	4.46	36	12.45	62.0	na	na	0
5/1/10	10:40	7.83	100	Clear	4.14	0.191	2.73	25	12.69	80.6	na	na	1000
5/1/10	10:50	7.83	100	Clear	4.05	0.199	2.47	15	12.89	92.2	na	na	1000
5/1/10	11:00	7.82	100	Clear	4.05	0.201	2.20	12	13.20	98.6	na	na	1000
5/1/10	11:10	7.81	100	Clear	4.02	0.203	2.26	10	13.24	100.3	na	na	1000
5/1/10	11:20	7.80	100	Clear	4.08	0.203	2.28	8.4	13.23	102.9	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/1/10	11:30	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/1/10	11:30	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/1/10	11:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT0911	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT09	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John King
WBS Code #		**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/3/10	11:30	8.93	100	Clear	5.52	0.792	14.86	5.3	14.70	112.2	na	na	0
5/3/10	11:40	9.11	100	Clear	5.52	0.788	0.99	6.0	14.02	107.4	na	na	1000
5/3/10	11:50	9.05	100	Clear	5.52	0.832	0.71	4.2	15.39	108.2	na	na	1000
5/3/10	12:00	9.04	100	Clear	5.52	0.882	0.71	3.1	17.25	110.6	na	na	1000
5/3/10	12:10	9.02	100	Clear	5.52	0.879	0.73	2.7	17.12	112.7	na	na	1000
5/3/10	12:20	9.05	100	Clear	5.53	0.880	0.70	2.7	17.01	108.5	na	na	1000
5/3/10	12:30	9.06	100	Clear	5.52	0.875	0.68	1.1	17.33	107.4	na	na	1000
5/3/10	12:40	9.04	100	Clear	5.54	0.877	0.69	2.8	17.28	109.0	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/3/10	12:50	9.05	100	Clear	5.54	0.875	0.66	2.3	17.14	109.9	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservativ	Count	Type	Requiremen	Comments	Chain#

✓	5/3/10	13:00	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	13:00	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	13:00	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

Protective casing around well is damaged and well does not shut properly.

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1110	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT11	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	Jason Trentini
WBS Code #		**Concentration**	Not known	**Modified Date**	5/5/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/1/10	12:30	8.91	100	Clear	3.97	0.114	7.05	10	14.78	190.2	NA	NA	0
5/1/10	12:40	9.10	100	Clear	3.93	0.202	1.22	8.4	14.89	171.2	NA	NA	1000
5/1/10	12:50	9.15	100	Clear	3.95	0.204	0.64	7.6	15.60	164.5	NA	NA	1000
5/1/10	13:00	9.25	100	Clear	3.93	0.201	0.36	6.9	14.51	162.0	NA	NA	1000
5/1/10	13:10	9.31	100	Clear	3.93	0.203	0.32	7.0	14.78	158.8	NA	NA	1000
5/1/10	13:20	9.31	100	Clear	3.93	0.205	0.30	6.4	14.80	158.1	NA	NA	1000
5/1/10	13:30	9.33	100	Clear	3.93	0.207	0.30	6.8	14.90	157.4	NA	NA	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/1/10	13:40	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/1/10	13:40	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/1/10	13:40	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1310	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT13	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #		**Concentration**	-Select-	**Modified Date**	5/5/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	15:00	4.05	100	Clear	14.16	0.094	5.11	3.9	14.13	260.7	na	na	0
5/2/10	15:10	4.18	100	Clear	4.08	0.091	4.91	3.5	14.34	275.8	na	na	1000
5/2/10	15:20	4.14	100	Clear	4.06	0.094	4.73	3.6	15.26	281.8	na	na	1000
5/2/10	15:30	4.09	100	Clear	4.08	0.103	3.90	3.5	17.90	293.3	na	na	1000
5/2/10	15:40	4.05	100	Clear	4.08	0.103	3.89	3.7	18.95	293.6	na	na	1000
5/2/10	15:50	4.26	100	Clear	4.06	0.101	5.21	4.0	15.15	294.1	na	na	1000
5/2/10	16:00	4.42	100	Clear	3.93	0.092	5.16	6.0	12.71	298.1	na	na	1000
5/2/10	16:10	4.50	100	Clear	3.92	0.097	5.30	3.9	12.57	304.7	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	16:20	4.43	100	Clear	3.92	0.097	5.34	2.1	12.62	308.6	na	na	1000
5/2/10	16:30	4.44	100	Clear	3.93	0.098	5.43	4.6	12.54	314.1	na	na	1000
5/2/10	16:40	4.44	100	Clear	3.93	0.098	5.42	2.2	12.60	316.8	na	na	1000

Analysis Records

Colle	Date	Time	Anal Meth	Desc of Ar	Pres	Cour	Type	Requ	Comi	Chai

✓	5/2/10	16:40	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	16:40	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	16:40	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1410	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT14	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	4/30/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

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)
4/30/10	10:05	14.38	100	Clear	4.74	1.183	14.92	19	14.09	83.3	na	na	0
4/30/10	10:15	14.41	100	Clear	5.38	1.034	2.61	18	14.14	57.9	na	na	1000
4/30/10	10:25	14.41	100	Clear	5.44	1.035	1.85	13	15.00	56.7	na	na	1000
4/30/10	10:35	14.40	100	Clear	5.43	1.018	1.68	8.7	15.02	59.2	na	na	1000
4/30/10	10:45	14.40	100	Clear	5.44	1.016	1.62	7.3	15.43	61.0	na	na	1000
4/30/10	10:55	14.41	100	Clear	5.43	0.976	1.33	7.3	14.37	63.8	na	na	1000
4/30/10	11:05	14.40	100	Clear	5.43	0.967	1.28	6.8	14.50	64.6	na	na	1000
4/30/10	11:15	14.39	100	Clear	5.40	0.965	1.23	5.8	14.67	64.7	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - 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)
4/30/10	11:25	14.40	100	Clear	5.41	0.960	1.19	4.9	14.69	65.0	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservativ	Count	Type	Requiremen	Comments	Chain#

✓	4/30/10	11:35	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	11:35	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	11:35	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1510	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT15	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #		**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/3/10	11:50	13.60	100	Clear	3.28	0.463	6.91	4.4	14.53	430.6	na	na	0
5/3/10	12:00	14.26	100	Clear	3.30	0.463	2.25	5.4	15.01	449.9	na	na	1000
5/3/10	12:10	14.01	100	Clear	3.34	0.469	1.85	8.4	15.98	453.7	na	na	1000
5/3/10	12:20	14.50	100	Clear	3.32	0.432	0.90	13	13.48	445.9	na	na	1000
5/3/10	12:30	14.70	100	Clear	3.38	0.423	0.80	17	13.74	438.8	na	na	1000
5/3/10	12:40	14.65	100	Clear	3.43	0.416	0.83	16	13.94	429.4	na	na	1000
5/3/10	12:50	14.58	100	Clear	3.43	0.408	0.94	14	14.02	425.2	na	na	1000
5/3/10	13:00	14.51	100	Clear	3.41	0.401	1.02	13	13.77	426.7	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/3/10	13:10	14.54	100	Clear	3.43	0.395	0.99	10	14.18	421.7	na	na	1000
5/3/10	13:20	14.50	100	Clear	3.44	0.396	1.02	10	14.23	421.9	na	na	1000
5/3/10	13:30	14.45	100	Clear	3.43	0.396	1.06	10	14.33	422.5	na	na	1000

Analysis Records

Colle	Date	Time	Anal Meth	Desc of Ar	Pres	Cour	Type	Req	Com	Chai

✓	5/3/10	13:30	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	13:30	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	13:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT1710	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT17	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	5/2/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/1/10	14:25	8.11	100	Clear	4.80	0.420	6.97	12	13.36	226.6	na	na	0
5/1/10	14:35	8.10	100	Clear	4.38	0.560	0.72	2.2	13.17	201.4	na	na	1000
5/1/10	14:45	8.12	100	Clear	4.38	0.565	0.58	2.1	13.29	191.7	na	na	1000
5/1/10	14:55	8.12	100	Clear	4.38	0.567	0.56	1.00	13.33	181.9	na	na	1000
5/1/10	15:05	8.10	100	Clear	4.39	0.564	0.43	1.2	13.18	173.8	na	na	1000
5/1/10	15:15	8.11	100	Clear	4.38	0.565	0.33	1.5	13.25	168.3	na	na	1000
5/1/10	15:25	8.11	100	Clear	4.38	0.564	0.29	0.15	13.23	165.3	na	na	1000
5/1/10	15:35	8.11	100	Clear	4.39	0.567	0.27	0.35	13.30	163.9	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/1/10	15:45	8.10	100	Clear	4.38	0.567	0.28	0.55	13.39	162.2	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservativ	Count	Type	Requiremen	Comments	Chain#

