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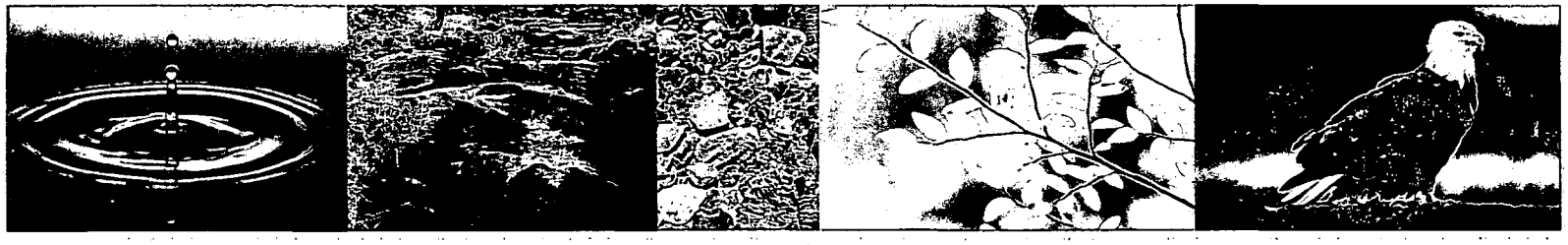

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Monitored Natural Attenuation Report
for
Crane Cast High Explosives Fill/Building 146 (SWMU 16)

Rounds No. 5 and 6

Naval Surface Warfare Center Crane
Crane, Indiana

Contract Task Order 0377

April 2006

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

TETRA TECH NUS, Inc.

REVISION 0
APRIL 2006

MONITORED NATURAL ATTENUATION REPORT
FOR
CAST HIGH EXPLOSIVES FILL/BUILDING 146 (SWMU 16)
ROUNDS NO. 5 and 6

NAVAL INDUSTRIAL WARFARE CENTER, CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
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TABLE OF CONTENTS

SECTION **PAGE NO.**

LIST OF ACRONYMS **4**

1.0 INTRODUCTION **1-1**

2.0 FIELD INVESTIGATION **2-1**
2.1 OVERVIEW 2-1
2.2 SAMPLING OPERATIONS 2-1
2.2.1 Groundwater and Surface Water Measurements 2-1
2.2.2 Groundwater Purging and Sampling 2-1
2.2.2 Surface Water Sampling 2-2
2.3 QUALITY CONTROL SAMPLES 2-3

3.0 DATA PRESENTATION **3-1**
3.1 GROUNDWATER DATA 3-1
3.1.1 Explosives 3-2
3.1.2 Volatile Organic Compounds 3-3
3.2 SURFACE WATER 3-5
3.2.1 Explosives 3-5
3.2.2 Volatile Organic Compounds 3-6

4.0 DATA EVALUATION **4-1**
4.1 GROUNDWATER MONITORING PROGRAM 4-4
4.2 SURFACE WATER MONITORING PROGRAM 4-4
4.3 ROUNDS 5 AND 6 POTENTIOMETRIC SURFACES 4-5
4.4 GROUNDWATER TEMPORAL TREND PLOTS AND DATA EVALUATION 4-7
4.4.1 Upper Pennsylvanian Water Bearing Zone (Puz) 4-7
4.4.2 Middle Pennsylvanian Water Bearing Zone (Pmz) 4-9
4.4.3 Lower Pennsylvanian Water Bearing Zone (Plz) 4-10
4.4 SURFACE WATER TEMPORAL TREND PLOTS AND DATA EVALUATION 4-10

REFERENCES **R-1**

APPENDICES

A SWMU 16 SAMPLE LOG SHEETS AND OTHER FIELD FORMS ROUNDS 5 AND 6
B SWMU 16 MISCELLANEOUS FIELD DOCUMENTATION ROUNDS 5 AND 6
C SWMU 16 HEALTH AND SAFETY DOCUMENTATION ROUNDS 5 AND 6
D SWMU 16 ANALYTICAL DATA
E POTENTIOMETRIC SURFACE MAPS ROUND 4

TABLES

NUMBER

2-1 Monitoring Well Construction Information and Water Level Measurements
2-2 Summary of Environmental Samples and Laboratory Analyses
3-1 Summary of Chemicals Detected, Field Parameters, and Miscellaneous Parameters for SWMU 16 Groundwater, Rounds 1 through 6, Upper Pennsylvanian Water Bearing Zone
3-2 Summary of Descriptive Statistics, Round 5 Upgradient Groundwater Samples, Upper Pennsylvanian Water Bearing Zone
3-3 Summary of Descriptive Statistics, Round 5 Groundwater Samples, Upper Pennsylvanian Water Bearing Zone
3-4 Summary of Descriptive Statistics, Round 6 Upgradient Groundwater Samples, Upper Pennsylvanian Water Bearing Zone
3-5 Summary of Descriptive Statistics, Round 6 Groundwater Samples, Upper Pennsylvanian Water Bearing Zone
3-6 Summary of Chemicals Detected, Field Parameters, and Miscellaneous Parameters for SWMU 16 Groundwater, Rounds 1 through 6, Middle Pennsylvanian Water Bearing Zone
3-7 Summary of Descriptive Statistics, Round 5 Groundwater Samples, Middle Pennsylvanian Water Bearing Zone
3-8 Summary of Descriptive Statistics, Round 6 Groundwater Samples, Middle Pennsylvanian Water Bearing Zone
3-9 Summary of Chemicals Detected, field Parameters, and Miscellaneous Parameters for SWMU 16 Groundwater, Rounds 1 through 6, Lower Pennsylvanian Water Bearing Zone
3-10 Summary of Descriptive Statistics, Round 5 Groundwater Samples - Lower Pennsylvanian Water Bearing Zone
3-11 Summary of Descriptive Statistics, Round 6 Groundwater Samples - Lower Pennsylvanian Water Bearing Zone
3-12 Summary of Chemicals Detected, Field Parameters, and Miscellaneous Parameters for SWMU 16 Surface Water, Rounds 1 through 6
3-13 Summary of Descriptive Statistics, Round 5 Surface Water Samples

FIGURES

NUMBER

2-1 Monitoring Well Locations
2-2 Surveyed Surface Water, Sediment, and Staff Gauge Locations
4-1 Potentiometric Surface Map for Upper Pennsylvanian Water-Bearing Zone – May 5, 2005 (Round 5)
4-2 Potentiometric Surface Map for Middle Pennsylvanian Water-Bearing Zone – May 5, 2005 (Round 5)
4-3 Potentiometric Surface Map for Lower Pennsylvanian Water-Bearing Zone – May 5, 2005 (Round 5)
4-4 Potentiometric Surface Map for Upper Pennsylvanian Water-Bearing Zone – August 10, 2005 (Round 6)
4-5 Potentiometric Surface Map for Middle Pennsylvanian Water-Bearing Zone – August 10, 2005 (Round 6)
4-6 Potentiometric Surface Map for Lower Pennsylvanian Water-Bearing Zone – August 10, 2005 (Round 6)
4-7 Temporal Plots for RDX and Degradation Product Concentrations in the Upper Pennsylvanian Water-Bearing Zone At SWMU 16 for Rounds 1 Through 6
4-8 Temporal Plots for Trichloroethene and Degradation Product Concentrations in the Upper Pennsylvanian Water-Bearing Zone At SWMU 16 for Rounds 1 Through 6
4-9 Temporal Plots for RDX and Degradation Product Concentrations in the Middle Pennsylvanian Water-Bearing Zone At SWMU 16 for Rounds 1 Through 6
4-10 Temporal Plots for Trichloroethene and Degradation Product Concentrations in the Middle Pennsylvanian Water-Bearing Zone At SWMU 16 for Rounds 1 Through 6
4-11 Temporal Plots for RDX and Degradation Product Concentrations in the Lower Pennsylvanian Water-Bearing Zone At SWMU 16 for Rounds 1 Through 6
4-12 Temporal Plots for Trichloroethene and Degradation Product Concentrations in the Lower Pennsylvanian Water-Bearing Zone At SWMU 16 for Rounds 1 Through 6
4-13 Temporal Plots for RDX and Degradation Product Concentrations Rounds 1 Through 6 in Surface Water
4-14 Temporal Plots for Trichloroethene and Degradation Product Concentrations Rounds 1 Through 6 in Surface Water

LIST OF ACRONYMS

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

1.0 INTRODUCTION

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

SWMU 16 originally consisted of Building 146 (B146) and three oil-fired, rotary kiln incinerators with fuel storage tanks. B146 is still in existence; it was previously used as an explosive fill and pressure washout facility. The incinerators and fuel storage tanks have been removed. During operation, incinerator ash was stored in waste piles adjacent to the incinerator. These ash piles have also been removed. In previous investigations, exterior sumps receiving roof drain waters and process waters were found to contain trichloroethylene (TCE). These sumps discharged into nearby ditches. After this discovery, a remedial action was conducted during the period 1996 to 1998 in which an air stripper was used to remove VOCs from liquids within the sumps and the roof drain waters were rerouted to a separate line discharging into a ditch. After TCE concentrations in the sump were reduced to acceptable levels, the sump drains were rerouted to the sanitary sewer system.

A corrective measures study (CMS) will be conducted at SWMU 16. Among the remedial alternatives expected to be evaluated will be the potential for natural attenuation to reduce the concentrations of explosives and VOCs in the groundwater in a reasonable time frame. The United States Environmental Protection Agency (U.S. EPA) Region 5 has established a framework entitled "Region 5 Framework for Monitored Natural Attenuation Decisions for Groundwater" (U.S. EPA, 2000). This framework provides technical direction for the collection of adequate monitoring data to support evaluations of the effectiveness of monitored natural attenuation (MNA) decisions. The guidance recommends collection of at least two years of quarterly sampling data. In order to determine whether residual explosives are naturally degrading at SWMU 16, a long-term groundwater monitoring plan for explosives, explosives degradation products, and VOCs is being conducted. Recently, 4 rounds of sampling and analyses were

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

The purpose of this report is to present the results of groundwater and surface water monitoring activities at SWMU 16 in Rounds 5 and 6, including field documentation, and to provide the framework for evaluation of data after all nine rounds of sampling have been completed. Field documentation associated with Rounds 5 and 6 is provided in Appendices A, B, and C of this report. Analytical results for Rounds 5 and 6 are presented in Appendix D. The final monitoring report (after Round 9) will contain an evaluation as to whether residual explosives may be naturally degrading and whether MNA is a viable remedial option for contaminated groundwater and surface water at SWMU 16. Information obtained from the long term monitoring program will be used in the CMS to evaluate the effectiveness of MNA. The MNA program being conducted at SWMU 16 meets the U.S. EPA Region 5 MNA requirements.

2.0 FIELD INVESTIGATION

This section presents sampling activities, procedures, and documentation utilized during Rounds 5 and 6 field operations performed in 2005 for NSWC Crane SWMU 16.

2.1 OVERVIEW

RFI field activities were conducted in May 2005 (Round 5) and August 2005 (Round 6). All work performed was conducted in accordance with the procedures and methodologies described in the U.S. EPA-approved 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 (TtNUS, 2004).

2.2 SAMPLING OPERATIONS

This section discusses the methodology for surface water and groundwater sampling activities performed at SWMU 16 during Rounds 5 and 6. Instruments used in the field were calibrated daily prior to use according to manufacturers' requirements and in accordance with applicable SOPs. Copies of all field forms, records, field logbooks, and health and safety documentation associated with the field investigations for Rounds 5 and 6 are provided in Appendices A through C of this document. Groundwater and surface water sampling locations are shown in Figures 2-1 and 2-2, respectively. No non-conformances or suspected deficiencies occurred during the Round 5 or Round 6 field investigations.

2.2.1 Groundwater and Surface Water Measurements

A complete synoptic round of water levels including all the wells was taken prior to any groundwater monitoring well sampling activities. 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 surface water staff gauge measurements were recorded to the nearest 0.01 foot on groundwater level measurement forms, which are provided in Appendix A.3 of this document. Table 2-1 contains water level/elevation data for Rounds 5 and 6, as well as previous rounds.

2.2.2 Groundwater Purging and Sampling

Groundwater measurements, purging, and stabilization of wells prior to sampling were accomplished using low-flow techniques in accordance with SOPS CTO166-15 and CTO166-16. Sampling was

accomplished in accordance with SOP CTO166-05. Groundwater quality parameters including pH, specific conductance, temperature, DO, and ORP were measured during purging at 5- to 10-minute intervals. Longer intervals were used for slower pumping wells. Turbidity readings were measured using a LaMotte 2020 turbidity meter. Water levels and pumping rates were also measured during purging at 5- to 10-minute intervals. Purging continued until a minimum of one well volume was removed and the above parameters stabilized, or until the well had been purged for 4 hours, in accordance with SOP CTO166-16 and SOP CTO166-15. To the extent possible, the pumping rates were adjusted to prevent drawdown from exceeding 0.3 foot during purging.

A listing of all SWMU 16 sample analytical fractions is provided in Table 2-2. Further discussion of the target analytes for each fraction in Rounds 5 and 6 sampling is discussed in Section 3 of the QAPP Addendum No. 2. See Figure 2-1 for all groundwater sample locations.

Round 5

All 12 proposed groundwater samples were collected at SWMU 16 during Round 5 (See Table 2-2). Due to monitoring well 16MWT11 historically drying out while purging, the well was not purged prior to the collection of the sample. A minimum volume for explosives (1 liter instead of 2) was collected on May 6, 2005 and a minimum volume for volatiles (1, 40 mL vial instead of 3) was collected on May 8, 2005.

Round 6

All 12 proposed groundwater samples were collected at SWMU 16 during Round 6 (See Table 2-2). As during Round 5, monitoring well 16MWT11 was not purged prior to the collection of the sample. The samples at well 16MWT11 were collected over a 3-day period. A minimum volume for explosives (1 liter instead of 2) was collected.

2.2.2 Surface Water Sampling

Surface water samples were collected from intermittent streams, drainage ditches, and surface runoff locations throughout SWMU 16. All samples were collected at previously sampled locations which had been marked with a labeled, wooden survey stake. Surface water samples were collected in accordance with Addendum No. 2 to the approved QAPP (TtNUS, 2004). All pertinent field data, including water quality parameters, sampling methods, and locations were recorded on a surface water sample log sheet (see Appendix A.1). See Figure 2-2 for all surface water sampling locations.

Round 5

All four proposed surface water samples were collected at SWMU 16 during Round 5 (See Table 2-2).

Round 6

Due to dry conditions at Crane, all four proposed surface water sample locations were dry and not collected.