✓	5/1/10	15:55	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/1/10	15:55	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/1/10	15:55	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT2110	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT21	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John King
WBS Code #		**Concentration**	-Select-	**Modified Date**	5/2/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	09:30	8.10	100	Clear	6.64	0.352	6.09	80	14.70	108.5	na	na	0
5/2/10	09:40	7.80	100	Clear	6.82	0.385	3.37	75	16.12	68.9	na	na	1000
5/2/10	09:50	7.81	100	Clear	6.91	0.409	3.16	50	16.44	60.7	na	na	1000
5/2/10	10:00	8.04	100	Clear	6.96	0.396	2.75	26	15.12	68.1	na	na	1000
5/2/10	10:10	8.10	100	Clear	7.02	0.392	2.87	24	15.19	74.3	na	na	1000
5/2/10	10:20	8.10	100	Clear	6.92	0.394	2.79	15	15.37	79.4	na	na	1000
5/2/10	10:30	8.08	100	Clear	6.92	0.400	2.99	12	15.48	85.1	na	na	1000
5/2/10	10:40	8.10	100	Clear	6.93	0.403	3.04	8.7	15.60	86.3	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/2/10	10:50	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	10:50	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	10:50	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT2809-NS	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT28	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	5/4/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/4/10	00:00	0	0	Other	NA	NA	NA	NA	NA	NA	NA	NA	0

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✘			SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		
✘			SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		
✘			EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		

General Observations and Notes

No Samples - well DRY -encountered mud @ ~2.5' btoc ?

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT3109	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT31	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	4/30/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

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)
4/30/10	12:20	11.65	100	Clear	4.55	122.1	12.06	120	16.67	194.2	na	na	0
4/30/10	12:30	11.90	100	Clear	4.88	1.153	6.52	330	14.84	152.9	na	na	1000
4/30/10	12:40	12.21	100	Clear	5.02	1.103	4.31	500	13.57	136.3	na	na	1000
4/30/10	12:50	12.43	100	Clear	5.03	1.106	3.29	180	13.78	130.1	na	na	1000
4/30/10	13:00	12.49	100	Clear	5.03	1.110	3.10	120	13.79	126.8	na	na	1000
4/30/10	13:09	12.53	100	Clear	5.03	1.110	2.88	90	13.88	123.5	na	na	900
4/30/10	13:20	12.55	100	Clear	5.03	1.122	2.77	60	14.21	121.0	na	na	1100
4/30/10	13:30	12.55	100	Clear	5.04	1.129	2.64	50	14.39	119.6	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - 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)
4/30/10	13:40	12.55	100	Clear	5.03	1.131	2.54	38	14.51	117.0	na	na	1000
4/30/10	13:50	12.55	100	Clear	5.03	1.135	2.46	30	15.00	115.2	na	na	1000
4/30/10	14:00	12.54	100	Clear	5.05	1.111	2.55	20	14.65	113.1	na	na	1000
4/30/10	14:10	12.54	100	Clear	5.06	1.102	2.43	21	14.95	111.7	na	na	1000
4/30/10	14:20	12.53	100	Clear	5.07	1.105	2.39	15	15.01	110.5	na	na	1000
4/30/10	14:30	12.54	100	Clear	5.08	1.080	2.37	12	14.89	109.3	na	na	1000
4/30/10	14:40	12.52	100	Clear	5.08	1.075	2.36	9.6	14.73	108.8	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	4/30/10	14:50	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	14:50	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	14:50	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT3409	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT34	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John King
WBS Code #		**Concentration**	-Select-	**Modified Date**	5/2/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	15:20	5.05	100	Clear	5.34	0.411	7.05	9.9	16.65	171.6	na	na	0
5/2/10	15:30	5.23	100	Clear	4.80	0.393	1.11	12	14.57	170.2	na	na	1000
5/2/10	15:40	5.25	100	Clear	4.81	0.402	0.67	8.7	15.55	164.9	na	na	1000
5/2/10	15:50	5.23	100	Clear	4.79	0.404	0.55	7.5	15.69	160.3	na	na	1000
5/2/10	16:00	5.30	100	Clear	4.78	0.396	0.37	6.5	14.87	157.0	na	na	1000
5/2/10	16:10	5.31	100	Clear	4.77	0.394	0.32	6.3	14.79	153.9	na	na	1000
5/2/10	16:20	5.30	100	Clear	4.80	0.402	0.30	4.9	15.38	150.1	na	na	1000
5/2/10	16:30	5.32	100	Clear	4.78	0.390	0.25	5.2	14.06	148.7	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	16:40	5.34	100	Clear	4.79	0.392	0.28	5.0	14.24	146.9	na	na	1000
5/2/10	16:50	5.33	100	Clear	4.78	0.395	0.26	4.4	14.18	145.3	na	na	1000
5/2/10	17:00	5.34	100	Clear	4.78	0.393	0.25	4.1	14.10	144.9	na	na	1000

Analysis Records

Colle	Date	Time	Anal Meth	Desc of Ar	Pres	Cour	Type	Requ	Com	Chai

✓	5/2/10	17:10	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	17:10	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	17:10	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT3709	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT37	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	5/1/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

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)
4/30/10	14:55	13.57	100	Clear	5.39	0.165	8.34	2.5	12.31	208.7	na	na	0
4/30/10	15:05	14.31	100	Clear	4.24	0.161	6.89	3.1	12.64	222.3	na	na	1000
4/30/10	15:15	14.75	100	Clear	5.20	0.154	6.48	4.0	12.75	228.5	na	na	1000
4/30/10	15:25	14.75	100	Clear	5.19	0.156	6.38	5.7	12.65	232.7	na	na	1000
4/30/10	15:35	14.75	100	Clear	5.19	0.155	6.39	5.3	12.68	233.1	na	na	1000
4/30/10	15:45	14.75	100	Clear	5.19	0.155	6.37	5.0	12.46	235.8	na	na	1000
4/30/10	15:55	14.75	100	Clear	5.20	0.158	6.31	4.2	12.41	237.5	na	na	1000
4/30/10	16:05	14.75	100	Clear	5.28	0.164	6.26	3.4	12.42	239.3	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - 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)
4/30/10	16:10	14.75	100	Clear	5.19	0.167	6.24	2.6	12.43	238.9	na	na	500

Analysis Records

Collecte	Date	Time	Analysis Method	Descript of Analy	Preserva	Count	Type	Require	Commer	Chain#

✓	4/30/10	16:10	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	16:10	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	16:10	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

~7.05 liters per well volume

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4009	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT40	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	5/1/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

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)
4/30/10	12:15	17.82	100	Clear	6.56	0.627	9.95	4.2	12.55	145.6	na	na	0
4/30/10	12:25	17.99	100	Clear	6.40	0.712	8.98	2.2	13.39	151.4	na	na	1000
4/30/10	12:35	17.99	100	Clear	6.42	0.742	9.28	1.2	13.96	153.3	na	na	1000
4/30/10	12:45	17.99	100	Clear	6.41	0.755	8.81	3.4	14.20	155.5	na	na	1000
4/30/10	12:55	17.99	100	Clear	6.37	0.700	9.79	1.5	13.45	159.3	na	na	1000
4/30/10	13:05	17.99	100	Clear	6.31	0.686	10.28	1.6	13.39	163.5	na	na	1000
4/30/10	13:15	17.99	100	Clear	6.29	0.675	10.06	1.5	13.48	164.9	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	4/30/10	13:15	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	13:15	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	13:15	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

4.74 liters per well volume

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4509	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT45	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John King
WBS Code #		**Concentration**	-Select-	**Modified Date**	5/2/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	11:40	69.98	100	Clear	7.24	0.586	5.31	7.4	15.25	138.0	na	na	0
5/2/10	11:50	71.70	100	Clear	6.90	0.524	1.34	8.4	15.27	133.1	na	na	1000
5/2/10	12:00	72.70	100	Clear	6.77	0.482	0.93	1.5	15.23	127.0	na	na	1000
5/2/10	12:10	73.24	100	Clear	6.63	0.439	1.17	0.50	15.40	121.6	na	na	1000
5/2/10	12:20	73.99	100	Clear	6.60	0.422	1.72	7.7	15.62	118.8	na	na	1000
5/2/10	12:30	74.31	100	Clear	6.62	0.423	1.80	21	16.35	116.7	na	na	1000
5/2/10	12:40	74.70	100	Clear	6.62	0.427	1.77	23	16.73	114.2	na	na	1000
5/2/10	12:50	74.97	100	Clear	16.97	0.431	1.70	23	16.96	111.3	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	13:00	75.28	100	Clear	6.62	0.438	1.66	17	17.12	106.2	na	na	1000
5/2/10	13:10	75.44	100	Clear	6.63	0.442	1.55	14	17.24	104.6	na	na	1000
5/2/10	13:20	75.69	100	Clear	6.63	0.447	1.60	12	17.05	104.3	na	na	1000
5/2/10	13:30	75.75	100	Clear	6.63	0.448	1.53	11	16.90	100.1	na	na	1000
5/2/10	13:40	75.83	100	Clear	6.64	0.449	1.52	9.6	16.96	99.8	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/2/10	13:50	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	13:50	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	5/2/10	13:50	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

Total depth on well is indicated as 80', Sample info has it labeled as 84'.

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4609	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT46	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	5/1/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

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)
4/30/10	10:10	55.82	100	Slightly Turbid	6.35	0.662	5.86	55	13.08	119.3	na	na	0
4/30/10	10:20	55.84	100	Slightly Turbid	6.22	0.671	2.05	55	13.57	105.5	na	na	1000
4/30/10	10:30	55.85	100	Slightly Turbid	6.19	0.667	1.09	31	13.07	97.7	na	na	1000
4/30/10	10:40	55.85	100	Clear	6.18	0.660	0.83	23	13.07	95.0	na	na	1000
4/30/10	10:50	55.85	100	Clear	6.18	0.655	0.68	15	12.99	93.1	na	na	1000
4/30/10	11:00	55.85	100	Clear	6.18	0.651	0.59	11	12.97	92.0	na	na	1000
4/30/10	11:10	55.85	100	Clear	6.18	0.651	0.51	10	13.14	90.6	na	na	1000
4/30/10	11:20	55.85	100	Clear	6.19	0.652	0.54	9.7	13.19	90.2	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - 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)
4/30/10	11:30	55.85	100	Clear	6.19	0.652	0.48	9.6	13.27	89.4	na	na	1000

Analysis Records

Colle	Date	Time	Analy Meth	Desc of An	Prese	Coun	Type	Requ	Comm	Chain

✓	4/30/10	11:30	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	11:30	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	11:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

7.52 liters per well volume

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT4709	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT47	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	John King	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	4/30/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

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)
4/30/10	15:40	7.82	100	Clear	3.28	1.064	7.45	9.3	12.63	162.3	na	na	0
4/30/10	15:50	7.83	100	Clear	3.34	1.056	1.22	7.7	13.05	157.5	na	na	1000
4/30/10	16:00	7.83	100	Clear	3.38	1.097	0.91	5.3	14.58	162.8	na	na	1000
4/30/10	16:10	7.85	100	Clear	3.36	1.050	0.45	9.3	13.03	161.8	na	na	1000
4/30/10	16:20	7.83	100	Clear	3.37	1.055	0.41	10	13.35	159.8	na	na	1000
4/30/10	16:30	7.85	100	Clear	3.38	1.059	0.40	9.7	13.57	158.0	na	na	1000
4/30/10	16:40	7.84	100	Clear	3.38	1.063	0.38	8.8	13.65	157.8	na	na	1000
4/30/10	16:50	7.84	100	Clear	3.38	1.066	0.37	8.9	13.72	157.6	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - 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)
4/30/10	17:00	7.84	100	Clear	3.38	1.068	0.37	7.4	13.79	157.2	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservativ	Count	Type	Requiremen	Comments	Chain#

✓	4/30/10	17:10	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	17:10	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-1
✓	4/30/10	17:10	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-1

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUND WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13GWT5108	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13MWT51	**Created Date**	4/5/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	John Wright
WBS Code #		**Concentration**	Not known	**Modified Date**	5/4/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	09:25	3.02	100	Slightly Turbid	6.65	0.223	4.60	50	12.78	207.7	na	na	0
5/2/10	09:35	3.15	100	Slightly Turbid	6.65	0.198	4.36	33	13.07	210.9	na	na	1000
5/2/10	09:45	3.15	100	Clear	6.64	0.194	4.31	25	13.39	212.3	na	na	1000
5/2/10	09:55	3.15	100	Clear	6.64	0.193	4.39	22	13.28	212.4	na	na	1000
5/2/10	10:05	3.15	100	Clear	6.64	0.193	4.39	21	13.27	213.0	na	na	1000
5/2/10	10:15	3.15	100	Clear	6.65	0.193	4.37	20	13.35	212.8	na	na	1000
5/2/10	10:25	3.15	100	Clear	6.67	0.194	4.32	19	13.44	212.3	na	na	1000
5/2/10	10:35	3.15	100	Clear	6.68	0.195	4.35	19	13.37	211.9	na	na	1000

Tetra Tech NUS, Inc.

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
5/2/10	10:45	3.15	100	Clear	6.69	0.196	4.27	19	13.60	212.3	na	na	1000
5/2/10	10:55	3.27	200	Clear	6.69	0.191	4.62	23	12.35	213.5	na	na	2000
5/2/10	11:05	3.27	200	Clear	6.64	0.191	4.59	21	12.42	214.1	na	na	2000
5/2/10	11:15	3.27	200	Clear	6.69	0.192	4.62	20	12.37	212.5	na	na	2000
5/2/10	11:25	3.27	200	Clear	6.69	0.191	4.66	19	12.27	212.9	na	na	2000
5/2/10	11:35	3.25	100	Clear	6.69	0.193	4.41	19	12.64	213.0	na	na	1000

5/2/10	11:45	3.22	100	Clear	6.69	0.193	4.45	18	12.65	212.7	na	na	1000
5/2/10	11:55	3.22	100	Clear	6.70	0.194	4.37	18	12.80	212.3	na	na	1000
5/2/10	12:05	3.22	100	Clear	6.71	0.194	4.41	19	12.76	211.5	na	na	1000
5/2/10	12:15	3.22	100	Clear	6.71	0.194	4.39	17	12.81	211.3	na	na	1000
5/2/10	12:25	3.22	100	Clear	6.72	0.195	4.40	17	12.75	210.7	na	na	1000
5/2/10	12:35	3.22	100	Clear	6.72	0.194	4.39	17	12.71	210.8	na	na	1000
5/2/10	12:45	3.22	100	Clear	6.71	0.193	4.42	19	12.64	210.7	na	na	1000
5/2/10	12:55	3.22	100	Clear	6.71	0.194	4.33	18	12.80	210.6	na	na	1000
5/2/10	13:05	3.22	100	Clear	6.71	0.195	4.38	18	12.84	210.6	na	na	1000
5/2/10	13:15	3.22	100	Clear	6.72	0.195	4.47	18	12.88	208.8	na	na	1000
5/2/10	13:25	3.22	100	Clear	6.71	0.195	4.44	18	12.88	207.9	na	na	1000

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/2/10	13:25	SW-846 8330	Explosives	4°C	6	Glass - Amber	1L	Run MS/MSD	ED00000120-1
✓	5/2/10	13:25	SW-846 8330 Modified	RDX Degradation Products	4°C	6	Glass - Amber	1L	Run MS/MSD	ED00000120-1
✓	5/2/10	13:25	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	3	Plastic - PE	500ml	Run MS/MSD	ED00000120-1

General Observations and Notes

-sample volume collected after purging well for 4 hour without turbidity achieving >10 NTU. MS/MSD volume and Field Duplicate FD05021001 collected from this location.

- End of Report -

APPENDIX A.2

SWMU 13

SURFACE WATER SAMPLE LOG SHEETS

ROUND 10

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW1106	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW11	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Sample Collection Records

Date	5/3/10	**Color**	amber	**Temp (C)**	20.60
Time	15:00	**pH (S.U.)**	7.15	**ORP (mV)**	299.0
Depth (ft.)	.5'	**S.C. (mS/cm)**	1.038	**Salinity (%)**	na
Method		**DO (mg/L)**	3.90		
MS/MSD Collected		**Turbidity (NTUs)**	130		
Duplicate Collected	N				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	15:00	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	15:00	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	15:00	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW1409	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW14	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Sample Collection Records

Date	5/3/10	**Color**	slightly turbid	**Temp (C)**	16.79
Time	17:00	**pH (S.U.)**	7.67	**ORP (mV)**	279.2
Depth (ft.)	0.8	**S.C. (mS/cm)**	0.279	**Salinity (%)**	na
Method		**DO (mg/L)**	6.43		
MS/MSD Collected		**Turbidity (NTUs)**	25		
Duplicate Collected	N				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	17:00	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	17:00	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	17:00	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW1509	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW15	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Sample Collection Records

Date	5/3/10	**Color**	slightly turbid	**Temp (C)**	16.11
Time	16:35	**pH (S.U.)**	7.37	**ORP (mV)**	273.5
Depth (ft.)	0.3	**S.C. (mS/cm)**	0.179	**Salinity (%)**	na
Method		**DO (mg/L)**	5.75		
MS/MSD Collected		**Turbidity (NTUs)**	32		
Duplicate Collected	N				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	16:35	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	16:35	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	16:35	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW1609	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW16	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Sample Collection Records

Date	5/3/10	**Color**	clear	**Temp (C)**	16.47
Time	16:15	**pH (S.U.)**	7.55	**ORP (mV)**	266.9
Depth (ft.)	1.0	**S.C. (mS/cm)**	0.176	**Salinity (%)**	na
Method		**DO (mg/L)**	6.28		
MS/MSD Collected		**Turbidity (NTUs)**	17		
Duplicate Collected	N				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	16:15	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	16:15	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	16:15	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW1908	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW19	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Sample Collection Records