2.3 QUALITY CONTROL SAMPLES

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

TABLE 2-1

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

Well Number	Installation Date	Northing (NAD83)	Easting (NAD83)	Ground Elevation	Top of Riser Elevation	Total Depth[1]	Screened Interval				Water-Bearing Zone	May 5, 2003		May 30, 2003		January 24, 2004		February 4, 2005		May 6, 2005		August 10, 2005	
							Top	Bottom	Top	Bottom		Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation
		(feet)	(feet)	(feet amsl)	(feet amsl)	(feet bgs)	(feet bgs)	(feet bgs)	(feet amsl)	(feet amsl)		(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)
16MWT01	4/8/2003	1321193.49	3032881.29	762.02	764.50	24.00	14.00	24.00	748.02	738.02	Puz	25.19	739.31	22.70	741.80	19.12	745.38	15.88	748.62	15.55	748.95	14.49	750.01
16MWT02	4/11/2003	1321146.42	3032559.16	757.60	760.36	18.00	8.00	18.00	749.60	739.60	Puz	6.55	753.81	12.18	748.18	10.94	749.42	12.61	747.75	11.68	748.68	13.1	747.26
16MWT03	4/10/2003	1320946.97	3032644.29	761.95	764.41	35.00	25.00	35.00	736.95	726.95	Pmz	27.20	737.21	28.07	736.34	28.34	736.07	28.88	735.53	27.85	736.56	30.08	734.33
16MWT04	4/9/2003	1321003.28	3032946.47	763.88	766.14	25.00	15.00	25.00	748.88	738.88	Puz	8.05	758.09	13.14	753.00	13.11	753.03	14.29	751.85	13.13	753.01	14.49	751.65
16MWT05	4/9/2003	1320741.79	3032812.77	764.50	766.88	40.00	29.00	39.00	735.50	725.50	Pmz	29.77	737.11	30.39	736.49	31.44	735.44	32.11	734.77	31.10	735.78	33.06	733.82
16MWT06	4/24/2003	1321199.52	3032883.37	761.77	764.44	25.00	15.00	25.00	746.77	736.77	Puz	22.33	742.11	15.92	748.52	17.41	747.03	17.79	746.65	16.69	747.75	17.93	746.51
16MWT07	11/11/2003	1321176.93	3033001.57	760.54	762.87	25.50	15.00	25.00	745.54	735.54	Puz	NA	NA	NA	NA	Dry	NA	Dry	NA	Dry	NA	Dry	NA
16MWT08	11/9/2003	1321179.45	3033009.24	759.57	761.56	99.00	85.00	95.00	674.57	664.57	Plz	NA	NA	NA	NA	97.03	664.53	96.60	664.96	96.16	665.40	95.81	665.75
16MWT09	11/8/2003	1321068.49	3033041.44	762.43	764.28	25.00	15.00	25.00	747.43	737.43	Puz	NA	NA	NA	NA	13.88	750.40	15.25	749.03	13.82	750.46	15.49	748.79
16MWT10	11/9/2003	1320936.05	3033074.74	761.93	764.43	25.00	14.00	24.00	747.93	737.93	Puz	NA	NA	NA	NA	22.05	742.38	22.30	742.13	21.07	743.36	23.4	741.03
16MWT11	11/11/2003	1320934.64	3033062.79	763.23	765.24	98.00	86.00	96.00	677.23	667.23	Plz	NA	NA	NA	NA	96.30	668.94	96.41	668.83	96.10	669.14	95.92	669.32
16MWT12	11/7/2003	1320729.14	3033074.92	753.23	755.45	26.50	16.00	26.00	737.23	727.23	Pmz	NA	NA	NA	NA	20.13	735.32	20.94	734.51	19.85	735.60	21.86	733.59
16MWT13	11/11/2003	1321125.78	3032562.41	757.62	759.57	19.00	8.00	18.00	749.62	739.62	Puz	NA	NA	NA	NA	10.25	749.32	11.36	748.21	10.42	749.15	12.08	747.49
16MWT14	11/7/2003	abd.	abd.	764.98	abd.	25.00	15.00	25.00	749.98	739.98	Puz	NA	NA	NA	NA	Dry, abd.	NA	abd.	NA	abd.	NA	abd.	NA
16MWT15	11/9/2003	1321120.81	3032563.53	757.73	759.69	92.00	81.00	91.00	676.73	666.73	Plz	NA	NA	NA	NA	53.23	706.46	54.99	704.70	56.57	703.12	58.95	700.74
16MWT16	11/9/2003	1321059.41	3032814.52	764.98	764.74	40.00	26.00	36.00	738.98	728.98	Pmz	NA	NA	NA	NA	32.93	731.81	34.40	730.34	33.47	731.27	33.33	731.41
16MWT17	11/8/2003	1321235.88	3032675.07	764.79	766.53	24.00	14.00	24.00	750.79	740.79	Puz	NA	NA	NA	NA	15.35	751.18	15.78	750.75	15.38	751.15	15.79	750.74
16MWT18	1/18/2004	1321068.96	3032807.84	764.99	764.44	105.00	94.00	104.00	670.99	660.99	Plz	NA	NA	NA	NA	96.65	667.79	95.75	668.69	95.68	668.76	95.48	668.96
16MWT19	7/28/2004	1320172.28	3033846.62	606.73	609.31	16.00	5.00	15.00	601.73	591.73	Valley deposits	NA	NA	NA	NA	NA	NA	3.25	606.06	3.36	605.95	8.18	601.13
16MWT20	7/28/2004	1320532.68	3034030.68	607.43	609.93	16.00	5.00	15.00	602.43	592.43	Valley deposits	NA	NA	NA	NA	NA	NA	3.66	606.27	3.81	606.12	7.76	602.17
16MWT21	9/9/2004	1320581.35	3032960.08	760.78	763.05	96.00	80.00	95.00	680.78	665.78	Plz	NA	NA	NA	NA	NA	NA	65.46	697.59	64.90	698.15	65.92	697.13
WES-14-01-83	1983	1320638.35	3032713.38	763.87	766.67	50.70	35.80	45.30	728.07	718.57	Pmz	31.00	735.67	31.00	735.67	31.94	734.73	32.33	734.34	31.62	735.05	33.07	733.60
WES-14-02-83	1983	1321319.90	3032647.27	763.69	766.54	25.80	11.35	20.39	752.34	743.30	Puz	14.23	752.31	14.56	751.98	15.36	751.18	15.94	750.60	15.40	751.14	15.76	750.78
WES-14-03-83	1983	1320816.00	3033018.50	761.51	763.93	35.40	20.88	29.99	740.63	731.52	Puz	18.80	745.13	19.83	744.10	20.00	743.93	20.45	743.48	19.44	744.49	20.69	743.24
WES-14-04-83	1983	1320572.35	3032960.96	760.42	762.99	46.00	31.38	40.47	729.04	719.95	Pmz	26.80	736.19	27.27	735.72	28.39	734.60	28.70	734.29	27.67	735.32	29.61	733.38
WES-14-05-83	1983	1320584.05	3032850.32	766.60	769.40	50.70	35.80	45.25	730.80	721.35	Pmz	32.59	736.81	33.05	736.35	34.18	735.22	34.88	734.52	33.80	735.60	35.72	733.68

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		(feet)	(feet)	(feet amsl)	(feet amsl)	(feet bgs)	(feet bgs)	(feet bgs)	(feet amsl)	(feet amsl)		(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)	(feet btor)	(feet amsl)
STAFF GAUGES																							
16SG01	10/16/04	1321342.91	3032498.83	750.58	NA	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	Dry	NA	Dry	NA	Dry	NA
16SG02	10/16/04	1321121.91	3032465.01	734.32	NA	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	5.29	729.03	Dry	NA	Dry	NA
16SG03	10/16/04	1320712.52	3032705.12	761.79	NA	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	5.03	756.76	Dry	NA	Dry	NA
16SG04	10/16/04	1320748.57	3033005.16	762.44	NA	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	2.15	760.29	Dry	NA	Dry	NA
16SG05	10/16/04	1320889.16	3032979.28	763.21	NA	NA	NA	NA	NA	NA	Puz	NA	NA	NA	NA	NM	NM	Dry	NA	Dry	NA	Dry	NA
16SG06	10/16/04	1320930.80	3034364.52	603.53	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	3.51	600.02	3.67	599.86	Dry	NA
16SG07	10/16/04	1320765.76	3034582.61	601.53	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	5.99	595.54	**Staff washed away	NA	**Staff washed away	NA
16SG08	10/16/04	1318992.38	3033277.47	590.00	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	4.16	585.84	4.22	585.78	Dry	NA
16SG09	10/16/04	1318679.54	3033368.61	583.26	NA	NA	NA	NA	NA	NA	Plz	NA	NA	NA	NA	NM	NM	6.34	576.92	Dry	NA	Dry	NA

Notes:

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

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

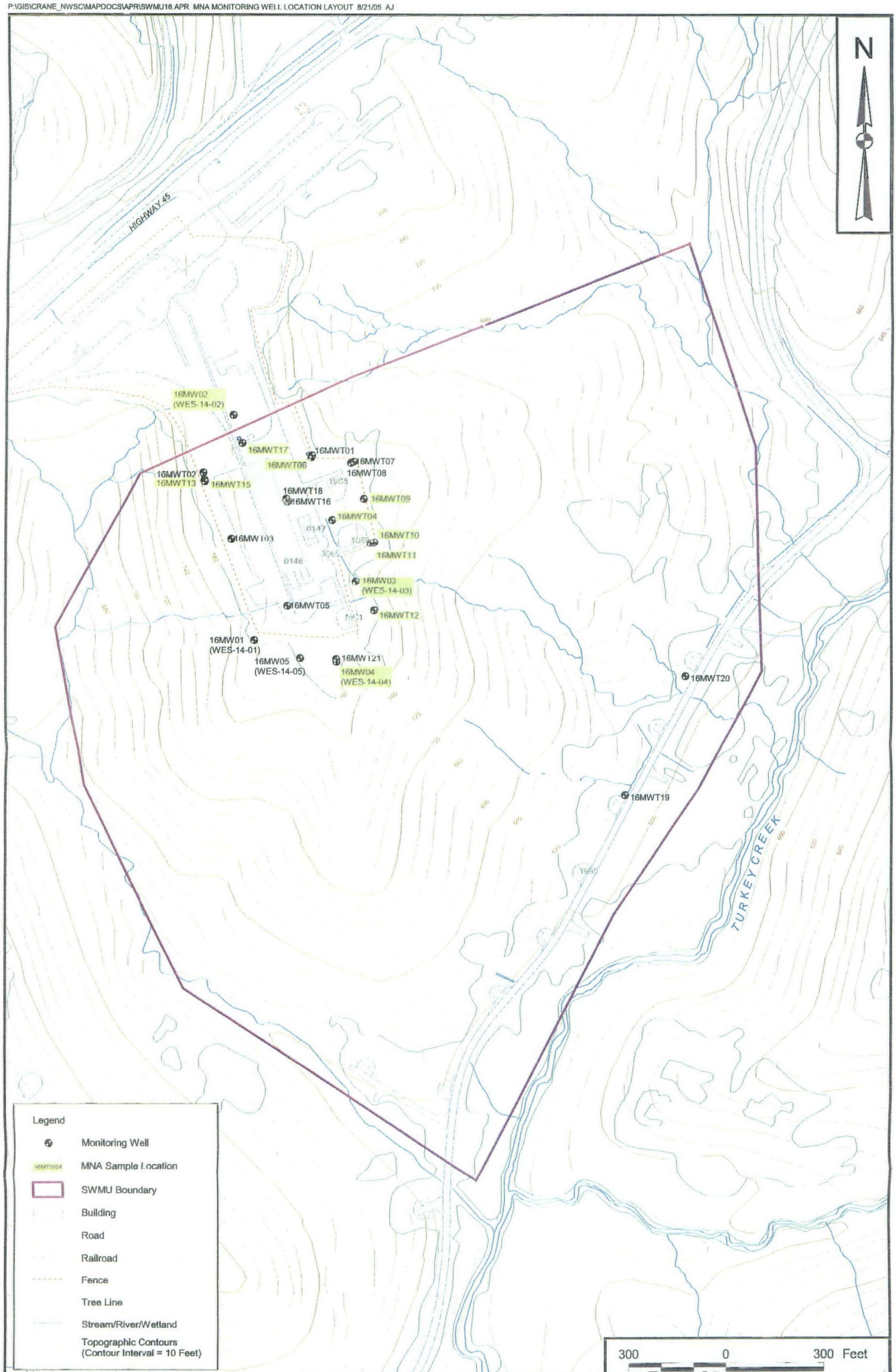
TABLE 2-2

SUMMARY OF ENVIRONMENTAL SAMPLES AND LABORATORY ANALYSES
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
ROUNDS 5 AND 6
NSWC CRANE
CRANE, INDIANA

Sample Number	Analytical Fraction						Reasoning Why Sample Was Not Collected
	Volatiles	Explosives		Miscellaneous			
	SW-846 8260B	Nitroaromatics and Nitramines SW-846 8330	RDX Degradation Products SW-846 8330, Modified	Nitrate + Nitrite (as N) EPA 353.2	Sulfate and Chloride	Methane, Ethane, Ethene	
Groundwater (Round 5)							
16GW0205	X	X					
16GW0305	X	X					
16GW0405	X	X					
16GWT0405	X	X					
16GWT0606	X	X					
16GWT0904	X	X					
16GWT1004	X	X					
16GWT1104	X	X					
16GWT1204	X	X					
16GWT1304	X	X					
16GWT1504	X	X					
16GWT1704	X	X					
GW TOTALS	**12**	**12**	**0**	**0**	**0**	**0**	
Groundwater (Round 6)							
16GW0206	X	X	X	X	X	X	
16GW0306	X	X	X	X	X	X	
16GW0406	X	X	X	X	X	X	
16GWT0406	X	X	X	X	X	X	
16GWT0607	X	X	X	X	X	X	
16GWT0905	X	X	X	X	X	X	
16GWT1005	X	X	X	X	X	X	
16GWT1105	X	X	X	X	X	X	
16GWT1205	X	X	X	X	X	X	
16GWT1305	X	X	X	X	X	X	
16GWT1505	X	X	X	X	X	X	
16GWT1705	X	X	X	X	X	X	
GW TOTALS	**12**	**12**	**12**	**12**	**12**	**12**	
Surface Water (Round 5)							
16SW1003	X	X					
16SW1204	X	X					
16SW1304	X	X					
16SW3003	X	X					
SW TOTALS	**4**	**4**	**0**	**0**	**0**	**0**	
Surface Water (Round 6)							
16SW1004	O	O					Dry
16SW1205	O	O					Dry
16SW1305	O	O					Dry
16SW3004	O	O					Dry
SW TOTALS	**0**	**0**	**0**	**0**	**0**	**0**	

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

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



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

NAVFAC

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

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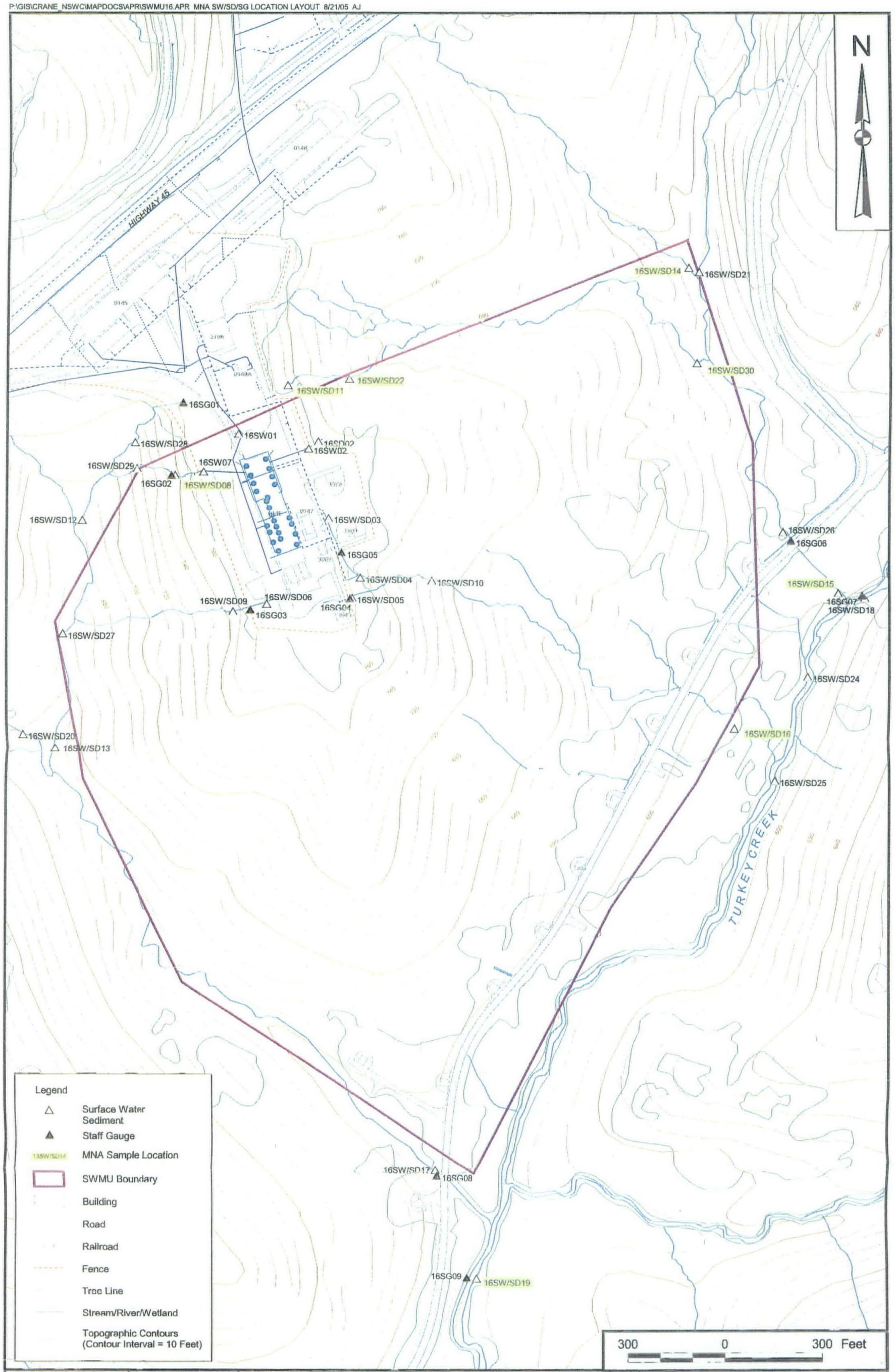
DRAWING NO.	REV
FIGURE 2 - 1	0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU16.APR MNA SW/SD/SG LOCATION LAYOUT 8/21/05 AJ



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

NAVFAC

SURVEYED SURFACE WATER,
SEDIMENT, AND STAFF GAUGE LOCATIONS
SWMU 16 CAST HIGH EXPLOSIVES FILL/
BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

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

3.0 DATA PRESENTATION

This section presents the analytical results for groundwater and surface water sampling conducted in Rounds 5 and 6 at SMWU 16 (see Tables 3-1 through 3-13). In addition, analytical results for Rounds 1 through 4 are also provided in this section to support data interpretation which is discussed in Section 4.0 of this report.

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

3.1 GROUNDWATER DATA

Groundwater analytical results for Rounds 1 through 6 at SWMU 16 are presented in Tables 3-1, 3-6, and 3-9 for select monitoring well locations in the Upper, Middle, and Lower Pennsylvanian Water Bearing Zones, respectively. These tables show summary listings of groundwater concentrations for select explosives, explosive degradation products, VOCs, VOC degradation products, field, and miscellaneous parameters for each aquifer. Concentrations are presented in micrograms per liter (µg/L), unless otherwise noted, along with data validation qualifiers, as applicable. Due to the staggered nature of the groundwater sampling, not all wells were sampled in each of the six rounds of sampling. Descriptive statistics for each water bearing zone in Rounds 5 and 6 are shown in Tables 3-2 through 3-5, 3-7 and 3-8, 3-10 and 3-11.

3.1.1 Explosives

3.1.1.1 Upper Pennsylvanian Water Bearing Zone (Puz)

Round 5

Monitoring results for Round 5 are presented in Table 3-1. Tables 3-2 through 3-3 present descriptive statistics for upgradient and downgradient Puz wells, respectively, in Round 5. There were no detections of explosives at the upgradient well (16MWT02) in Round 5. Explosives were detected in all MNA downgradient wells in Round 5 with the exception of 16MWT13. The most frequently detected explosive was RDX with concentrations ranging from 4.9 µg/L at 16MWT17 to 98 µg/L at 16MWT09. Other explosives detected on a less frequent basis at two or more downgradient wells included HMX, 4-amino-2,6-dinitrotolunene, and 2-amino-4,6-dinitrotolunene. The maximum detected concentrations for these explosive compounds, respectively, were 9.3, 31, and 60 µg/L. RDX degradation products were not target analytes in Round 5.

Round 6

Round 6 monitoring results are given in Table 3-1. Tables 3-3 and 3-4 present descriptive statistics for upgradient and downgradient Puz wells. No explosive compounds were detected at the upgradient well in Round 6. Explosives were detected in all MNA downgradient wells in Round 6 with the exception of 16MWT13. The most frequently detected explosive was RDX with concentrations ranging from 4.5 µg/L at 16MWT17 to 130 µg/L at 16MWT04. Several additional explosives were detected on a less frequent basis. For example, explosives detected at four or more downgradient wells included HMX, 4-amino-2,6-dinitrotolunene, and 2-amino-4,6-dinitrotolunene. The maximum detected concentrations for these explosives, respectively, were 11, 13, and 28 µg/L.

MNX was the only RDX degradation product that was detected in Round 6. MNX was detected at four of the seven downgradient wells (16MWT03, 16MWT04, 16MWT06, and 16MWT09) with concentrations ranging from 0.33 at 16MWT06 to 2.5 µg/L at 16MWT04.

3.1.1.2 Middle Pennsylvanian Water Bearing Zone (Pmz)

Round 5

Table 3-6 presents analytical results for Round 5 sampling at Pmz monitoring locations 16MW04 and 16MWT12. The descriptive statistics for Round 5 results are presented in Table 3-7. Only one explosive

compound, RDX, was detected in Round 5 at location 16MW04 (0.59 µg/L). RDX degradation products were not target analytes in Round 5.

Round 6

Table 3-6 presents analytical results for Round 6 sampling at Pmz monitoring locations (16MW04 and 16MWT12). The descriptive statistics for Round 6 results are presented in Table 3-8. Only one explosive compound, RDX, was detected in Round 6 at location 16MW04 (0.64 µg/L). There were no detections of RDX degradation products.

3.1.1.3 Lower Pennsylvanian Water Bearing Zone (Plz)

Round 5

Table 3-9 presents analytical results for Round 5 sampling at Plz monitoring locations (16MW11 and 16MWT15). The descriptive statistics for Round 5 results are presented in Table 3-9. In Round 5, there were no detections of explosives in Plz monitoring wells. RDX degradation products were not target analytes in Round 5.

Round 6

Table 3-9 presents analytical results for Round 6 sampling at Plz monitoring locations (16MW11 and 16MWT15). The descriptive statistics for Round 6 results are presented in Table 3-10. In Round 6, there were no detections of explosives in Plz monitoring wells. There were no detections of RDX degradation products.

3.1.2 Volatile Organic Compounds

3.1.2.1 Upper Pennsylvanian Water Bearing Zone

Round 5

VOC monitoring results for Round 5 sampling in the Puz wells are presented in Table 3-1. Tables 3-2 through 3-3 present descriptive statistics for upgradient and downgradient Puz wells, respectively. In Round 5, there were no VOC detections in the upgradient well (16MW02). VOCs were detected in one or more downgradient wells in Round 5. Trichloroethene was detected at all downgradient wells with concentrations ranging from 1.6 µg/L in 16MWT10 to 510,000 µg/L at 16MWT06. The next most frequently detected VOC was cis-1,2-dichloroethene, which was detected at three downgradient

locations. The concentrations of cis-1,2-dichloroethene ranged from 12 µg/L in 16MWT13 to 5,600 µg/L in 16MWT06. TCE was also detected in combination with cis-1,2-dichloroethene in 16MWT06, 16MWT13, and 16MWT17. Several other VOCs were also detected in the Puz wells in Round 5, but generally on a less frequent basis. Vinyl chloride (610 µg/L) was only detected at 16MWT06. Ethane, ethene, and methane were not target analytes in Round 5.

Round 6

Round 6 monitoring results for Puz wells are presented in Table 3-1. Tables 3-4 through 3-5 present descriptive statistics for upgradient and downgradient Puz wells, respectively. Two VOCs (ethane and , ethene) were detected at low concentrations in Round 5 at the upgradient well (16MW02). In the downgradient wells, trichloroethene, ethane, ethene, and methane were the most frequently detected VOCs and were detected in all wells. The maximum concentration for each of these four VOCs occurred in well 16MWT06. Trichloroethene concentrations ranged from 1.4 µg/L in 16MWT10 to 480,000 µg/L in 16MWT06. Ethane concentrations ranged from 0.004 µg/L in 16 MWT04 to 1.5 µg/L in 16MWT06. Ethene concentrations ranged from 0.016 µg/L in 16MWT04 to 22 ug/L in 16MWT06. Methane concentrations ranged from 0.25 µg/L in 16MWT04 to 260 µg/L in 16MWT06. The degradation product cis-1,2-dichloroethene was also detected in three wells with concentrations ranging from 1.5 µg/L in 16MWT13 to 4,600 µg/L in 16MWT06. Vinyl chloride (350 µg/L) was only detected at 16MWT06.

3.1.2.2 Middle Pennsylvanian Water Bearing Zone

Round 5

VOC monitoring results for Round 5 at the Pmz wells are presented in Table 3-6. Summary descriptive statistics for these locations are shown in Table 3-7. In Round 5, the only VOC detected was trichloroethene in 16MW04 at a concentration of 0.7 µg/L. Ethane and ethene were not target analytes in Round 5.

Round 6

Round 6 VOC monitoring results for the Pmz wells are shown in Table 3-6. Summary descriptive statistics for these locations are shown in Table 3-8. Ethane, ethene, and methane were detected at both Pmz monitoring wells (16MW04 and 16MWT12) in Round 6. Ethane concentrations ranged from 0.01 µg/L in 16 MW04 to 0.13 µg/L in 16MWT12. Ethene concentrations ranged from 0.018 µg/L in 16MW04 to 0.028 ug/L in 16MWT06. Methane concentrations ranged from 0.34 µg/L in 16MW04 to

0.88 µg/L in 16MWT12. Trichloroethene was only detected in well 16GW04 in Round 6 at a concentration of 0.9 µg/L.

3.1.2.3 Lower Pennsylvanian Water Bearing Zone

Round 5

Analytical results for VOC detections in Round 5 at the Plz wells are presented in Table 3-9. Summary descriptive statistics for Round 5 is given in Table 3-10. Ethane, ethene, and methane were not target analytes in Round 5. In Round 5, there were no detections of VOCs.

Round 6

Analytical results for VOC detections in Round 6 at the Plz wells are presented in Table 3-9. Summary descriptive statistics for Round 6 is given in Table 3-11. Ethane, ethene, and methane were the only VOCs detected at both 16MWT11 and 16MWT15 in Round 6. Ethane concentrations ranged from 0.44 µg/L in 16 MWT11 to 0.99 µg/L in 16MWT15. Ethene concentrations ranged from 0.074 µg/L in 16MWT11 to 0.41 ug/L in 16MWT15. Methane concentrations ranged from 1,700 µg/L in 16MWT11 to 5,400 µg/L in 16MWT15.

3.2 SURFACE WATER

Surface water sampling was conducted at 4 locations in Round 5; however, could not be conducted at the four proposed locations in Round 6 due to dry conditions. The analytical results for Round 5 are presented in Table 3-12. Summary descriptive statistics for Round 5 are presented in Table 3-13.

3.2.1 Explosives

Round 5

In Round 5, there were single detections of five explosives at locations 16SW30 and 16SW10. RDX (13 µg/L), HMX (4.4 µg/L), 4-amino-2,6-dichlorotoluene (0.76 µg/L), and 2-amino-4,6-dinitrotoluene (0.39 µg/L) were all detected at 16WSW30. Only 2-nitrotoluene (0.6 µg/L) was detected at 16SW10. RDX degradation products were not target analytes in Round 5.

3.2.2 Volatile Organic Compounds

Round 5

The only VOC detected in surface water in Round 5 was trichloroethene at location 16SW12. The measured concentration was 6.7 µg/L.

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 6
UPPER PENNSYLVANIAN WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

SAMPLING LOCATION	16MW02						16MW03						16MWT04					
SAMPLING ROUND	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
DATE	4/24/03	10/26/03	8/25/04	2/4/05	5/6/05	8/14/05	5/11/03	11/8/03	8/24/04	2/5/05	5/6/05	8/13/05	4/22/03	11/8/03	8/15/04	2/5/05	5/7/05	8/13/05
Parameters																		
Explosives (µg/L)																		
1,3,5-TRINITROBENZENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U
1,3-DINITROBENZENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 U	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 U	0.27 U	0.25 U	0.269 U	0.28 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.48 U						0.5 U						0.51 U				
2,4,6-TRINITROTOLUENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U
2,4-DIAMINO-6-NITROTOLUENE		0.24 U		0.278 U		0.26 U		0.25 U		0.258 U		0.25 U		0.255 U		0.25 U		0.28 U
2,4-DINITROTOLUENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U
2,6-DIAMINO-4-NITROTOLUENE		0.24 U		0.278 U		0.26 U		0.25 U		0.258 U		0.25 U		0.255 U		0.25 U		0.28 U
2,6-DINITROTOLUENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U
2-AMINO-4,6-DINITROTOLUENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.48 J	0.62 J	0.89	0.52 J	0.45 J	0.41 J	0.55 U	0.47 J	0.27 U	0.3 J	0.269 U	0.34 J
2-NITROTOLUENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U
4,4'-TN-AZOXY				0.555 U		0.52 U				0.515 U		0.5 U				0.5 U		0.55 U
4-AMINO-2,6-DINITROTOLUENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.86 J	1.1	1 J	0.91	0.76	0.72	0.55 U	1 J	0.56	0.75	0.44 J	0.75
4-NITROTOLUENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 UJ	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 UJ	0.27 U	0.25 U	0.269 U	0.28 U
DNX		0.24 U		0.278 U		0.26 U		0.25 U		0.258 U		0.25 U		0.63 J		0.25 U		0.28 U
HMX	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	5.7	7.5	6.1	5.7	5	5.4	7.8	21	8.6	8.2	6.4	8.8
MNX		0.24 U		0.278 U		0.26 U		0.82		0.36 J		0.32 J		4.1		1.2		2.5
NITROBENZENE	0.21 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	0.45 U	0.25 U	0.242 U	0.258 U	0.271 U	0.25 U	0.55 U	0.255 U	0.27 U	0.25 U	0.269 U	0.28 U
RDX	0.195 U	0.24 U	0.27 U	0.278 U	0.26 U	0.26 U	52	71	50	55	51	51	77	200	70	68	59	130
TETRYL	0.21 U	0.24 U	0.27 UJ	0.278 U	0.26 U	0.26 U	0.45 U	0.25 U	0.242 UJ	0.258 U	0.271 U	0.25 U	0.55 U	0.255 U	0.27 U	0.25 U	0.269 U	0.28 U
TNX		0.24 U		0.278 U		0.26 U		0.25 U		0.258 U		0.25 U		0.255 U		0.25 U		0.28 U
Volatiles (µg/L)																		
CIS-1,2-DICHLOROETHENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		0.4 J	0.5 J	0.6 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
ETHANE		0.062		0.078		0.093				0.005 U		0.016 J		0.013		0.0088 J		0.004 J
ETHENE		0.018		0.005 U		0.007 J				0.026		0.052		0.027		0.014 J		0.016 J
TRICHLOROETHENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		5.6	5	4.3	5	4.5	4.8	2.2	3.9	2.1	5	2.4	3.7
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Miscellaneous Parameters (MG/L)																		
AMMONIA-N	0.04						0.02						0.03					
CHLORIDE		14		25 J		22		5		5 J		4		10		11 J		7
NITRITE/NITRATE-N	0.02 U	0.05 U		0.45		0.025 U	0.54	0.7		0.75		0.36	0.6	0.49		0.88		0.025 U
SULFATE		270		8700		59		170		150		200		70		32		24
TOTAL ORGANIC CARBON		1.7				1.1						1.2		1.4				2.6
Field Parameters (MG/L unless indicated otherwise)																		
ALKALINITY (MG/L)		300						10 U						75				
CARBON DIOXIDE (MG/L)		105						130						19				
DISSOLVED OXYGEN (MG/L)		0.2	0.12	4.68				1	0.1	13.83				2	1.81	7.25		
DISSOLVED OXYGEN - METER (MG/L)	0.64	6.3			1.53	0.95	1.63	0.74			0.81	1.5	5.41	0.89			0.39	2.02
HYDROGEN SULFIDE (MG/L)		0						0						0				
IRON(+2) (MG/L)		3.3 >						0.54						5.19				
MANGANESE(+2) (MG/L)		1.5						2.1						1				
NITRITE-N (MG/L)		0.003						0.007						0.004				
OXIDATION REDUCTION POTENTIAL (MV)	7.1	-0.8	124	28.2	641		154.2	350	438.1	266	335.8		79.7	152	54	231	286.3	
PH	6.65	6.54	5.75	6.59	5.2	5.91	5.84	4.82	5.28	5	5.13	5	6.28	5.84	5.6	5.5	6.32	6.1
SPECIFIC CONDUCTANCE (MS/CM)	0.568	1.75	0.502	0.479	0.446	402	0.483	0.355	0.43	0.323	0.359	339	0.225	0.582	0.232	0.18	0.16	0.168
SULFIDE (MG/L)		0						0.01						0				
TEMPERATURE (C)	11.8	15.27	17.24	13.04	15.84	16.63	14.17	13.62	18.66	14.69	14.85	17.14	12.41	15.73	19.45	15.09	15.93	19.6
TURBIDITY	2.2	0.8	0	1.1	0.2	0	2.8	1.06	15.5	7.9	8.7	8.4	9.2	2.2	5.13	2.3	7.8	0.7

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 6
UPPER PENNSYLVANIAN WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