Date	5/3/10	**Color**	clear	**Temp (C)**	15.40
Time	18:30	**pH (S.U.)**	7.30	**ORP (mV)**	207.0
Depth (ft.)	0.3	**S.C. (mS/cm)**	0.600	**Salinity (%)**	na
Method		**DO (mg/L)**	7.89		
MS/MSD Collected		**Turbidity (NTUs)**	5.3		
Duplicate Collected	N				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	18:30	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	18:30	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	18:30	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW2008	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW20	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Sample Collection Records

Date	5/3/10	**Color**	clear	**Temp (C)**	15.61
Time	17:50	**pH (S.U.)**	7.64	**ORP (mV)**	219.9
Depth (ft.)	0.5	**S.C. (mS/cm)**	0.198	**Salinity (%)**	na
Method		**DO (mg/L)**	7.32		
MS/MSD Collected		**Turbidity (NTUs)**	12		
Duplicate Collected	N				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	17:50	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	17:50	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	17:50	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW2208	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW22	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	Jason Trentini
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/3/10
QA Sample Type				**Printed By**	Joseph Lucas
Status	Complete			**Printed Date**	5/19/10

Sample Collection Records

Date	5/3/10	**Color**	clear	**Temp (C)**	16.24
Time	17:15	**pH (S.U.)**	7.59	**ORP (mV)**	226.9
Depth (ft.)	0.4	**S.C. (mS/cm)**	0.291	**Salinity (%)**	na
Method		**DO (mg/L)**	6.10		
MS/MSD Collected		**Turbidity (NTUs)**	17		
Duplicate Collected	N				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	17:15	SW-846 8330	Explosives	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	17:15	SW-846 8330 Modified	RDX Degradation Products	4°C	2	Glass - Amber	1L		ED00000120-2
✓	5/3/10	17:15	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	1	Plastic - PE	500ml		ED00000120-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLING LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Sample ID #**	13SW3009	**Created By**	John Wright
TtNUS Project #	112G00041	**Sample Location ID**	13SW30	**Created Date**	4/19/10
Task/Contract #	0377	**Sampled By**	Jason Trentini	**Modified By**	John Wright
WBS Code #	0000.TP0050300	**Concentration**	-Select-	**Modified Date**	5/4/10
QA Sample Type	Field Duplicat & MS/MSD			**Printed By**	Joseph Lucas
				Printed Date	5/19/10
Status	Complete				

Sample Collection Records

Date	5/3/10	**Color**	clear	**Temp (C)**	18.95
Time	15:40	**pH (S.U.)**	7.75	**ORP (mV)**	242.8
Depth (ft.)	1.0	**S.C. (mS/cm)**	0.257	**Salinity (%)**	na
Method		**DO (mg/L)**	6.01		
MS/MSD Collected	MS/MSD	**Turbidity (NTUs)**	9.6		
Duplicate Collected	Y				
Duplicate ID					

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	5/3/10	15:40	SW-846 8330	Explosives	4°C	6	Glass - Amber	1L	Run MS/MSD	ED00000120-2
✓	5/3/10	15:40	SW-846 8330 Modified	RDX Degradation Products	4°C	6	Glass - Amber	1L	Run MS/MSD	ED00000120-2
✓	5/3/10	15:40	EPA 353.2	Nitrate + Nitrite (as N)	4°C/H2SO4	3	Plastic - PE	500ml	Run MS/MSD	ED00000120-2

General Observations and Notes

No Notes

- End of Report -

APPENDIX A.3

SWMU 13

CHAIN OF CUSTODY RECORDS

ROUND 10

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Joseph Lucas	**Created By**	Jason Trentini
TtNUS Project #	112G00041	**PM Telephone**		**Created Date**	5/3/10
Task/Contract #	0377	**Field Op Leader (FOL)**	Jason Trentini	**Modified By**	
WBS Code #	0000.TP0050300	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000120-1	**Carrier**	Federal Express	**Printed By**	Joseph Lucas
		Carrier/Waybill No.	863138883663	**Printed Date**	5/19/10

Chain of Custody Information

Chain of Custody #	**ED00000120-1**	**Lab Name**	Centauri Labs	**Relenquished By**	Jason Trentini
Carrier	Federal Express	**Address**	7210 Corporate Court	**Date**	05/03/2010
Carrier/Waybill No.	863138883663	**City, State, Zip**	Frederick, MD 21703	**Time**	09:00
		Lab Contact	Dave Howell	**Received By:**	Federal Express
		Lab Telephone	540-548-7303	**Date**	5/3/10
				Time	09:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
4/30/10	13GWT1410	11:35	SW-846 8330	Explosives	13MWT14	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT1410	11:35	SW-846 8330 Modified	RDX Degradation Products	13MWT14	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT1410	11:35	EPA 353.2	Nitrate + Nitrite (as N)	13MWT14	GW	4° C/H2SO4	1	Plastic - PE	500ml	
4/30/10	13GWT3109	14:50	SW-846 8330	Explosives	13MWT31	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT3109	14:50	SW-846 8330 Modified	RDX Degradation Products	13MWT31	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT3109	14:50	EPA 353.2	Nitrate + Nitrite (as N)	13MWT31	GW	4° C/H2SO4	1	Plastic - PE	500ml	
4/30/10	13GWT3709	16:10	SW-846 8330	Explosives	13MWT37	GW	4°C	2	Glass - Amber	1L	
			SW-846	RDX							

4/30/10	13GWT3709	16:10	8330 Modified	Degradation Products	13MWT37	GW	4°C	2	Glass - Amber	1L	

Page 1 of 3

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
4/30/10	13GWT3709	16:10	EPA 353.2	Nitrate + Nitrite (as N)	13MWT37	GW	4° C/H2SO4	1	Plastic - PE	500ml	
4/30/10	13GWT4009	13:15	SW-846 8330	Explosives	13MWT40	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT4009	13:15	SW-846 8330 Modified	RDX Degradation Products	13MWT40	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT4009	13:15	EPA 353.2	Nitrate + Nitrite (as N)	13MWT40	GW	4° C/H2SO4	1	Plastic - PE	500ml	
4/30/10	13GWT4609	11:30	SW-846 8330	Explosives	13MWT46	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT4609	11:30	SW-846 8330 Modified	RDX Degradation Products	13MWT46	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT4609	11:30	EPA 353.2	Nitrate + Nitrite (as N)	13MWT46	GW	4° C/H2SO4	1	Plastic - PE	500ml	
4/30/10	13GWT4709	17:10	SW-846 8330	Explosives	13MWT47	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT4709	17:10	SW-846 8330 Modified	RDX Degradation Products	13MWT47	GW	4°C	2	Glass - Amber	1L	
4/30/10	13GWT4709	17:10	EPA 353.2	Nitrate + Nitrite (as N)	13MWT47	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/1/10	13GWT0110	11:30	SW-846 8330	Explosives	13MWT01	GW	4°C	2	Glass - Amber	1L	
5/1/10	13GWT0110	11:30	SW-846 8330 Modified	RDX Degradation Products	13MWT01	GW	4°C	2	Glass - Amber	1L	
5/1/10	13GWT0110	11:30	EPA 353.2	Nitrate + Nitrite (as N)	13MWT01	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/1/10	13GWT1110	13:40	SW-846 8330	Explosives	13MWT11	GW	4°C	2	Glass - Amber	1L	
5/1/10	13GWT1110	13:40	SW-846 8330 Modified	RDX Degradation Products	13MWT11	GW	4°C	2	Glass - Amber	1L	
5/1/10	13GWT1110	13:40	EPA 353.2	Nitrate + Nitrite (as N)	13MWT11	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/1/10	13GWT1710	15:55	SW-846 8330	Explosives	13MWT17	GW	4°C	2	Glass - Amber	1L	
5/1/10	13GWT1710	15:55	SW-846 8330 Modified	RDX Degradation Products	13MWT17	GW	4°C	2	Glass - Amber	1L	
				Nitrate +			4°		Plastic -		