SAMPLING LOCATION	16MWT06						16MWT09						16MWT10					
SAMPLING ROUND	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
DATE	4/28/03	11/8/03	8/24/04	2/5/05	5/7/05	8/12/05	No Sample	11/22/03	8/17/04	2/6/05	5/7/05	8/14/05	No Sample	11/21/03	8/17/04	2/6/05	5/7/05	8/13/05
Parameters																		
Explosives (µg/L)																		
1,3,5-TRINITROBENZENE	0.34 U	0.25 UJ	1.8	2	3.4	1.9		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
1,3-DINITROBENZENE	0.34 U	0.25 U	0.25 U	0.24 U	0.264 UJ	0.28 U		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.5 U						0.543 U						0.575 U				
2,4,6-TRINITROTOLUENE	0.34 U	0.25 UJ	4.8	6.2	12	4.1		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
2,4-DIAMINO-6-NITROTOLUENE		0.27 J		0.31 J		1.3		0.272 U		0.24 U		0.26 U		0.287 U		0.255 U		0.27 U
2,4-DINITROTOLUENE	0.34 U	0.25 UJ	0.8	1.2	1 J	0.68		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
2,6-DIAMINO-4-NITROTOLUENE		0.25 U		0.24 U		0.28 U		0.272 U		0.24 U		0.26 U		0.287 U		0.255 U		0.27 U
2,6-DINITROTOLUENE	0.34 U	0.25 UJ	0.25 U	0.92 J	1.3 J	0.52 J		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
2-AMINO-4,6-DINITROTOLUENE	0.34 U	4.2 J	29 J	34	60 J	28 J		0.31 J	0.27 U	0.26 J	0.269 U	0.27 J		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
2-NITROTOLUENE	0.34 U	0.25 UJ	0.25 U	0.24 U	0.264 UJ	0.28 U		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
4,4'-TN-AZOXY				0.48 U		0.56 U				0.48 U		0.52 U				0.51 U		0.54 U
4-AMINO-2,6-DINITROTOLUENE	0.34 U	1.5	14	18	31	13		0.69 J	0.27 U	0.61 J	0.269 U	0.68		0.287 U	0.27 U	0.42 J	0.248 U	0.47 J
4-NITROTOLUENE	0.34 U	0.25 UJ	0.25 U	0.24 U	0.264 UJ	0.28 U		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
DNX		0.25 U		0.24 U		0.28 U		0.272 U		0.24 U		0.26 U		0.287 U		0.255 U		0.27 U
HMX	0.34 U	0.27 J	0.93 J	0.72 J	0.64 J	1.6		11	8.1	9.3	9.3	11		6.7	5.2	5.1	4.8	5.8
MNX		0.25 U		0.24 U		0.33 J		1.1		0.43 J		0.46 J		0.5 J		0.3 J		0.27 U
NITROBENZENE	0.34 U	0.25 U	0.25 U	0.24 U	0.264 UJ	0.28 U		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
RDX	4	1.8	8.8	7.3	11	13		110	79	92	98	100		55	55	50	51	58
TETRYL	0.34 U	0.25 U	0.25 UJ	0.24 U	0.264 UJ	0.28 U		0.272 U	0.27 U	0.24 U	0.269 U	0.26 U		0.287 U	0.27 U	0.255 U	0.248 U	0.27 U
TNX		0.25 U		0.24 U		0.28 U		0.272 U		0.24 U		0.26 U		0.287 U		0.255 U		0.27 U
Volatiles (µg/L)																		
CIS-1,2-DICHLOROETHENE	600	4200	4100	5200	5600	4600		0.2 J	0.3 U	0.3 U	0.3 U	0.3 U		0.2 J	0.3 U	0.3 U	0.3 U	0.3 U
ETHANE		7.7		2.3		1.5				0.074		0.044		0.33		0.082		0.054
ETHENE		65		29		22				0.081		0.079		0.16		0.03		0.036
TRICHLOROETHENE	35000	250000	330000	440000	510000	480000		7.6	7.1	10	6.9	9.1		1.9	1.9	2.4	1.6	1.4
VINYL CHLORIDE	65 J	340 J	390 J	660	610	350 J		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Miscellaneous Parameters (MG/L)																		
AMMONIA-N	0.57																	
CHLORIDE		47		54 J		58		14 U		13 J		12		8 J		9 J		7
NITRITE/NITRATE-N	0.5	0.025 U		0.025 U		0.025 U		0.05 U		0.56		0.025 U		0.27 J		0.72		0.27
SULFATE		520		480		490		210 U		290		240		980 J		1100		880
TOTAL ORGANIC CARBON						4.1						1						1.7
Field Parameters (MG/L unless indicated other																		
ALKALINITY (MG/L)		200												10 U				
CARBON DIOXIDE (MG/L)		40												280				
DISSOLVED OXYGEN (MG/L)		1.5	0.39	2.64					0.37	1.41				0.35	0.14	7.14		
DISSOLVED OXYGEN - METER (MG/L)	0.48	1.67			2.69	3.06		2.33			1.51	1.09		1.28			1.1	220
HYDROGEN SULFIDE (MG/L)		0												0				
IRON(+2) (MG/L)		0.03												3.3 >				
MANGANESE(+2) (MG/L)		3.8												22 >				
NITRITE-N (MG/L)		0.016												0.002				
OXIDATION REDUCTION POTENTIAL (MV)	-106	188.6	402	14.5	497			329.8	199.7	169.4	525			328.9	501.2	315.2	337	
PH	7.7	6.49	4.69	5.96	6	6		4.1	4.7	4.82	5	4.11		3.72	3.21	3.31	3.59	3
SPECIFIC CONDUCTANCE (MS/CM)	0.516	1.216	1.219	0.889	0.762	862		0.502	0.937	0.456	0.432	522		1.178	1.284	1.168	0.867	854
SULFIDE (MG/L)		0.07												0.02				
TEMPERATURE (C)	15	14.55	18.77	15.57	17.46	20.27		16.56	19.68	12.18	14.1	17.77		14.77	16.75	14.1	15.88	17.85
TURBIDITY	8.8	1.99	29	17.9	15	5.2		4.82	2.32	0	1	0		5.56	6.31	4.3	7.4	6.9

TABLE 3-1

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 6
UPPER PENNSYLVANIAN WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

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

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

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

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

> - 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.

TABLE 3-2

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 UPGRADIENT GROUNDWATER SAMPLES
UPPER PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC 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							
DISSOLVED OXYGEN - METER (mg/L)	1/1	1.53	1.53	---	1.53	1.53	16GW0206
OXIDATION REDUCTION POTENTIAL (MV)	1/1	641	641	---	641	641	16GW0206
PH (S.U.)	1/1	5.2	5.2	---	5.2	5.2	16GW0206
SPECIFIC CONDUCTANCE (MS/CM)	1/1	0.446	0.446	---	0.446	0.446	16GW0206
TEMPERATURE (C)	1/1	15.84	15.84	---	15.8	15.8	16GW0206
TURBIDITY (NTU)	1/1	0.2	0.2	---	0.2	0.2	16GW0206

TABLE 3-3

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 GROUNDWATER SAMPLES
UPPER PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organics (ug/L)							
1,1,1,2-TETRACHLOROETHANE	1/7	0.6 J	0.6 J	0.3 - 6	0.621	0.6	16GWT0606
1,1,2,2-TETRACHLOROETHANE	1/7	5.5	5.5	0.3 - 6	1.32	5.5	16GWT0606
1,1,2-TRICHLOROETHANE	3/7	3.2	250	0.3	42.3	98.4	16GWT0606
1,1-DICHLOROETHENE	2/7	0.5 J	160 J	0.3 - 6	23.4	80.3	16GWT0606
4-METHYL-2-PENTANONE	1/7	41	41	0.5 - 10	6.75	41	16GWT0606
ACETONE	1/7	17 J	17 J	0.5 - 10	3.32	17	16GWT0606
BENZENE	1/7	4.7	4.7	0.3 - 6	1.21	4.7	16GWT0606
CARBON DISULFIDE	1/7	2.6	2.6	0.3 - 6	0.907	2.6	16GWT0606
CARBON TETRACHLORIDE	2/7	3.5	14	0.3 - 6	3.01	8.75	16GW0305
CHLOROFORM	2/7	4.5	21	0.3 - 6	4.31	12.8	16GWT0606
CIS-1,2-DICHLOROETHENE	3/7	12	5600	0.3	839	1957	16GWT0606
ETHYLBENZENE	1/7	6.2	6.2	0.3 - 6	1.42	6.2	16GWT0606
TETRACHLOROETHENE	2/7	0.6 J	180 J	0.3 - 6	26.3	90.3	16GWT0606
TOLUENE	1/7	380	380	0.3 - 6	54.8	380	16GWT0606
TOTAL XYLENES	1/7	9.1	9.1	0.3 - 6	1.84	9.1	16GWT0606
TRANS-1,2-DICHLOROETHENE	1/7	25	25	0.3 - 6	4.11	25	16GWT0606
TRICHLOROETHENE	7/7	1.6	510000	---	75888	75888	16GWT0606
VINYL CHLORIDE	1/7	610	610	0.3 - 6	87.7	610	16GWT0606
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	1/7	3.4	3.4	0.248 - 0.298	0.603	3.4	16GWT0606
2,4,6-TRINITROTOLUENE	1/7	12	12	0.248 - 0.298	1.83	12	16GWT0606
2,4-DINITROTOLUENE	1/7	1 J	1 J	0.248 - 0.298	0.26	1	16GWT0606
2,6-DINITROTOLUENE	1/7	1.3 J	1.3 J	0.248 - 0.298	0.303	1.3	16GWT0606
2-AMINO-4,6-DINITROTOLUENE	2/7	0.45 J	60 J	0.248 - 0.298	8.73	30.2	16GWT0606
4-AMINO-2,6-DINITROTOLUENE	3/7	0.44 J	31	0.248 - 0.298	4.68	10.7	16GWT0606
HMX	5/7	0.64 J	9.3	0.281 - 0.298	3.78	5.23	16GWT0904
RDX	6/7	4.9	98	0.298	39.3	45.8	16GWT0904
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	7/7	-17.04	2.69	---	-1.51	-1.51	16GWT0606
OXIDATION REDUCTION POTENTIAL (MV)	7/7	100.1	525	---	322	322	16GWT0904
PH (S.U.)	7/7	3.59	6.32	---	5.23	5.23	16GWT0405
SPECIFIC CONDUCTANCE (MS/CM)	7/7	0.16	0.867	---	0.469	0.469	16GWT1004
TEMPERATURE (C)	7/7	13.78	17.46	---	15.5	15.5	16GWT0606
TURBIDITY (NTU)	7/7	1	30	---	10.6	10.6	16GWT1304

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

TABLE 3-4

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 6 UPGRADIENT GROUNDWATER SAMPLES
UPPER PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organics (ug/L)							
ETHANE	1/1	0.093	0.093	---	0.093	0.093	16GW0207
ETHENE	1/1	0.007 J	0.007 J	---	0.007	0.007	16GW0207
METHANE	1/1	75	75	---	75	75	16GW0207
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	1/1	0.95	0.95	---	0.95	0.95	16GW0207
PH (S.U.)	1/1	5.91	5.91	---	5.91	5.91	16GW0207
SPECIFIC CONDUCTANCE (MS/CM)	1/1	402	402	---	402	402	16GW0207
TEMPERATURE (C)	1/1	16.63	16.63	---	16.6	16.6	16GW0207
TURBIDITY (NTU)	1/1	0	0	---	---	---	16GW0207
Miscellaneous Parameters (ug/L)							
CHLORIDE	1/1	22	22	---	22	22	16GW0207
SULFATE	1/1	59	59	---	59	59	16GW0207
TOTAL ORGANIC CARBON	1/1	1.1	1.1	---	1.1	1.1	16GW0207

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

TABLE 3-5

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 6 GROUNDWATER SAMPLES
UPPER PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organics (ug/L)							
1,1,2-TRICHLOROETHANE	1/7	43	43	0.3 - 120	14.8	43	16GWT1705
1,1-DICHLOROETHENE	1/7	6.3 J	6.3 J	0.3 - 120	9.58	6.3	16GWT1705
CARBON TETRACHLORIDE	1/7	14	14	0.3 - 120	10.9	14	16GW0306
CHLOROFORM	3/7	0.8 J	4.7	0.3 - 120	9.94	2.6	16GW0306
CIS-1,2-DICHLOROETHENE	3/7	1.5	4600	0.3	699	1631	16GWT0607
ETHANE	7/7	0.004 J	1.5	---	0.341	0.341	16GWT0607
ETHENE	7/7	0.016 J	22	---	3.21	3.21	16GWT0607
METHANE	7/7	0.25	260	---	75.3	75.3	16GWT0607
TOLUENE	1/7	290 J	290 J	0.3 - 3	41.8	290	16GWT0607
TRICHLOROETHENE	7/7	1.4	480000	---	71307	71307	16GWT0607
VINYL CHLORIDE	1/7	350 J	350 J	0.3 - 3	50.3	350	16GWT0607
Energetics (ug/L)							
1,3,5-TRINITROBENZENE	1/7	1.9	1.9	0.25 - 0.29	0.387	1.9	16GWT0607
2,4,6-TRINITROTOLUENE	1/7	4.1	4.1	0.25 - 0.29	0.701	4.1	16GWT0607
2,4-DIAMINO-6-NITROTOLUENE	1/7	1.3	1.3	0.25 - 0.29	0.301	1.3	16GWT0607
2,4-DINITROTOLUENE	1/7	0.68	0.68	0.25 - 0.29	0.213	0.68	16GWT0607
2,6-DINITROTOLUENE	1/7	0.52 J	0.52 J	0.25 - 0.29	0.19	0.52	16GWT0607
2-AMINO-4,6-DINITROTOLUENE	4/7	0.27 J	28 J	0.27 - 0.29	4.21	7.26	16GWT0607
3-NITROTOLUENE	2/7	0.34 J	1.1 J	0.25 - 0.29	0.304	0.72	16GWT0905
4-AMINO-2,6-DINITROTOLUENE	5/7	0.47 J	13	0.27 - 0.29	2.27	3.12	16GWT0607
HMX	5/7	1.6	11	0.27 - 0.29	4.7	6.52	16GWT0905
MNX	4/7	0.33 J	2.5	0.27 - 0.29	0.575	0.903	16GWT0406
RDX	6/7	4.5	130	0.29	50.9	59.4	16GWT0406
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	7/7	0.41	220	---	35.5	35.5	16GWT1005
PH (S.U.)	7/7	3	6.82	---	5.33	5.33	16GWT1305
SPECIFIC CONDUCTANCE (MS/CM)	7/7	0.168	862	---	368	368	16GWT0607
TEMPERATURE (C)	7/7	17.14	21.63	---	18.9	18.9	16GWT1305
TURBIDITY (NTU)	7/7	0	8.4	---	4.21	4.21	16GW0306
Miscellaneous Parameters (mg/L)							
CHLORIDE	7/7	4	120	---	33	33	16GWT1705
NITRITE/NITRATE-N	2/7	0.27	0.36	0.025	0.0989	0.315	16GW0306
SULFATE	7/7	24	880	---	304	304	16GWT1005
TOTAL ORGANIC CARBON	7/7	1	4.1	---	1.94	1.94	16GWT0607

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

TABLE 3-6

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 6
MIDDLE PENNSYLVANIAN WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

SAMPLING LOCATION	16MW04						16MWT12					
SAMPLING ROUND	1	2	3	4	5	6	1	2	3	4	5	6
DATE	4/23/03	10/26/03	8/25/04	2/6/05	5/6/05	8/13/05	No Sample	11/21/03	8/24/04	2/6/05	5/7/05	8/13/05
Parameter												
Explosives (µg/L)												
1,3,5-TRINITROBENZENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
1,3-DINITROBENZENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.5 U						0.538 U				
2,4,6-TRINITROTOLUENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
2,4-DIAMINO-6-NITROTOLUENE		0.25 U		0.264 U		0.25 U		0.269 U		0.26 U		0.26 U
2,4-DINITROTOLUENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
2,6-DIAMINO-4-NITROTOLUENE		0.25 U		0.264 U		0.25 U		0.269 U		0.26 U		0.26 U
2,6-DINITROTOLUENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
2-AMINO-4,6-DINITROTOLUENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
2-NITROTOLUENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
4,4'-TN-AZOXY				0.528 U		0.5 U				0.52 U		0.51 U
4-AMINO-2,6-DINITROTOLUENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
4-NITROTOLUENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
DNX		0.25 U		0.264 U		0.25 U		0.269 U		0.26 U		0.26 U
HMX	0.39	0.45 J	0.264 U	0.264 U	0.269 U	0.25 U		1.3 J	0.264 U	0.26 U	0.266 U	0.26 U
MNX		0.25 U		0.264 U		0.25 U		0.269 U		0.26 U		0.26 U
NITROBENZENE	0.165 U	0.25 U	0.264 U	0.264 U	0.269 U	0.25 U		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
RDX	1.7	1.9	0.66	0.58	0.59	0.64		0.269 U	0.264 U	0.26 U	0.266 U	0.26 U
TETRYL	0.165 U	0.25 U	0.264 UJ	0.264 U	0.269 U	0.25 U		0.269 U	0.264 UJ	0.26 U	0.266 U	0.26 U
TNX		0.25 U		0.264 U		0.25 U		0.269 U		0.26 U		0.26 U
Volatiles (µg/L)												
CIS-1,2-DICHLOROETHENE	0.3 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
ETHANE				0.005 U		0.01 J		0.37 J		0.17		0.13
ETHENE				0.005 U		0.018 J		0.031 J		0.12		0.028
TRICHLOROETHENE	0.5 J	0.3 U	0.7 J	1.4	0.7 J	0.9 J		0.3 U	0.3 U	0.5 J	0.3 U	0.3 U
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Miscellaneous Parameters (MG/L)												
AMMONIA-N	0.08											
CHLORIDE		12		15 J		14		15 U		15 J		13
NITRITE/NITRATE-N	0.02 U	0.05 U		0.025 U		0.025 U		0.025 U		0.025 U		0.025 U
SULFATE		430		660		650		260 J		1300		980
TOTAL ORGANIC CARBON						1						1
Field Parameters												
ALKALINITY (MG/L)								10 U				
CARBON DIOXIDE (MG/L)								260				
DISSOLVED OXYGEN (MG/L)				5.79				0.1	3.66	4.22		
DISSOLVED OXYGEN - METER (MG/L)	0.29	0.54			1.57	2.01		0.64			-1.57	0.36
HYDROGEN SULFIDE (MG/L)								0				
IRON(+2) (MG/L)								3.3 >				
MANGANESE(+2) (MG/L)								9.4				
NITRITE-N (MG/L)								0				
OXIDATION REDUCTION POTENTIAL (MV)	207.4	328.7	124	319	274.3			306.8	220.7	134.6	230.2	
PH	3.68	3.65	4.1	4.5	4.06	3.33		4.27	4.64	4.89	4.65	6.68
SPECIFIC CONDUCTANCE (MS/CM)	0.72	0.735	0.838	0.672	0.738	0.703		0.795	2.785	1.898	2.014	1.165
SULFIDE (MG/L)								0.01				
TEMPERATURE (C)	13.31	13.21	15.03	12.87	14.13	15.79		16.04	17.81	12.28	16.46	16.75
TURBIDITY	0.5	0.13	8.9	0.05	0.49	0.5		4.11	7.63	1.7	1.7	0

U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
UJ – Indicates that the chemical was not detected; however, the detection limit (sample-specific detection limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.
> - Indicates that the true value is probably greater than the reported value.

TABLE 3-7

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 GROUNDWATER SAMPLES
MIDDLE PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organics (ug/L)							
TRICHLOROETHENE	1/2	0.7 J	0.7 J	0.3	0.425	0.7	16GW0405
Energetics (ug/L)							
RDX	1/2	0.59	0.59	0.266	0.362	0.59	16GW0405
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	2/2	-1.57	1.57	---	---	---	16GW0405
OXIDATION REDUCTION POTENTIAL (MV)	2/2	230.2	274.3	---	252	252	16GW0405
PH (S.U.)	2/2	4.06	4.65	---	4.36	4.36	16GWT1204
SPECIFIC CONDUCTANCE (MS/CM)	2/2	0.738	2.014	---	1.38	1.38	16GWT1204
TEMPERATURE (C)	2/2	14.13	16.46	---	15.3	15.3	16GWT1204
TURBIDITY (NTU)	2/2	0.49	1.7	---	1.1	1.1	16GWT1204

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

TABLE 3-8

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 6 GROUNDWATER SAMPLES
MIDDLE PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organics (ug/L)							
ETHANE	2/2	0.01 J	0.13	---	0.07	0.07	16GWT1205
ETHENE	2/2	0.018 J	0.028	---	0.023	0.023	16GWT1205
METHANE	2/2	0.34	0.88	---	0.61	0.61	16GWT1205
TRICHLOROETHENE	1/2	0.9 J	0.9 J	0.3	0.525	0.9	16GW0406
Energetics (ug/L)							
RDX	1/2	0.64	0.64	0.26	0.385	0.64	16GW0406
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	2/2	0.36	2.01	---	1.19	1.19	16GW0406
PH (S.U.)	2/2	3.33	6.68	---	5.01	5.01	16GWT1205
SPECIFIC CONDUCTANCE (MS/CM)	2/2	0.703	1.165	---	0.934	0.934	16GWT1205
TEMPERATURE (C)	2/2	15.79	16.75	---	16.3	16.3	16GWT1205
TURBIDITY (NTU)	2/2	0	0.5	---	0.25	0.25	16GW0406
Miscellaneous Parameters (ug/L)							
CHLORIDE	2/2	13	14	---	13.5	13.5	16GW0406
SULFATE	2/2	650	980	---	815	815	16GWT1205
TOTAL ORGANIC CARBON	2/2	1	1	---	1	1	16GW0406, 16GWT1205

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

TABLE 3-9

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 GROUNDWATER
ROUNDS 1 THROUGH 6
LOWER PENNSYLVANIAN WATER BEARING ZONE
NSWC CRANE
CRANE, INDIANA

Sample Location	16MWT11						16MWT15					
Sampling Round	1	2	3	4	5	6	1	2	3	4	5	6
Date	No Sample	12/6/03	8/25/04	2/4/05	5/6/05	8/12/05	No Sample	12/6/03	8/17/04	2/5/05	5/7/05	8/14/05
Parameter												
Explosives (µg/L)												
1,3,5-TRINITROBENZENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
1,3-DINITROBENZENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.495 UJ						0.495 U				
2,4,6-TRINITROTOLUENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
2,4-DIAMINO-6-NITROTOLUENE		0.248 UJ		0.316 U		0.29 U		0.248 U		0.266 U		0.26 U
2,4-DINITROTOLUENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
2,6-DIAMINO-4-NITROTOLUENE		0.248 UJ		0.316 U		0.29 U		0.248 U		0.266 U		0.26 U
2,6-DINITROTOLUENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
2-AMINO-4,6-DINITROTOLUENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
2-NITROTOLUENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
4,4'-TN-AZOXY				0.632 U		0.59 U				0.532 U		0.52 U
4-AMINO-2,6-DINITROTOLUENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
4-NITROTOLUENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
DNX		0.248 UJ		0.316 U		0.29 U		0.248 U		0.266 U		0.26 U
HMX		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
MNX		0.248 UJ		0.316 U		0.29 U		0.248 U		0.266 U		0.26 U
NITROBENZENE		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
RDX		0.248 UJ	0.242 U	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
TETRYL		0.248 UJ	0.242 UJ	0.316 U	0.266 U	0.29 U		0.248 U	0.26 U	0.266 U	0.271 U	0.26 U
TNX		0.248 UJ		0.316 U		0.29 U		0.248 U		0.266 U		0.26 U
Volatiles (µg/L)												
CIS-1,2-DICHLOROETHENE		0.3 U	0.3 U	0.3 U	30 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
ETHANE				0.34		0.44		1		2.5		0.99
ETHENE				0.075		0.074		0.22		0.26		0.41
TRICHLOROETHENE		0.3 U	0.3 U	0.3 U	52 U	0.3 U		0.3 U	0.3 U	0.6 J	0.3 U	0.3 U
VINYL CHLORIDE		0.3 U	0.3 U	0.3 U	30 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Miscellaneous Parameters (MG/L)												
CHLORIDE				5		5		4		3 J		2
NITRITE/NITRATE-N				0.025 U		0.025 U		0.05 UJ		0.025 U		0.025 U
SULFATE				4		4		8		0.5 U		0.5 U
TOTAL ORGANIC CARBON						1 U		2.6				1 U
Field Parameters												
ALKALINITY (MG/L)								250				
CARBON DIOXIDE (MG/L)								10 U				
DISSOLVED OXYGEN (MG/L)			0.87	9.72				3.5	1.77	1.36		
DISSOLVED OXYGEN - METER (MG/L)		4.51						2.57			-0.04	1.09
HYDROGEN SULFIDE (MG/L)								0				
IRON(+2) (MG/L)								0				
MANGANESE(+2) (MG/L)								0.3				
NITRITE-N (MG/L)								0.007				
OXIDATION REDUCTION POTENTIAL (MV)		188	95	-43.9				174.1	143.1	-21.7	238.4	
PH		7.35	5.47	6.98				7.99	6.15	7.43	7.06	6.95
SPECIFIC CONDUCTANCE		0.256	1.004	0.756				0.392	0.411	0.354	0.301	0.326
SULFIDE (MG/L)												
TEMPERATURE (°C)		7.29	24.93	11.82				12.78	15.85	13.89	16.87	19.23
TURBIDITY (NTU)		650	4.7	2.8				22.5	2	0.6	0	0.65

U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ – Indicates that the chemical was not detected; however, the detection limit (sample-specific detection limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.
J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

TABLE 3-10

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 GROUNDWATER SAMPLES - LOWER PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC 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							
DISSOLVED OXYGEN - METER (mg/L)	1/1	-0.04	-0.04	---	-0.04	-0.04	16GWT1504
OXIDATION REDUCTION POTENTIAL (MV)	1/1	238.4	238.4	---	238	238	16GWT1504
PH (S.U.)	1/1	7.06	7.06	---	7.06	7.06	16GWT1504
SPECIFIC CONDUCTANCE (MS/CM)	1/1	0.301	0.301	---	0.301	0.301	16GWT1504
TEMPERATURE (C)	1/1	16.87	16.87	---	16.9	16.9	16GWT1504
TURBIDITY (NTU)	1/1	0	0	---	---	---	16GWT1504

TABLE 3-11

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 6 GROUNDWATER SAMPLES - LOWER PENNSYLVANIAN WATER BEARING ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organics (ug/L)							
ETHANE	2/2	0.44	0.99	---	0.715	0.715	16GWT1505
ETHENE	2/2	0.074	0.41	---	0.242	0.242	16GWT1505
METHANE	2/2	1700	5400	---	3550	3550	16GWT1505
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L	1/1	1.09	1.09	---	1.09	1.09	16GWT1505
PH (S.U.)	1/1	6.95	6.95	---	6.95	6.95	16GWT1505
SPECIFIC CONDUCTANCE (MS/CM)	1/1	0.326	0.326	---	0.326	0.326	16GWT1505
TEMPERATURE (C)	1/1	19.23	19.23	---	19.2	19.2	16GWT1505
TURBIDITY (NTU)	1/1	0.65	0.65	---	0.65	0.65	16GWT1505
Miscellaneous Parameters (ug/L)							
CHLORIDE	2/2	2	5	---	3.5	3.5	16GWT1105
SULFATE	1/2	4	4	0.5	2.13	4	16GWT1105

TABLE 3-12

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 SURFACE WATER
ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA

SAMPLING LOCATION	16SW/SD10						16SW/SD12					
SAMPLING ROUND	1	2	3	4	5	6	1	2	3	4	5	6
DATE	No Sample	No Sample	11/11/04	02/03/05	05/08/05	No Sample	No Sample	10/25/03	11/02/04	02/03/05	05/08/05	No Sample
PARAMETER												
EXPLOSIVES (µg/l)												
1,3,5-TRINITROBENZENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
1,3-DINITROBENZENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE								0.5 U				
2,4,6-TRINITROTOLUENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
2,4-DIAMINO-6-NITROTOLUENE								0.25 U				
2,4-DINITROTOLUENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
2,6-DIAMINO-4-NITROTOLUENE								0.25 U				
2,6-DINITROTOLUENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
2-AMINO-4,6-DINITROTOLUENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
2-NITROTOLUENE				0.242 U	0.6			0.25 U	0.255 U	0.24 U	0.25 U	
3,5-DINITROANILINE								0.25 U				
3-NITROTOLUENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
4-AMINO-2,6-DINITROTOLUENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
4-NITROTOLUENE				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
DNX								0.25 U				
HMX				0.242 U	0.25 U			0.27 J	0.255 U	0.24 U	0.25 U	
MNX								0.25 U				
TNX								0.25 U				
RDX				0.242 U	0.25 U			0.25 U	0.255 U	0.24 U	0.25 U	
VOLATILES (µg/l)												
CIS-1,2-DICHLOROETHENE				0.3 U	0.3 U			1.4	0.3 U	1.3	0.3 U	
TRICHLOROETHENE				0.3 U	0.3 U			15	5.6	20	6.7	
VINYL CHLORIDE				0.3 U	0.3 U			0.3 U	0.3 U	0.3 U	0.3 U	
MISCELLANEOUS PARAMETERS												
NITRITE/NITRATE-N (MG/L)								0.11	0.43			
FIELD PARAMETERS												
DISSOLVED OXYGEN - METER (MG/L)					10.04			6			10.49	
DISSOLVED OXYGEN (MG/L)			6.02	8.95					9.38	10.07		
OXIDATION REDUCTION POTENTIAL (MV)			120	218	213			195.4	51.4	218	211	
PH			7.26	3.65	6.96			7.21	7.16	3.75	6.76	
SPECIFIC CONDUCTANCE (MS/CM)			0.066	0.126	0.135			0.204	0.1	0.164	0.164	
TEMPERATURE (°C)			10.74	5.44	13.71			13.24	16.24	5.95	13.92	
TURBIDITY (NTU)			46.7	6.9	1.5			4.06	38.4	3	3.5	

TABLE 3-12

SUMMARY OF CHEMICALS DETECTED, FIELD PARAMETERS,
AND MISCELLANEOUS PARAMETERS FOR SWMU 16 SURFACE WATER
ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA

SAMPLING LOCATION	16SW/SD13						16SW/SD30					
SAMPLING ROUND	1	2	3	4	5	6	1	2	3	4	5	6
DATE	No Sample	10/25/03	11/02/04	02/03/05	05/08/05	No Sample	No Sample	No Sample	10/26/04	02/03/05	05/08/05	No Sample
PARAMETER												
EXPLOSIVES (µg/l)												
1,3,5-TRINITROBENZENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
1,3-DINITROBENZENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
2,2',6,6'-TETRANITRO-4,4'-AZOXYTOLUENE		0.5 U										
2,4,6-TRINITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
2,4-DIAMINO-6-NITROTOLUENE		0.25 U										
2,4-DINITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
2,6-DIAMINO-4-NITROTOLUENE		0.25 U										
2,6-DINITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
2-AMINO-4,6-DINITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.29 J	0.245 U	0.39 J	
2-NITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
3,5-DINITROANILINE		0.25 U										
3-NITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
4-AMINO-2,6-DINITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.63	0.44 J	0.76	
4-NITROTOLUENE		0.25 U	0.25 U	0.24 U	0.245 U				0.24 U	0.245 U	0.25 U	
DNX		0.25 U										
HMX		0.25 U	0.25 U	0.24 U	0.245 U				4.8	3.6	4.4	
MNX		0.25 U										
TNX		0.25 U										
RDX		0.25 U	0.25 U	0.24 U	0.245 U				24	14	13	
VOLATILES (µg/l)												
CIS-1,2-DICHLOROETHENE		0.3 U	0.3 U	0.3 U	0.3 U				0.3 U	0.3 U	0.3 U	
TRICHLOROETHENE		0.3 U	0.3 U	0.3 U	0.3 U				0.3 U	0.3 U	0.3 U	
VINYL CHLORIDE		0.3 U	0.3 U	0.3 U	0.3 U				0.3 U	0.3 U	0.3 U	
MISCELLANEOUS PARAMETERS												
NITRITE/NITRATE-N (MG/L)		0.27	0.55									
FIELD PARAMETERS												
DISSOLVED OXYGEN - METER (MG/L)		2.94			8.45						10.44	
DISSOLVED OXYGEN (MG/L)			9.18	10.93					8.9	11.15		
OXIDATION REDUCTION POTENTIAL (MV)		68.3	49.4	203	203				53.6	188	207	
PH		6.4	7.64	3.83	6.48				7.37	4.16	7.07	
SPECIFIC CONDUCTANCE (MS/CM)		0.168	0.84	0.175	0.166				0.159	0.14	0.133	
TEMPERATURE (°C)		13.68	16.03	5.25	12.66				13.28	3.12	14.56	
TURBIDITY (NTU)		15.9	22.8	2.2	3.3				9.49	3.1	9	

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

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

TABLE 3-13

SUMMARY OF DESCRIPTIVE STATISTICS
ROUND 5 SURFACE WATER SAMPLES
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Parameter	Frequency of Detection	Minimum Concentration	Maximum Concentration	Range of Nondetects	Mean Concentration	Average of Positive Detects	Sample of Maximum Detect
Volatile Organics (ug/L)							
TRICHLOROETHENE	1/4	6.7	6.7	0.3	1.79	6.7	16SW1204
Energetics (ug/L)							
2-AMINO-4,6-DINITROTOLUENE	1/4	0.39 J	0.39 J	0.245 - 0.25	0.191	0.39	16SW3003
2-NITROTOLUENE	1/4	0.6	0.6	0.245 - 0.25	0.243	0.6	16SW1003
4-AMINO-2,6-DINITROTOLUENE	1/4	0.76	0.76	0.245 - 0.25	0.283	0.76	16SW3003
HMX	1/4	4.4	4.4	0.245 - 0.25	1.19	4.4	16SW3003
RDX	1/4	13	13	0.245 - 0.25	3.34	13	16SW3003
Field Parameters							
DISSOLVED OXYGEN - METER (mg/L)	4/4	8.45	10.49	---	9.86	9.86	16SW1204
OXIDATION REDUCTION POTENTIAL (MV)	4/4	203	213	---	209	209	16SW1003
PH (S.U.)	4/4	6.48	7.07	---	6.82	6.82	16SW3003
SPECIFIC CONDUCTANCE (MS/CM)	4/4	0.133	0.166	---	0.15	0.15	16SW1304
TEMPERATURE (C)	4/4	12.66	14.56	---	13.7	13.7	16SW3003
TURBIDITY (NTU)	4/4	1.5	9	---	4.33	4.33	16SW3003

4.0 DATA EVALUATION

Section 4 presents groundwater and surface monitoring data for Rounds 1 through 6. The information presented includes potentiometric surface contours and temporal plots for each groundwater and surface sampling location included in the SWMU 16 long term monitoring program. The objective of the long term monitoring program at SWMU 16 is to collect enough monitoring data (up to nine rounds) to determine whether residual explosives are naturally degrading and to provide data for making remedy decisions for residual explosives and VOC contamination to complete the CMS.