5/1/10	13GWT1710	15:55	EPA 353.2	Nitrite (as N)	13MWT17	GW	C/H2SO4	1	PE	500ml	
5/2/10	13GWT1310	16:40	SW-846 8330	Explosives	13MWT13	GW	4°C	2	Glass - Amber	1L	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/2/10	13GWT1310	16:40	SW-846 8330 Modified	RDX Degradation Products	13MWT13	GW	4°C	2	Glass - Amber	1L	
5/2/10	13GWT1310	16:40	EPA 353.2	Nitrate + Nitrite (as N)	13MWT13	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/2/10	13GWT2110	10:50	SW-846 8330	Explosives	13MWT21	GW	4°C	2	Glass - Amber	1L	
5/2/10	13GWT2110	10:50	SW-846 8330 Modified	RDX Degradation Products	13MWT21	GW	4°C	2	Glass - Amber	1L	
5/2/10	13GWT2110	10:50	EPA 353.2	Nitrate + Nitrite (as N)	13MWT21	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/2/10	13GWT3409	17:10	SW-846 8330	Explosives	13MWT34	GW	4°C	2	Glass - Amber	1L	
5/2/10	13GWT3409	17:10	SW-846 8330 Modified	RDX Degradation Products	13MWT34	GW	4°C	2	Glass - Amber	1L	
5/2/10	13GWT3409	17:10	EPA 353.2	Nitrate + Nitrite (as N)	13MWT34	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/2/10	13GWT4509	13:50	SW-846 8330	Explosives	13MWT45	GW	4°C	2	Glass - Amber	1L	
5/2/10	13GWT4509	13:50	SW-846 8330 Modified	RDX Degradation Products	13MWT45	GW	4°C	2	Glass - Amber	1L	
5/2/10	13GWT4509	13:50	EPA 353.2	Nitrate + Nitrite (as N)	13MWT45	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/2/10	13GWT5108	13:25	SW-846 8330	Explosives	13MWT51	GW	4°C	6	Glass - Amber	1L	Run MS/MSD
5/2/10	13GWT5108	13:25	SW-846 8330 Modified	RDX Degradation Products	13MWT51	GW	4°C	6	Glass - Amber	1L	Run MS/MSD
5/2/10	13GWT5108	13:25	EPA 353.2	Nitrate + Nitrite (as N)	13MWT51	GW	4° C/H2SO4	3	Plastic - PE	500ml	Run MS/MSD
5/2/10	FD05021001	00:00	EPA 353.2	Nitrate + Nitrite (as N)	QC	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/2/10	FD05021001	00:00	SW-846 8330	Explosives	QC	GW	4°C	2	Glass - Amber	1L	
5/2/10	FD05021001	00:00	SW-846 8330 Modified	RDX Degradation Products	QC	GW	4°C	2	Glass - Amber	1L	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Joseph Lucas	**Created By**	Jason Trentini
TtNUS Project #	112G00041	**PM Telephone**		**Created Date**	5/4/10
Task/Contract #	0377	**Field Op Leader (FOL)**	Jason Trentini	**Modified By**	
WBS Code #	0000.TP0050300	**FOL Phone**		**Modified Date**	
Chain of Custody ID	ED00000120-2	**Carrier**	Federal Express	**Printed By**	Joseph Lucas
		Carrier/Waybill No.	863138883538	**Printed Date**	5/19/10

Chain of Custody Information

Chain of Custody #	**ED00000120-2**	**Lab Name**	Centauri Labs	**Relenquished By**	Jason Trentini
Carrier	Federal Express	**Address**	7210 Corporate Court	**Date**	05/04/2010
Carrier/Waybill No.	863138883538	**City, State, Zip**	Frederick, MD 21703	**Time**	09:00
		Lab Contact	Dave Howell	**Received By:**	Federal Express
		Lab Telephone	540-548-7303	**Date**	5/4/10
				Time	09:00

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/3/10	13GWT0911	13:00	SW-846 8330	Explosives	13MWT09	GW	4°C	2	Glass - Amber	1L	
5/3/10	13GWT0911	13:00	SW-846 8330 Modified	RDX Degradation Products	13MWT09	GW	4°C	2	Glass - Amber	1L	
5/3/10	13GWT0911	13:00	EPA 353.2	Nitrate + Nitrite (as N)	13MWT09	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13GWT1510	13:30	SW-846 8330	Explosives	13MWT15	GW	4°C	2	Glass - Amber	1L	
5/3/10	13GWT1510	13:30	SW-846 8330 Modified	RDX Degradation Products	13MWT15	GW	4°C	2	Glass - Amber	1L	
5/3/10	13GWT1510	13:30	EPA 353.2	Nitrate + Nitrite (as N)	13MWT15	GW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13SW1106	15:00	SW-846 8330	Explosives	13SW11	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1106	15:00	SW-846 8330 Modified	RDX Degradation Products	13SW11	SW	4°C	2	Glass - Amber	1L	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/3/10	13SW1106	15:00	EPA 353.2	Nitrate + Nitrite (as N)	13SW11	SW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13SW1409	17:00	SW-846 8330	Explosives	13SW14	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1409	17:00	SW-846 8330 Modified	RDX Degradation Products	13SW14	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1409	17:00	EPA 353.2	Nitrate + Nitrite (as N)	13SW14	SW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13SW1509	16:35	SW-846 8330	Explosives	13SW15	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1509	16:35	SW-846 8330 Modified	RDX Degradation Products	13SW15	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1509	16:35	EPA 353.2	Nitrate + Nitrite (as N)	13SW15	SW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13SW1609	16:15	SW-846 8330	Explosives	13SW16	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1609	16:15	SW-846 8330 Modified	RDX Degradation Products	13SW16	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1609	16:15	EPA 353.2	Nitrate + Nitrite (as N)	13SW16	SW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13SW1908	18:30	SW-846 8330	Explosives	13SW19	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1908	18:30	SW-846 8330 Modified	RDX Degradation Products	13SW19	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW1908	18:30	EPA 353.2	Nitrate + Nitrite (as N)	13SW19	SW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13SW2008	17:50	SW-846 8330	Explosives	13SW20	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW2008	17:50	SW-846 8330 Modified	RDX Degradation Products	13SW20	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW2008	17:50	EPA 353.2	Nitrate + Nitrite (as N)	13SW20	SW	4° C/H2SO4	1	Plastic - PE	500ml	
5/3/10	13SW2208	17:15	SW-846 8330	Explosives	13SW22	SW	4°C	2	Glass - Amber	1L	
5/3/10	13SW2208	17:15	SW-846 8330 Modified	RDX Degradation Products	13SW22	SW	4°C	2	Glass - Amber	1L	
				Nitrate +			4°		Plastic -		

5/3/10	13SW2208	17:15	EPA 353.2	Nitrite (as N)	13SW22	SW	C/H2SO4	1	PE	500ml	
5/3/10	13SW3009	15:40	SW-846 8330	Explosives	13SW30	SW	4°C	6	Glass - Amber	1L	Run MS/MSD

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

MNA Sampling - SWMU13 (Round 10) - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
5/3/10	13SW3009	15:40	SW-846 8330 Modified	RDX Degradation Products	13SW30	SW	4°C	6	Glass - Amber	1L	Run MS/MSD
5/3/10	13SW3009	15:40	EPA 353.2	Nitrate + Nitrite (as N)	13SW30	SW	4° C/H2SO4	3	Plastic - PE	500ml	Run MS/MSD
5/3/10	FD05031001	00:00	SW-846 8330 Modified	RDX Degradation Products	QC	SW	4°C	2	Glass - Amber	1L	
5/3/10	FD05031001	00:00	SW-846 8330	Explosives	QC	SW	4°C	2	Glass - Amber	1L	
5/3/10	FD05031001	00:00	EPA 353.2	Nitrate + Nitrite (as N)	QC	SW	4° C/H2SO4	1	Plastic - PE	500ml	

General Observations and Notes

Extra volume for MS/MSD generated at 13SW3009.

- End of Report -

APPENDIX B

SWMU 13
EQUIPMENT CALIBRATION FORMS
ROUND 10

JAT

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

INSTRUMENT NAME/MODEL: LaMotte 2020 turbidimeter

SITE NAME: Crane GW (12,13)

MANUFACTURER: Lamotte

PROJECT No.: 112G00041

SERIAL NUMBER: 1541-0100

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		
4-23-10	Turb-2	JRK	0.70	1.00	10.0	10.0	(1) 8184-P8914 41 (10.0)	8184-P890791
4-24-10	"	"	0.85	1.00	9.9	10.0	"	"
4-25-10	"	"	1.1	1.00	10.0	10.0	"	"
4-26-10	"	"	1.3	1.00	9.7	10.0	"	"
4-27-10	"	"	0.80	1.00	10.0	10.0	"	"
4-28-10	"	"	0.75	1.00	9.4	10.0	"	"
4-29-10	"	"	1.2	1.00	10.0	10.0	"	"
4-30-10	"	"	0.80	1.00	10.0	10.0	"	"
4-31-10	"	"	1.1	1.00	9.8	10.0	"	"
5-1-10	"	"	1.2	1.00	9.7	10.0	"	"
5-2-10	"	"	0.90	1.00	10.0	10.0	"	"
5-3-10	"	"	0.75	1.00	10.0	10.0	"	"

JAT

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

SITE NAME: Crane GW(12,13)