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

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

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

- **There should be at least two years of quarterly sampling to evaluate seasonal effects on the contaminant concentrations.** At the completion of the ninth round of sampling at SWMU 16 in 2006, quarterly monitoring will have been conducted for approximately 2 years.

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

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

- **The most recent analytical data on groundwater should be no more than two years old at the time of evaluation.** The ninth round of sampling is expected to be completed in August 2006. A final report evaluating the MNA program through nine rounds of sampling is expected to be issued in the fall of 2006. As a result, the most recent analytical data will be no more than two years old.

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

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

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

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

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

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

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

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

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

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

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

4.1 GROUNDWATER MONITORING PROGRAM

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

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

4.2 SURFACE WATER MONITORING PROGRAM

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

4.3 ROUNDS 5 AND 6 POTENTIOMETRIC SURFACES

Figures 4-1 through 4-6 show the Round 5 and Round 6 potentiometric surface elevation maps for the Puz, Pmz, and Plz water bearing zones.. The groundwater elevations for both rounds in all three zones were compared to groundwater elevations reported in the Round 4 MNA report (TtNUS, 2005). The groundwater elevations for Round 4 are presented in Appendix E. The comparison revealed similar groundwater elevations and flow directions for each zone. Further discussion of the potentiometric surface elevations for Rounds 5 and 6 is presented below.

Round 5

In Round 5, groundwater elevations in the Puz monitoring wells ranged from 743.36 feet above mean sea level (amsl) at well 16MWT10 to 753.01 feet amsl at well 16MWT04. Monitoring well 16MWT01 was not used to develop the Puz potentiometric surface map because it is not representative of SWMU 16 groundwater elevations due to differences in water elevation in previous rounds. The highest groundwater elevations in the northern portion of SWMU 16 were measured in monitoring wells 16MW02 (751.14 feet amsl) and 16MWT17 (751.15 feet amsl).. Groundwater to the west of the centerline flows to the west and southwest, ultimately discharging into gullies that drain surface water and groundwater westward towards a tributary of Turkey Creek. Shallow groundwater east of the centerline flows to the east towards gullies on the eastern side of the site. Shallow groundwater is also present in the east-central portion of the site and flows in a southeasterly direction towards gullies on the southeastern side of the site that convey water eastward and southeastward towards Turkey Creek.

Groundwater elevations in the Pmz ranged from 731.27 feet amsl at well 16MWT16 to 736.56 feet amsl at well 16MWT03. Monitoring well 16MWT16 was not used in developing the potentiometric surface map for the Pmz because the potentiometric surface elevation for 16MWT16 was approximately 5 feet lower than the average water level for other monitoring wells screened in the Pmz. Groundwater elevations for the Pmz are highest near the central portion of SWMU 16 and groundwater is flowing toward the southwestern, southern, and southeastern hillsides.

Plz groundwater elevations in Round 5 ranged from 665.40 at well 16MWT08 to 703.12 feet amsl at well 16MWT15. Monitoring well 16MWT15 was not used in developing the potentiometric surface map for the Plz because the potentiometric elevation for 16MWT15 was approximately 35 feet higher than the average water level measured in the other wells screened in the Plz. This may indicate that the well is in an area of increased vertical fracturing and enhanced leakage from the overlying intermediate flow zone. The groundwater flow direction on the eastern side of the site in the Plz is towards the northeast. There

is insufficient data to determine the direction of groundwater flow on the southern and western portions of SWMU 16.

Round 6

In Round 6, groundwater elevations in the Puz ranged from 741.03 feet amsl at well 16MWT10 to 751.65 feet amsl at well 16MWT04. Monitoring well 16MWT01 was again not used to develop the Puz potentiometric surface map because it is not representative of SWMU 16 groundwater elevations due to differences in water elevation in previous rounds. The highest groundwater elevations measured in the northern portion of SWMU 16 were in monitoring wells 16MW02 (750.78 feet amsl) and 16MWT17 (750.74 feet amsl).. Groundwater to the west of the centerline flows to the west and southwest, ultimately discharging into gullies that drain surface water and groundwater westward towards a tributary of Turkey Creek. Shallow groundwater east of the centerline flows to the east towards gullies on the eastern side of the site. Shallow groundwater in the east-central portion of the site flows in a southeasterly direction towards gullies on the southeastern side of the site that convey water eastward and southeastward towards Turkey Creek.

Groundwater elevations in the Pmz in Round 6 ranged from 731.41 feet amsl at 16MWT16 to 734.33 feet amsl at 16MWT03. Monitoring well 16MWT16 was again not used in developing the potentiometric surface map because the potentiometric surface elevation for this well was approximately 3 feet lower than the average water level for other monitoring wells in the Pmz. Groundwater elevations for the Pmz at SMWU 16 are highest near the central portion of the site and groundwater is flowing toward the southwestern, southern, and southeastern hillsides.

In Round 5, Plz groundwater elevations ranged from 665.75 at well 16MWT08 to 700.74 feet amsl at well 16MWT15. Monitoring well 16MWT15 was not used in developing the potentiometric surface map for the Plz because the potentiometric elevation for 16MWT15 was approximately 33 feet higher than the average water level measured in the other wells screened in the Plz. This may indicate that the well is in an area of increased vertical fracturing and enhanced leakage from the overlying intermediate flow zone. The groundwater flow direction on the eastern side of the site in the Plz is towards the northeast. There is insufficient data to determine the direction of groundwater flow on the southern and western portions of SWMU 16.

4.4 GROUNDWATER TEMPORAL TREND PLOTS AND DATA EVALUATION

4.4.1 Upper Pennsylvanian Water Bearing Zone (Puz)

Figure 4-7 shows temporal plots of RDX and degradation by-product concentrations for Rounds 1 through 6 in the Puz. Figure 4-8 shows temporal plots of TCE and degradation-by-product concentrations. The temporal plots are arranged in columns by monitoring well location showing concentration trends for RDX and TCE followed by the trend for each degradation by-product. All detections are shown as a data point on each plot with the data validation qualifier as applicable and correspond to data presented in Table 3-1 for the Puz.

Through Round 6, RDX has been detected at all Puz monitoring locations with the exception of 16MW02, which is the upgradient well (see Figure 4-7). This pattern of concentrations, among other evidence, links RDX to SWMU 16 as a site-related contaminant in groundwater. DNX and more notably MNX have been detected in 5 wells (16MWT03, 16MWT04, 16MWT06, 16MWT09, and 16MWT10). This alone, is an indication that degradation of RDX is occurring because the only source of these degradation compounds is RDX.

TCE has been detected at all Puz well locations with the exception of 16MW02, which is upgradient (see Figure 4-8). TCE degradation-by-products have been detected at all Puz wells, including 16MW02. Similar to RDX, this links TCE to SWMU 16 as a site-related contaminant and also provides evidence that TCE is degrading in the environment. A summary evaluation of monitoring results through Round 6 for each Puz well location is presented below:

- Upgradient well:
  - 16MW02 – No detection of RDX or degradation-by-products. No detections of TCE; however ethene and ethane have been detected in most rounds. Results for Rounds 2, 4, and 6 show a possible upward trend in ethene concentrations and a potential downward trend in ethane concentrations.
- Three source area wells:
  - 16MWT06 – Six detections of RDX with a potential upward trend in concentrations. Only one degradation product (MNX) has been detected and only in Round 6. TCE and associated degradation-by-products have been detected in all rounds of sampling. TCE,

cis-1,2-dichloroethene, and vinyl chloride concentrations have generally increased through Round 5; but decreased in Round 6. The concentrations for these contaminants through Round 6 indicate an upward trend. Concentrations of ethene and ethane, based on only three sampling events, show a downward trend in concentrations.

- 16MWT13 – RDX has only been detected in Rounds 2 and 3. Through Round 6 there have been no detections of RDX degradation products. TCE and cis-1,2-dichloroethene concentrations have been generally decreasing since Round 1 and exhibit a potential downward trend. Ethane and ethene have been detected in three rounds (2, 4, and 6) and concentrations have also decreased in most cases indicating a potential downward trend.

- 16MWT17 – RDX has been detected in Rounds 2 through 6 with concentrations remaining in the range of 4 to 5 µg/L. There have been no detections of RDX degradation products. TCE and cis-1,2-dichloroethene have also been detected in Rounds 2 through 6 with concentrations generally trending upward. Degradation product concentrations show no discernible trends other than the fact that they have been detected in Rounds 2, 4, and 6.

- Four wells within the RDX and TCE plumes:

  - 16MW03 – RDX has been detected in all rounds with concentrations exhibiting only minor fluctuations in the range of 50 to 71 µg/L. MNX has been the only detected degradation product with concentrations showing no apparent trend. TCE has been detected in all rounds with no trend in concentrations. Cis-1,2-dichloroethene was detected in early rounds of sampling (Rounds 1 through 3), but not in Rounds 4 through 6. Ethane and ethene were target analytes in Rounds 4 and 6. Ethene concentrations have increased since Round 4. Ethane was only detected in Round 6.

  - 16MWT04 – RDX has been detected in all rounds with concentrations. Concentrations have fluctuated between 59 and 200 µg/L with no apparent trend. MNX has been detected in three sample rounds, while DNX was only detected once in Round 2. Insufficient data is available to indicate a trend in TCE degradation product concentrations.

  - 16MWT09 – RDX has been detected in Rounds 2 through 6 with concentrations fluctuating between 79 and 110 µg/L and show no signs of a discernible trend. MNX has been the only detected degradation product and concentrations have generally decrease since Round 2. TCE has been detected in all rounds of sampling with no trend in concentrations. TCE has been

detected in Rounds 2 through 6 with only minor fluctuations in concentrations and no indications of a trend. Vinyl chloride and cis-1,2-dichloroethene have not been detected in most rounds. Ethane and ethene were detected in Rounds 4 and 6; however, there is insufficient data to indicate a trend for either compound.

- 16MWT10 – RDX has been detected in all rounds with no apparent trend in concentrations. MNX has been the only degradation product detected through Round 6, however there is insufficient data to discern a trend for this compound. TCE has been detected in Rounds 2 through 6; but there is no apparent trend in concentrations. Ethene and ethane were detected in Round 2, 4, and 6. The concentrations for both compounds have generally decreased since Round 2.

4.4.2 Middle Pennsylvanian Water Bearing Zone (Pmz)

Figure 4-9 shows temporal plots of RDX and degradation by-product concentrations for Rounds 1 through 6. Figure 4-10 shows temporal plots of TCE and degradation-by-product concentrations. All positive hits are shown as a data point on each plot and correspond to data presented in Table 3-6. RDX has been detected in one well (16MW04).. There have been no detections of RDX degradation-by-products. TCE has been detected in most rounds at 16MW04 but not at 16MWT12. A summary evaluation of monitoring results for each Pmz well location is presented below:

- Well at the leading edge of the plume:

  - 16MW04 – RDX has been detected in all six rounds with concentrations decreasing since Round 2, then remaining about the same in Rounds 3 through 6. There have been no detections of RDX degradation-by-products. TCE has been detected in most rounds and show a possible upward trend in concentrations. The has only been one detection each for cis-1,2-dichloroethene in Round 1, and ethane and ethene in Round 6.

- Downgradient well:

  - 16MWT12 – There have been no detections of RDX or degradation-by-products. TCE has only been detected once in Round 4. Ethene and ethane have been the only detected degradation products in Rounds 2, 4, and 6. Ethane concentrations show a potential downward trend since Round 2. However, ethene concentrations are exhibiting no trend.

4.4.3 Lower Pennsylvanian Water Bearing Zone (Plz)

Figure 4-11 shows temporal plots of RDX and degradation by-product concentrations. Figure 4-12 shows temporal plots of TCE and degradation-by-product concentrations. All positive hits are shown as a data point on each plot and correspond to data presented in Table 3-9. A summary evaluation of monitoring results for each Plz well location is presented below:

- Deep wells below the plumes:
  - 16MWT11 – There have been no detections of RDX, TCE, or RDX degradation-by-products. Ethane and ethene were detected in Round 4 and 6. However, there is insufficient data to show a trend in concentrations.
  - 16MWT15 – There have been no detections of RDX or degradation-by-products. TCE was only detected in Round 4. Ethene and ethane have been the only detected degradation products in Rounds 2, 4, and 6. Insufficient data is available to discern a trend for these compounds.