PROJECT No.: 112G00091

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 08010195 2

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
4-23-10	JRK	7.05	3.92	1.096	8.77			7.00	4.00	1.409	8.84		NA	
4-23-10	JRK	6.96	3.96	1.389	7.31									
4-24-10	JRK	7.04	4.06	1.465	6.67			7.00	4.00	1.409	7.65			
4-24-10	JRK	7.02	4.04	1.412	7.81									
4-25-10	JRK	6.99	3.99	1.403	8.33			7.00	4.00	1.409	9.03			
4-25-10	JRK	7.03	4.10	13.89	8.51									
4-26-10	JRK	7.02	4.03	1.297	9.59			7.00	4.00	1.409	9.29			
4-26-10	JRK	7.04	4.01	1.340	8.92									
4-27-10	JRK	7.01	3.98	1.371	10.55			7.00	4.00	1.409	11.30			
4-27-10	JRK	7.05	4.10	1.340	10.68			~~7.00~~	~~4.00~~	~~1.409~~	~~9.35~~			
4-28-10	JRK	7.07	4.06	1.293	10.44			7.00	4.00	1.409	9.35			
4-28-10	JRK	7.02	4.04	1.372	10.26									
4-29-10	JRK	7.00	4.02	1.442	10.12			7.00	4.00	1.409	10.48			
4-29-10	JRK	7.01	4.03	1.422	10.41									
4-30-10	JAT	7.03	4.01	1.528				7.00	4.00	1.409				
4-30-10	JRK	7.00	3.98	1.542	9.34									

JAT

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

SITE NAME: crane GW(12,13)

PROJECT No.: 112G00041

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 08D101952

Date of Calibration	Person Performing Calibration	INITIAL READINGS						FINAL READINGS					Calibration Standard (Lot No.)	Remarks and Comments
		PH 7	PH 4	COND	DO	ORP		PH 7	PH 4	COND	DO	ORP		
5-1-10	JRK	6.96	4.07	1.486	6.48			7.00	4.00	1.409	7.73			
5-1-10	"	7.01	3.92	1.455	8.34									
5-2-10	"	7.04	3.99	1.436	9.61			7.00	4.00	1.409	8.20			
5-2-10	"	7.00	4.02	1.459	8.17									
5-3-10	"	7.00	3.92	1.382	7.96			7.00	4.00	1.409	9.61			

JRK

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

INSTRUMENT NAME/MODEL: 2020 turbidimeter

SITE NAME: CRANE GW (12-13)

MANUFACTURER: LaMotte

PROJECT No.: 112G00041

SERIAL NUMBER: 3675-4002

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		
4-23-10	TURB-1	JRK	1.54	1.00	9.42	10.0	(1) 8184-P78 3996	(10.0) 8184-P890791
4-24-10	"	"	0.95	1.00	10.0	10.0	"	"
4-25-10	"	"	1.3	1.00	10.0	10.0	"	"
4-26-10	"	"	0.75	1.00	10.0	10.0	"	"
4-27-10	"	"	0.90	1.00	11.0	10.0	"	"
4-28-10	"	"	0.85	1.00	10.0	10.0	"	"
4-29-10	"	"	0.75	1.00	10.0	10.0	"	"
4-30-10	"	"	0.85	1.00	10.0	10.0	"	"
4-31-10	"	"	1.00	1.00	10.0	10.0	"	"
5-1-10	"	"	0.95	1.00	9.57	10.0	"	"
5-2-10	"	"	1.00	1.00	9.98	10.0	"	"
5-3-10	"	"	0.70	1.00	9.9	10.0	"	"

JRK

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

SITE NAME: Crane GW(12,13)

PROJECT No.: 112G00041

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 01G0784 A1

Date of Calibration	Person Performing Calibration	INITIAL READINGS						FINAL READINGS					Calibration Standard (Lot No.)	Remarks and Comments
		PH 7	PH 4	COND	DO	ORP		PH 7	PH 4	COND	DO	ORP		
4-23-10	JRK	7.02	3.95	1.139	8.01			7.00	4.00	1.409	8.44		NA	
4-23-10	JRK	7.06	4.01	1.342	8.55									
4-24-10	JRK	7.08	4.02	1.430	8.46			7.00	4.00	1.409	8.25			
4-24-10	JRK	7.05	4.06	1.392	8.36									
4-25-10	JRK	7.03	3.95	1.386	8.48			7.00	4.00	1409	8.55			
4-25-10	JRK	7.10	4.04	1.352	9.32									
4-26-10	JRK	7.01	4.02	1.310	9.22			7.00	4.00	1.409	9.00			
4-26-10	JRK	7.03	4.08	1.286	10.04									
4-27-10	JRK	6.99	3.99	1.358	10.43			7.00	4.00	1.409	10.01			
4-27-10	JRK	7.00	3.95	1.362	9.98									
4-28-10	JRK	7.03	4.07	1.405	8.63			7.00	4.00	1.409	9.35			
4-28-10	JRK	7.03	4.02	1.371	8.10									
4-29-10	JRK	6.98	4.05	1.446	7.95			7.00	4.00	1409	8.32			
4-29-10	JRK	6.99	4.02	1.431	8.38									
4-30-10	JRK	7.07	4.12	1.531	7.34			7.00	4.00	1.409	6.43			
4-30-10	JRK	7.03	4.02	1.433	8.99									

JRK

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE

SITE NAME: Crane GW(12,13)

PROJECT No.: 112G00041

INSTRUMENT NAME/MODEL: YSI

MANUFACTURER: YSI

SERIAL NUMBER: 01G0784 A1

Date of Calibration	Person Performing Calibration	INITIAL READINGS						FINAL READINGS					Calibration Standard (Lot No.)	Remarks and Comments
		PH 7	PH 4	COND	DO	ORP		PH 7	PH 4	COND	DO	ORP		
5-1-10	JRK	6.93	4.08	1.473	7.39			7.00	4.00	1.409	6.18			
5-1-10	"	6.90	4.06	1.321	8.51									
5-2-10	"	7.02	4.06	1.377	8.98			7.00	4.00	1.409	9.04			
5-2-10	"	7.03	4.03	1.490	9.67									
5-3-10	"	7.04	3.90	1.410	8.41			7.00	4.00	1.409	7.28			

APPENDIX C

SWMU 13
HEALTH AND SAFETY DOCUMENTATION
ROUND 10

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: **Periodic Examination**

EMPLOYEE:	**King, John R.**	**COMPANY:**	**TT/NUS**
SSN:	**XXX-XX-6009**	**POSITION:**	**Technician**
DATE OF EXAM:	**12/30/2008**	**LOCATION:**	**TT/NUS-Pittsburgh**
EXPIRATION DATE:	**12/30/2010**	**SITE:**	**Pittsburg**

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: 01/06/09

Signature: Peter P Greaney MD

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

John Ryan King

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 27, 2009

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

John Ryan King

has successfully completed a course of instruction in

SHIPPING HAZARDOUS MATERIALS

prepared by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 27, 2009

Date of Award

Clyde Snyder
Senior Instructor
Health and Safety Training

Matthew M. Soltis, CIH, CSP
Manager
Health and Safety

CERTIFICATE OF TRAINING

This Certifies that

JOHN KING

successfully completed 40 hours of instruction in

HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Presented by the Center for Safety and Environmental Management

in compliance with OSHA standard 29 CFR 1910.120

Frank V. Quarato/Instructor

September 22, 2006

Completion Date

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: **Periodic Examination**

EMPLOYEE:	**Trentini, Jason**	**COMPANY:**	**TT/NUS**
ID:		**POSITION:**	**Environmental Scientist**
DATE OF EXAM:	**01/13/2010**	**LOCATION:**	**TT/NUS-Pittsburgh**
EXPIRATION DATE:	**01/13/2012**	**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?	☐	X	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	X	☐

STATUS

1. X **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: 01/19/10

Signature: Peter P Greaney MD

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Jason Trentini

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 27, 2009

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Jason Trentini

has successfully completed a course of instruction in

SHIPPING HAZARDOUS MATERIALS

prepared by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 27, 2009

Date of Award

Clyde Snyder
Senior Instructor
Health and Safety Training

Matthew M. Soltis, CIH, CSP
Manager
Health and Safety

MFG, Inc.

Certificate of Completion

This is to certify that

Jason Trentini

has successfully completed 40 hours of equivalent training in

Environmental Health and Safety for Hazardous Waste Site Operations
(OSHA Regulation 29 CFR 1910.120)

M
F
G
consulting
scientists and
engineers

This 10th day of January, 2000.