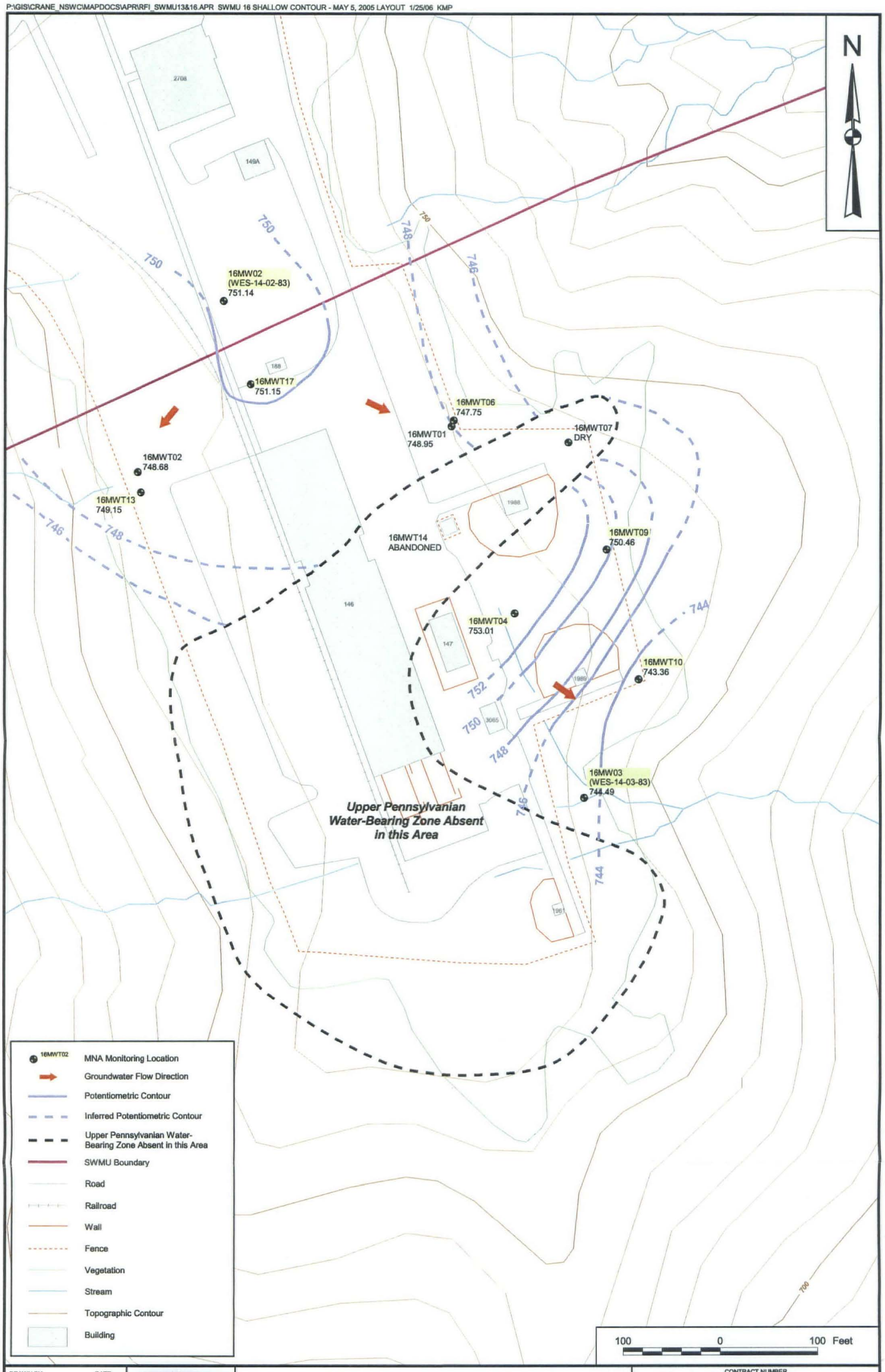
4.4 SURFACE WATER TEMPORAL TREND PLOTS AND DATA EVALUATION

Figures 4-13 and 4-14, respectively show temporal plots of RDX and TCE and associated degradation by-product concentrations in surface water through Round 6. It is important to note that surface water samples were not collected in Round 6 due to dry conditions. All positive hits are shown as a data point on each plot and correspond to data presented in Table 3-12. Through Round 6, RDX has only been detected at location 16SW/SD30 and there have been no detections of degradation products. Only TCE and cis-1,2-dichloroethene have been detected at 16SW/SD12. A summary evaluation of monitoring results for surface water location is presented below:

- 16SW10 – No detections of RDX, TCE, or their associated degradation products..
- 16SW12 - No detections of RDX or degradation products. TCE has been detected in Rounds 2 through 5 with no trend in concentrations. Cis-1,2-dichloroethene has only been detected in Rounds 2 and 4. .
- 16SW13 - No detections of RDX, TCE, or their associated degradation products.

- 16SW30 – RDX has been detected in Rounds 3, 4, and 5 and indicate a gradual decrease in concentrations since Round 3. No analyses have been conducted for RDX degradation products at this location. There have been no detections of TCE or degradation products.

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16.APR SWMU 16 SHALLOW CONTOUR - MAY 5, 2005 LAYOUT 1/25/06 KMP



DRAWN BY	DATE
K. PEILA	1/25/06
CHECKED BY	DATE
J. LUCAS	1/25/06
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
UPPER PENNSYLVANIAN WATER-BEARING ZONE - MAY 5, 2005 (ROUND 5)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
00041	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
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DRAWING NO.	REV
FIGURE 4 - 1	0

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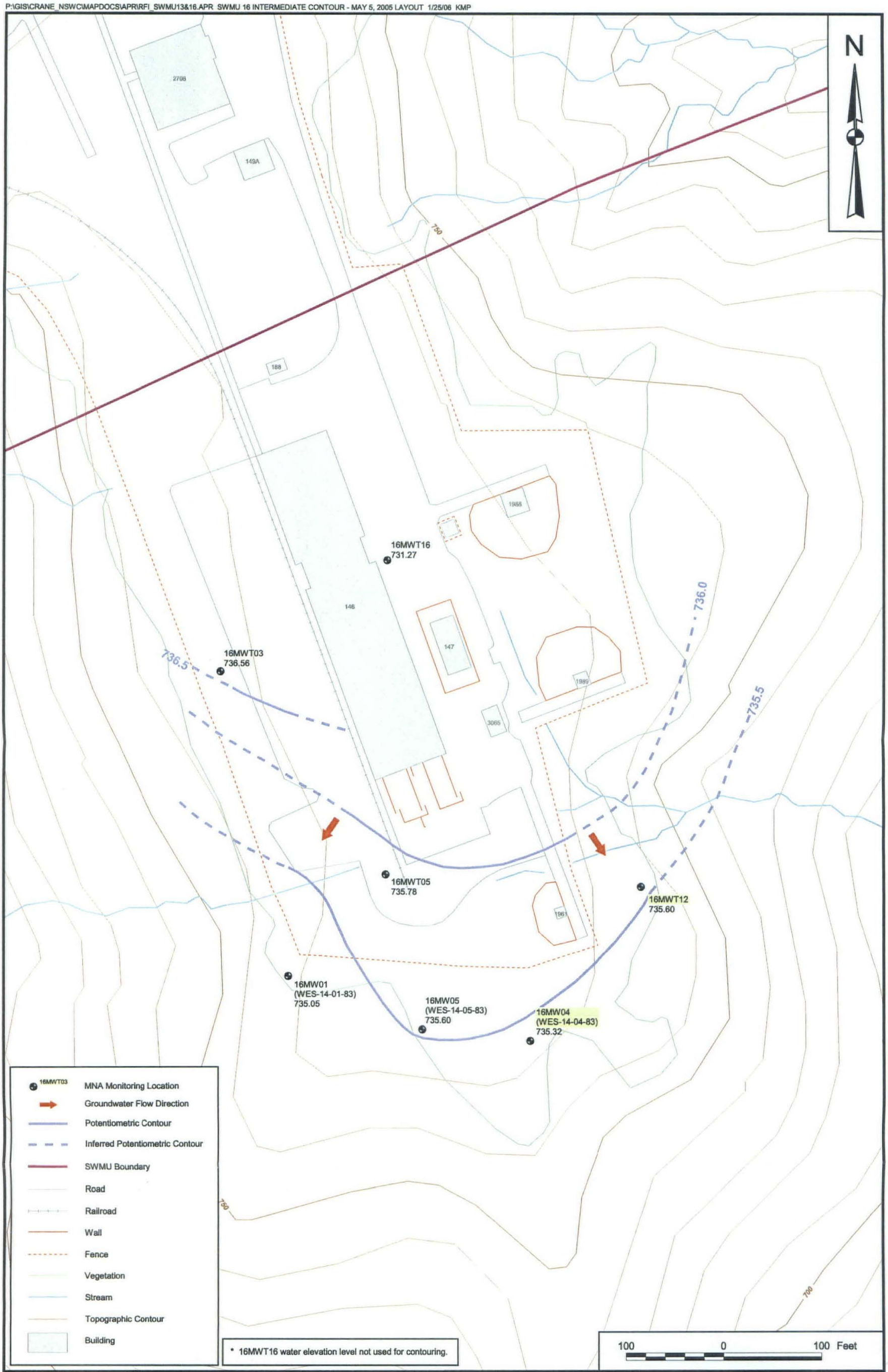

DRAWN BY	DATE
K. PEILA	1/25/06
CHECKED BY	DATE
J. LUCAS	1/25/06
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
MIDDLE PENNSYLVANIAN WATER-BEARING ZONE - MAY 5, 2005 (ROUND 5)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
00041	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. FIGURE 4 - 2	REV 0

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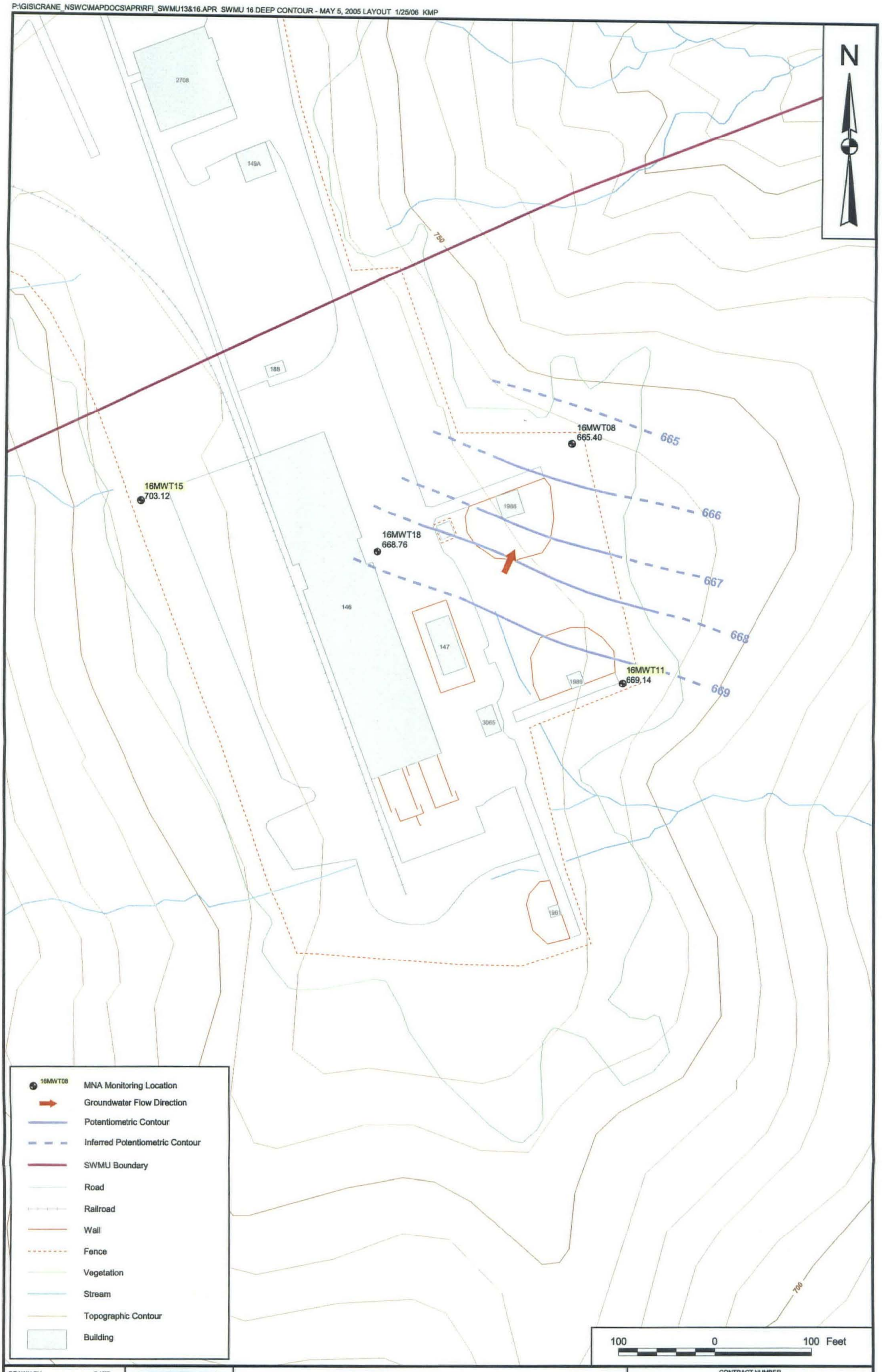

DRAWN BY	DATE
K. PEILA	1/25/06
CHECKED BY	DATE
J. LUCAS	1/25/06
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
LOWER PENNSYLVANIAN WATER-BEARING ZONE - MAY 5, 2005 (ROUND 5)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
00041	
APPROVED BY	DATE
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APPROVED BY	DATE
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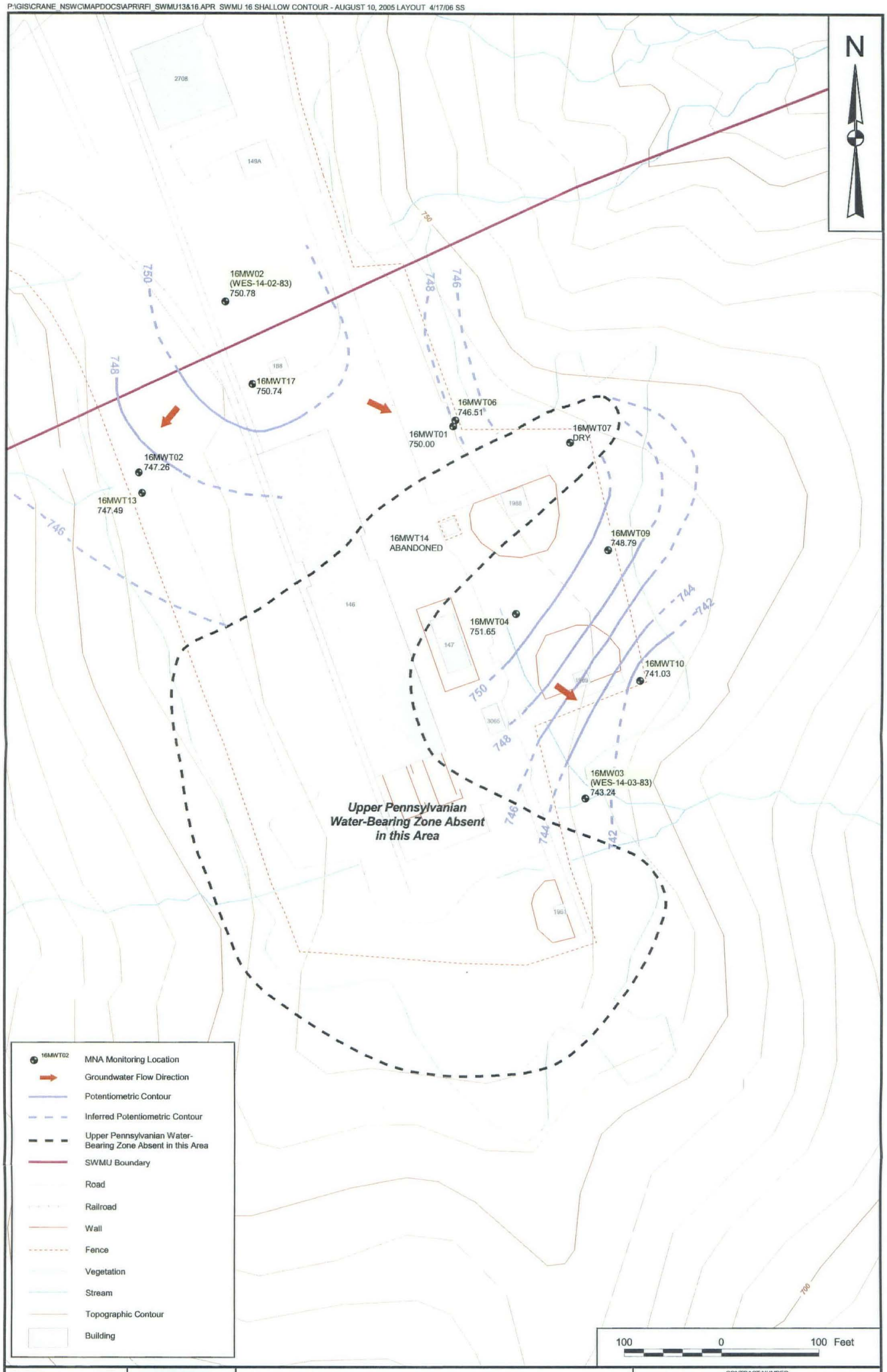
DRAWING NO. FIGURE 4 - 3	REV 0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16.APR SWMU 16 SHALLOW CONTOUR - AUGUST 10, 2005 LAYOUT 4/17/06 SS



DRAWN BY	DATE
K. PEILA	1/25/06
CHECKED BY	DATE
J. LUCAS	4/17/06
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
UPPER PENNSYLVANIAN WATER-BEARING ZONE - AUGUST 10, 2005 (ROUND 6)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