Tory Fravel

Tory Fravel
Corporate Health and Safety Program Manager

APPENDIX D

SWMU 13
ANALYTICAL DATA
ROUND 10

APPENDIX D.1

SWMU 13

ROUND 10

SUMMARY OF GROUNDWATER WATER

ANALYTICAL RESULTS

APPENDIX D

NSA CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 10
PENNSYLVANIA UPPER AND LOWER WATER BEARING ZONE
SWMU 13 (MINE FILL B)

SITE	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**
AOC	**PUZ-UPGRAD**	**PUZ**	**PUZ**	**PUZ**	**PUZ**	**PUZ-UPGRAD**	**PUZ**
SWMU	**13**	**13**	**13**	**13**	**13**	**13**	**13**
PHASE							
LOCATION	**13MWT01**	**13MWT09**	**13MWT11**	**13MWT13**	**13MWT14**	**13MWT15**	**13MWT17**
NSAMPLE	**13GWT0110**	**13GWT0911**	**13GWT1110**	**13GWT1310**	**13GWT1410**	**13GWT1510**	**13GWT1710**
MATRIX	**GW**	**GW**	**GW**	**GW**	**GW**	**GW**	**GW**
SACODE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
SAMPLE DATE	**20100501**	**20100503**	**20100501**	**20100502**	**20100430**	**20100503**	**20100501**
Explosives (ug/L)							
1,3,5-TRINITROBENZENE	0.2 U	0.216 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DINITROBENZENE	0.2 U	0.942 J	0.272 J	0.2 U	0.2 U	0.2 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.2 U	5.07 J	9.9	0.2 U	0.2 U	0.2 U	0.091 J
2,4-DIAMINO-6-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-DINITROTOLUENE	0.2 U	0.458 J	1.18	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DINITROTOLUENE	0.2 U	3.42 J	1.11 J	0.2 U	0.2 U	0.2 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE	0.2 U	5.38 J	4.67 J	0.2 U	0.2 U	0.2 U	0.2 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-AMINO-2,6-DINITROTOLUENE	0.2 U	13.9 J	11	0.2 U	0.2 U	0.2 U	0.289 J
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
DNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
HMX	0.4 U	48.6 J	25.6	4.31	0.4 U	0.4 U	50.1 J
MNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
RDX	0.4 U	559 J	253	10.2	1.26 J	0.4 U	461 J
TETRYL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
TNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	0.16	50	0.092	0.36	0.1	0.11	0.15

APPENDIX D

NSA CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 10
PENNSYLVANIA UPPER AND LOWER WATER BEARING ZONE
SWMU 13 (MINE FILL B)

SITE	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**
AOC	**PUZ**	**PUZ**	**PUZ**	**PUZ**	**PUZ**	**PLZ**	**PLZ**
SWMU	**13**	**13**	**13**	**13**	**13**	**13**	**13**
PHASE							
LOCATION	**13MWT21**	**13MWT31**	**13MWT34**	**13MWT37**	**13MWT40**	**13MWT45**	**13MWT46**
NSAMPLE	**13GWT2110**	**13GWT3109**	**13GWT3409**	**13GWT3709**	**13GWT4009**	**13GWT4509**	**13GWT4609**
MATRIX	**GW**	**GW**	**GW**	**GW**	**GW**	**GW**	**GW**
SACODE	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**	**NORMAL**
SAMPLE DATE	**20100430**	**20100430**	**20100502**	**20100430**	**20100430**	**20100502**	**20100430**
Explosives (ug/L)							
1,3,5-TRINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE	0.0814 J	0.2 U	0.2 U	0.293 J	0.415 J	0.2 U	0.2 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-AMINO-2,6-DINITROTOLUENE	0.181 J	0.2 U	0.221 J	0.2 U	0.2 U	0.2 U	0.2 U
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
DNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
HMX	46.1 J	7.07	18.5 J	82.9 J	81.2 J	0.4 U	0.4 U
MNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
RDX	24.7 J	12.1	213 J	902	116 J	0.4 U	0.4 U
TETRYL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
TNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Miscellaneous Parameters (mg/L)							
NITRITE/NITRATE-N	0.1	0.11	0.24	0.45	0.41	0.074	0.059

APPENDIX D

NSA CRANE
SUMMARY OF ANALYTIC RESULTS - GROUNDWATER ROUND 10
PENNSYLVANIA UPPER AND LOWER WATER BEARING ZONE
SWMU 13 (MINE FILL B)

SITE	**MINE FILL B**	**MINE FILL B**	**MINE FILL B**
AOC	**PUZ**	**PUZ**	**PUZ**
SWMU	**13**	**13**	**13**
PHASE			
LOCATION	**13MWT47**	**13MWT51**	**13MWT51**
NSAMPLE	**13GWT4709**	**13GWT5108**	**13GWT5108-D**
MATRIX	**GW**	**GW**	**GW**
SACODE	**NORMAL**	**ORIG**	**DUP**
SAMPLE DATE	**20100430**	**20100502**	**20100502**
Explosives (ug/L)			
1,3,5-TRINITROBENZENE	0.2 U	0.2 U	0.2 U
1,3-DINITROBENZENE	0.2 U	0.2 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.2 U	0.2 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE	0.2 U	0.2 U	0.2 U
2,4-DINITROTOLUENE	0.2 U	0.2 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE	0.2 U	0.2 U	0.2 U
2,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U
4-AMINO-2,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U
DNX	0.4 U	0.4 U	0.4 U
HMX	0.4 U	5 J	4.91
MNX	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.2 U	0.2 U	0.2 U
RDX	0.4 U	26	24.5
TETRYL	0.4 U	0.4 U	0.4 U
TNX	0.4 U	0.4 U	0.4 U
Miscellaneous Parameters (mg/L)			
NITRITE/NITRATE-N	0.05 U	0.28	0.34

APPENDIX D.2

SWMU 13

ROUND 10

SUMMARY OF SURFACE WATER

ANALYTICAL RESULTS

APPENDIX D

NSA CRANE
SUMMARY OF ANALYTIC RESULTS - SURFACE WATER ROUND 10
SWMU 13 (MINE FILL B)

SITE	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B	MINE FILL B
AOC	GULLY	GULLY	GULLY	GULLY	GULLY	GULLY
SWMU	13	13	13	13	13	13
PHASE						
LOCATION	13SW11	13SW/SD14	13SW/SD15	13SW/SD16	13SW/SD19	13SW/SD20
SAMPLE ID	13SW1106	13SW1409	13SW1509	13SW1609	13SW1908	13SW2008
MATRIX	SW	SW	SW	SW	SW	SW
SAMPLE CODE	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
SAMPLE DATE	20100503	20100503	20100503	20100503	20100503	20100503
Explosives (UG/L)						
1,3,5-TRINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE	0.2 U	0.145 J	0.2 U	0.098 J	0.2 U	0.2 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
4-AMINO-2,6-DINITROTOLUENE	0.2 U	0.563 J	0.2 U	0.46 J	0.2 U	0.2 U
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
DNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
HMX	12.6 J	3.23	10.9 J	2.7	0.4 U	0.4 U
MNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
RDX	73.1 J	10.3	35.3 J	8.85	0.4 U	0.4 U
TETRYL	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
TNX	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Miscellaneous Parameters (MG/L)						
NITRITE/NITRATE-N	11	0.86	0.15	0.23	0.34	0.092
Field Parameters						
TEMPERATURE (C)	20.6	16.79	16.11	16.47	15.4	15.61
DISSOLVED OXYGEN (MG/L)	3.9	6.43	5.75	6.28	7.89	7.32
CONDUCTIVITY (MS/CM)	1.038	0.279	0.179	0.176	0.6	0.198
OXIDATION REDUCTION POTENTIAL (MV)	299	279.2	273.5	266.9	207	219.9
TURBIDITY (NTU)	130	25	32	17	5.3	12
PH (S.U.)	7.15	7.67	7.37	7.55	7.3	7.64

APPENDIX D

NSA CRANE
SUMMARY OF ANALYTIC RESULTS - SURFACE WATER ROUND 10
SWMU 13 (MINE FILL B)

SITE	MINE FILL B	MINE FILL B		
AOC	GULLY	MS		
SWMU	13	13		
PHASE				
LOCATION	13SW/SD22	13SW/SD30		
SAMPLE ID	13SW2208	13SW3009	13SW3009-AVG	13SW3009-D
MATRIX	SW	SW	SW	SW
SAMPLE CODE	NORMAL	ORIG	AVG	DUP
SAMPLE DATE	20100503	20100503	20100503	20100503
Explosives (UG/L)				
1,3,5-TRINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DINITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U
2,4,6-TRINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U
2,4-DIAMINO-6-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U
2,4-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DIAMINO-4-NITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U
2,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U
2-AMINO-4,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U
2-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U
3-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U
4-AMINO-2,6-DINITROTOLUENE	0.2 U	0.2 U	0.2 U	0.2 U
4-NITROTOLUENE	0.4 U	0.4 U	0.4 U	0.4 U
DNX	0.4 U	0.4 U	0.4 U	0.4 U
HMX	0.4 U	0.718	0.598	0.478
MNX	0.4 U	0.4 U	0.4 U	0.4 U
NITROBENZENE	0.2 U	0.2 U	0.2 U	0.2 U
RDX	0.408	2.31 J	1.745	1.18 J
TETRYL	0.4 U	0.4 U	0.4 U	0.4 U
TNX	0.4 U	0.4 U	0.4 U	0.4 U
Miscellaneous Parameters (MG/L)				
NITRITE/NITRATE-N	0.05 U	0.054	0.0395	0.05 U
Field Parameters				
TEMPERATURE (C)	16.24	18.95	18.95	NA
DISSOLVED OXYGEN (MG/L)	6.1	6.01	6.01	NA
CONDUCTIVITY (MS/CM)	0.291	0.257	0.257	NA
OXIDATION REDUCTION POTENTIAL (MV)	226.9	242.8	242.8	NA
TURBIDITY (NTU)	17	9.6	9.6	NA
PH (S.U.)	7.59	7.75	7.75	NA

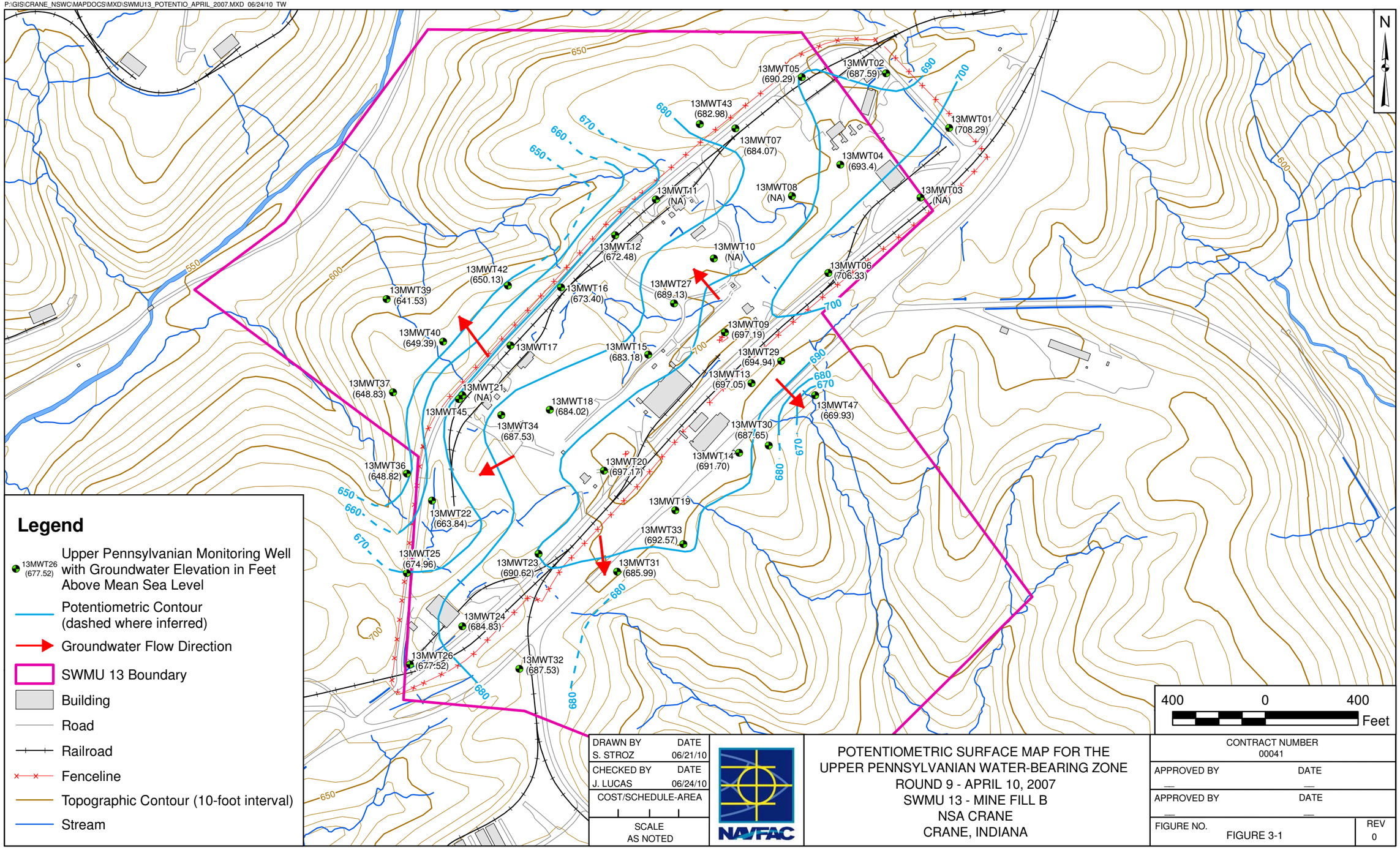
APPENDIX E

SWMU 13

ROUND 9

POTENTIOMETRIC SURFACE MAPS

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU13_POTENTIO_APRIL_2007.MXD 06/24/10 TW



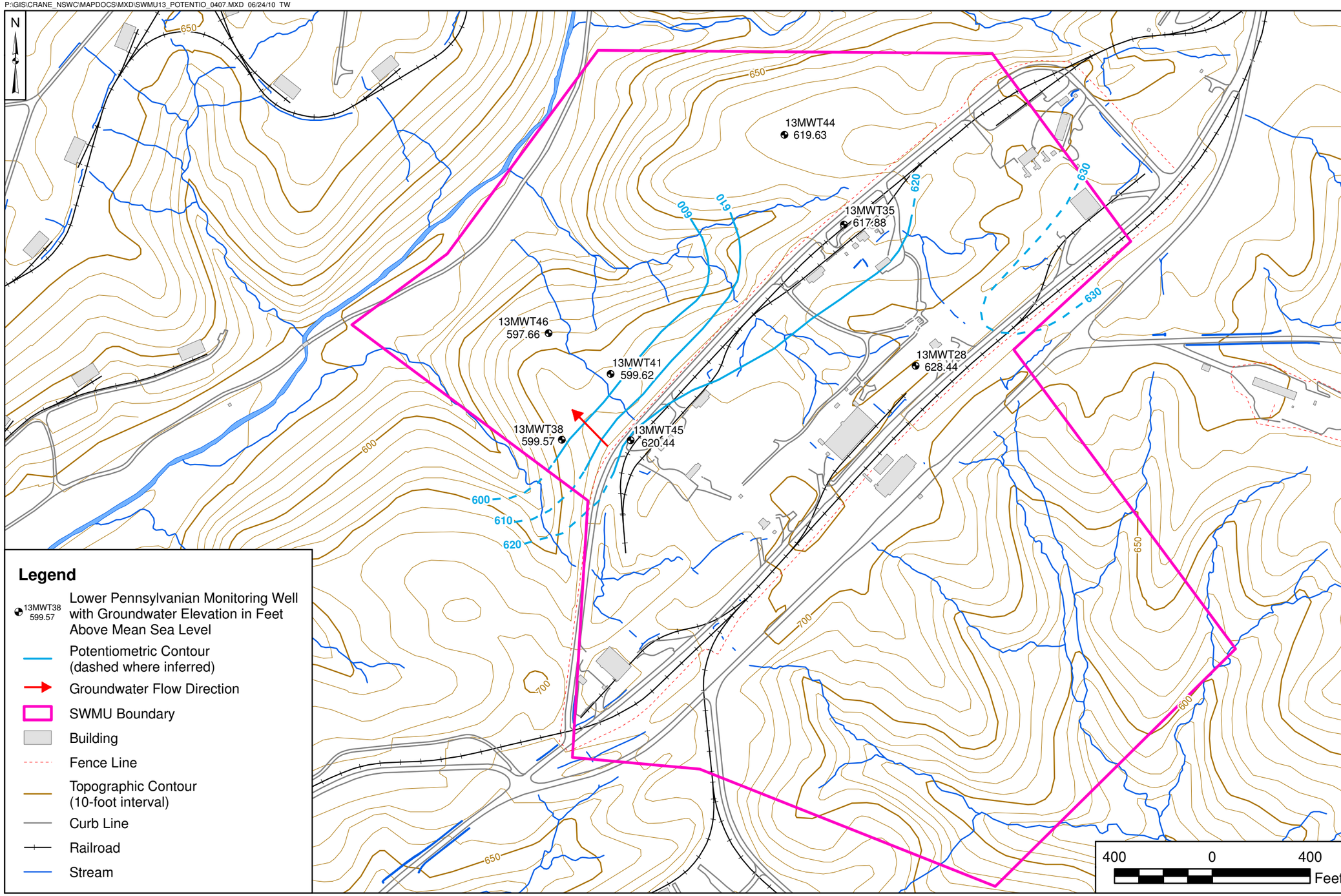
DRAWN BY	DATE
S. STROZ	06/21/10
CHECKED BY	DATE
J. LUCAS	06/24/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR THE
UPPER PENNSYLVANIAN WATER-BEARING ZONE
ROUND 9 - APRIL 10, 2007
SWMU 13 - MINE FILL B
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 00041	
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. FIGURE 3-1	REV 0

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU13_POTENTIO_0407.MXD 06/24/10 TW



CONTRACT NUMBER
00041

APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 3-2

REV 0

POTENTIOMETRIC SURFACE MAP FOR THE
LOWER PENNSYLVANIAN WATER-BEARING ZONE
ROUND 9 - APRIL 10, 2007
SWMU 13 - MINE FILL B
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY T. WHEATON DATE 06/22/10

CHECKED BY J. LUCAS DATE 06/24/10

COST/SCHEDULE-AREA —

SCALE AS NOTED