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

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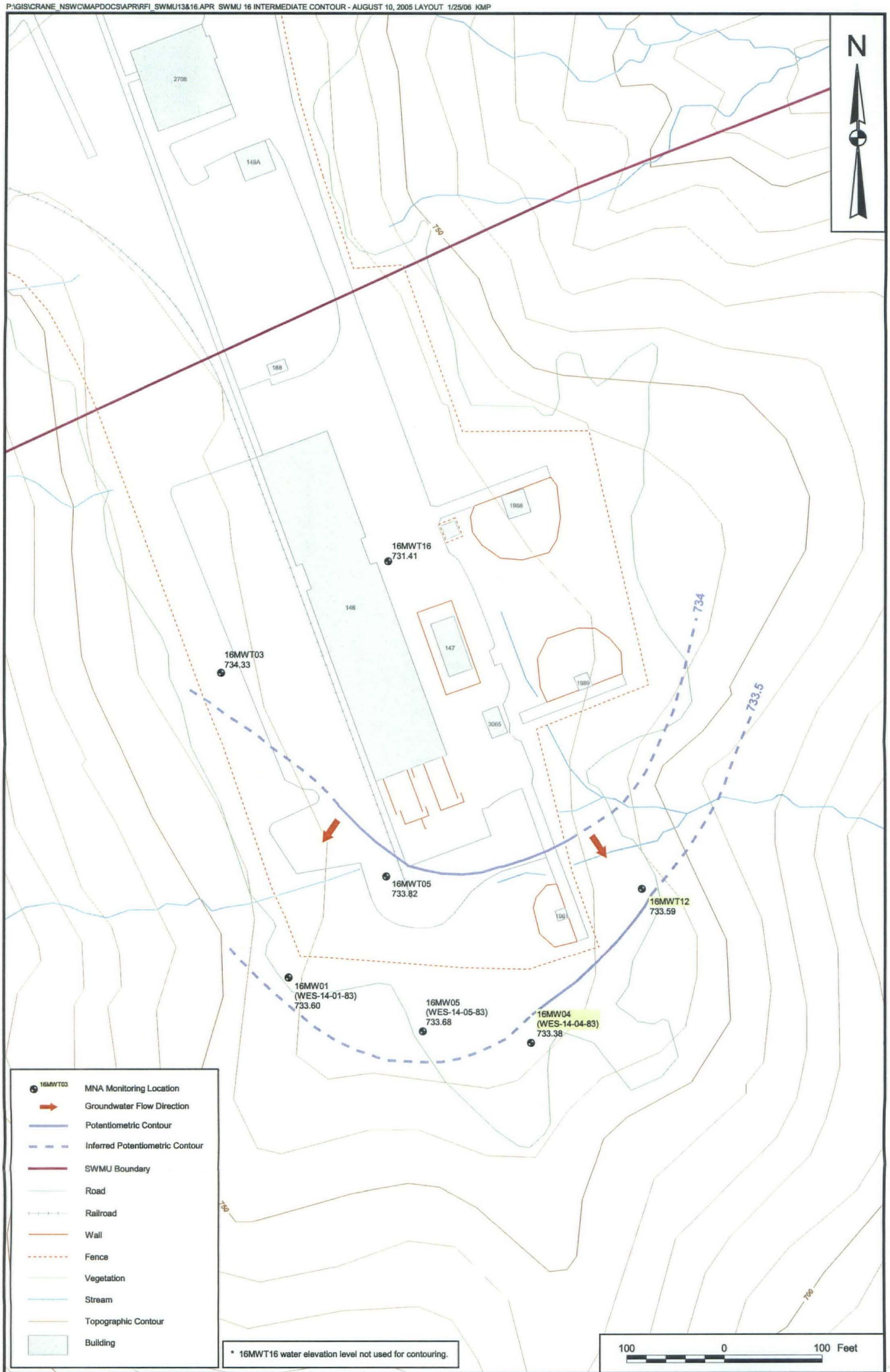

DRAWN BY	DATE
K. PEILA	1/25/06
CHECKED BY	DATE
J. LUCAS	1/25/06
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
MIDDLE PENNSYLVANIAN WATER-BEARING ZONE - AUGUST 10, 2005 (ROUND 6)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
00041	
APPROVED BY	DATE
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APPROVED BY	DATE
—	—
DRAWING NO. FIGURE 4 - 5	REV 0

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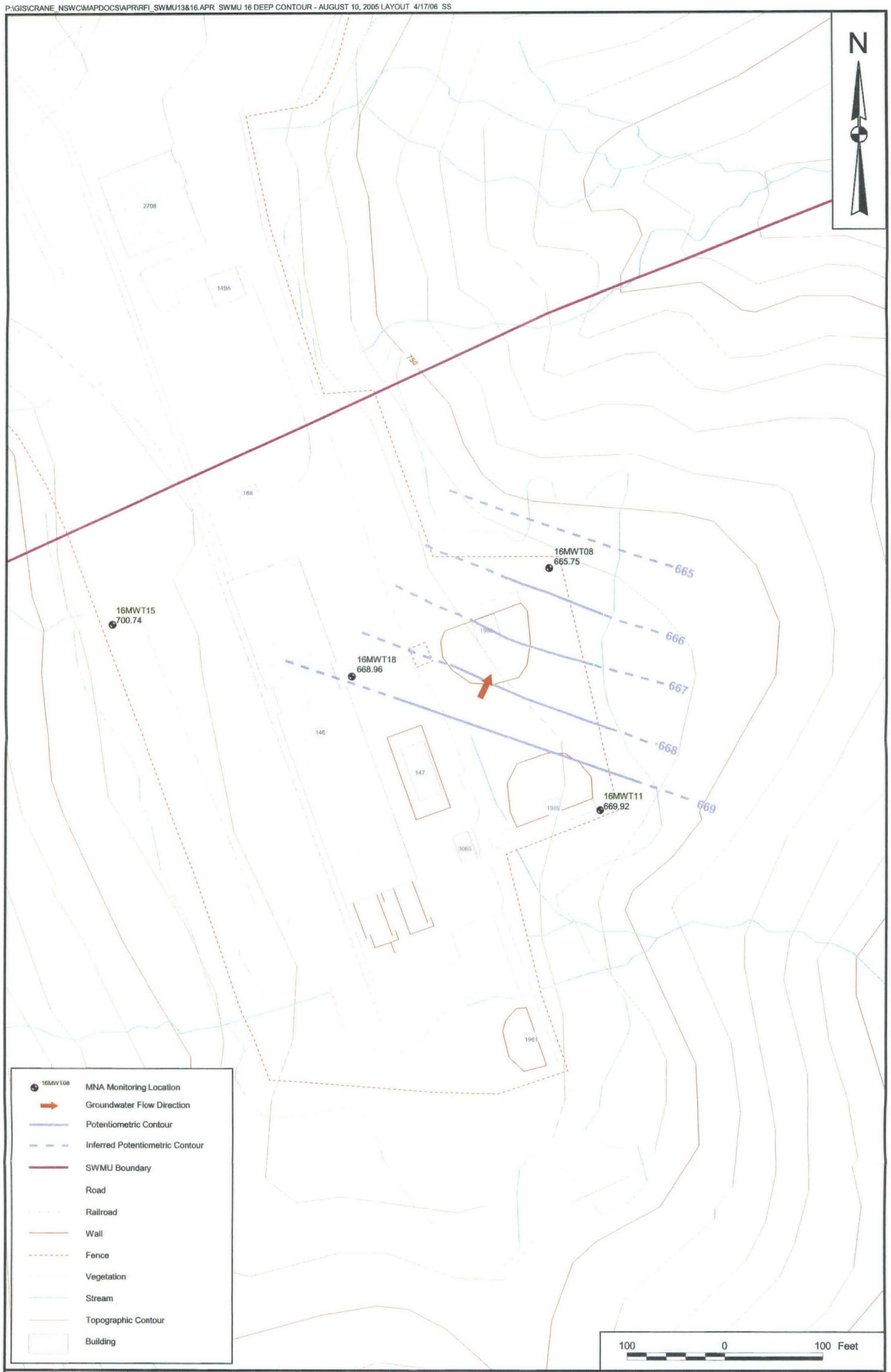

DRAWN BY	DATE
K. PEILA	1/25/06
CHECKED BY	DATE
J. LUCAS	4/17/06
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
LOWER PENNSYLVANIAN WATER-BEARING ZONE - AUGUST 10, 2005 (ROUND 6)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
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APPROVED BY	DATE
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APPROVED BY	DATE
—	—
DRAWING NO.	REV
FIGURE 4 - 6	0

FIGURE 4-7

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

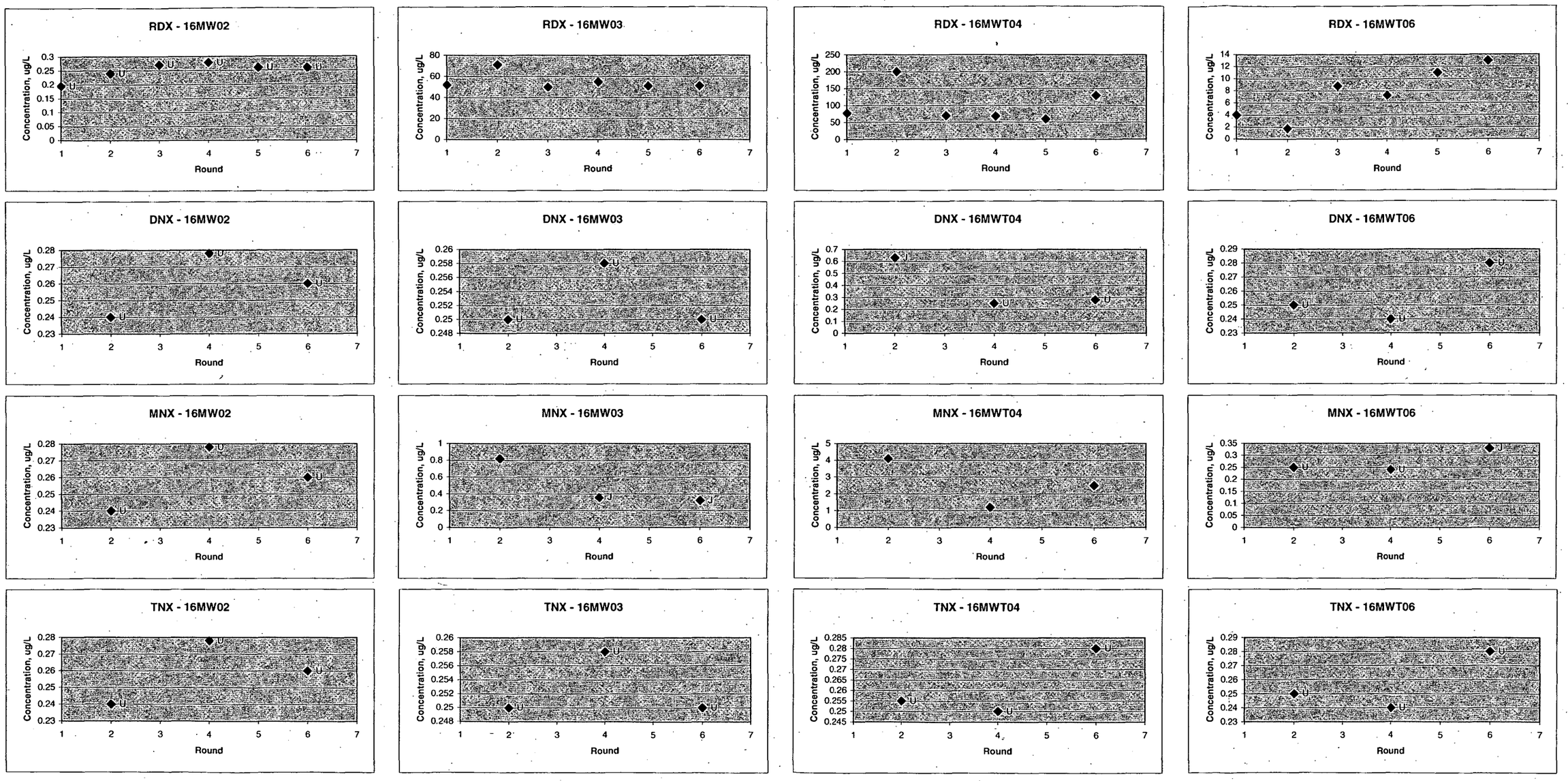
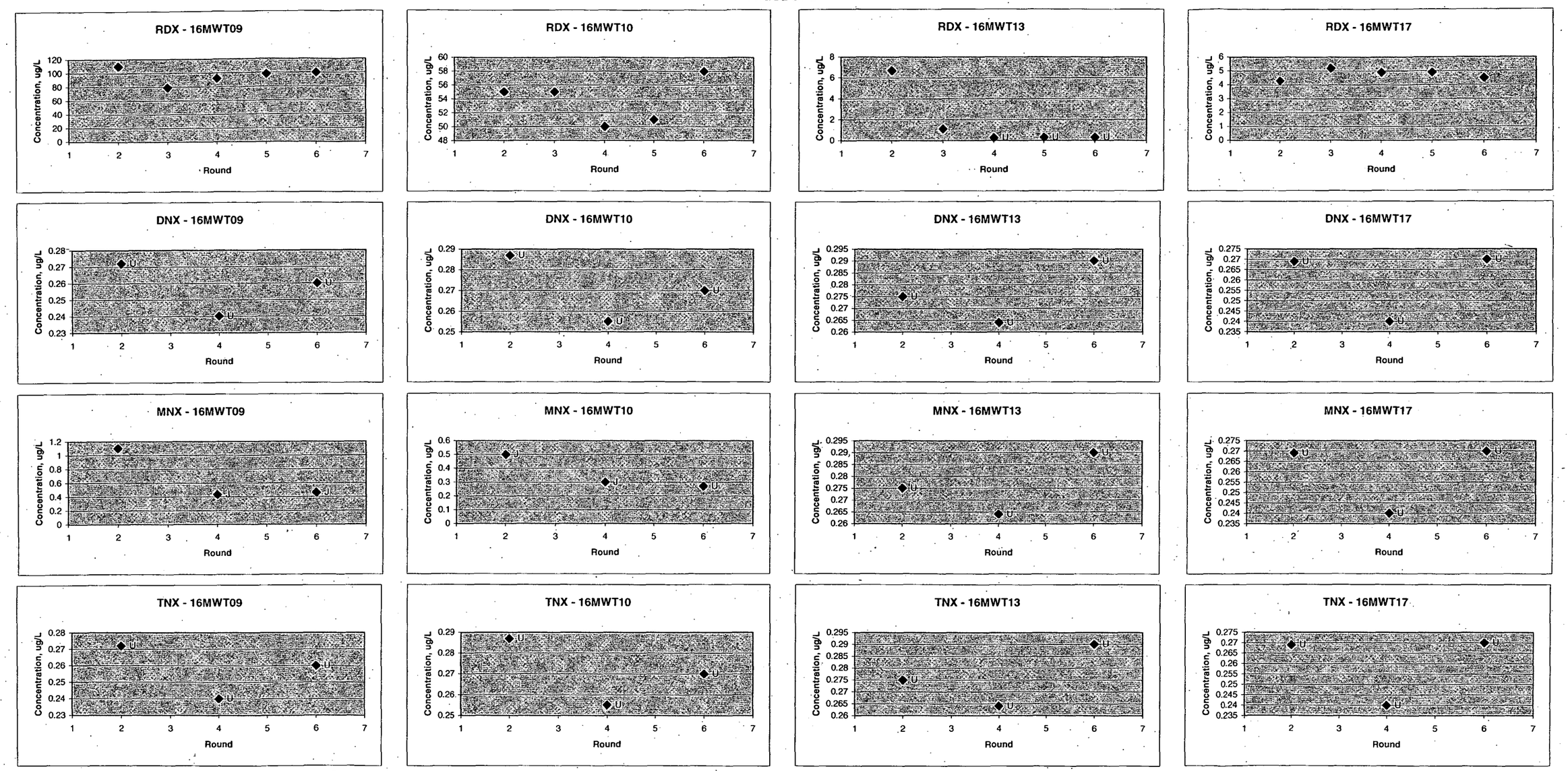


FIGURE 4-7

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



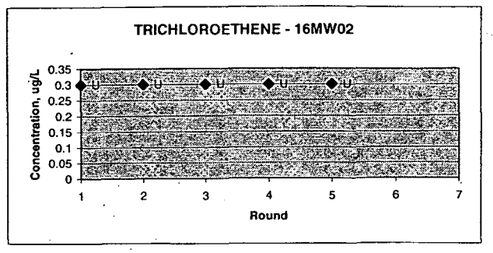
No data marker for a round indicates that no sample was collected or analysis was conducted for the parameter.

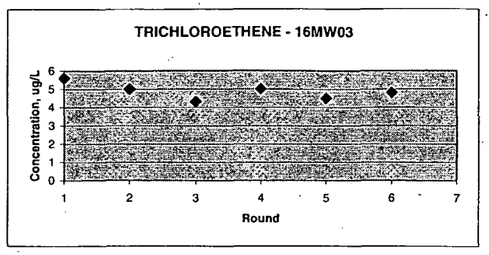
U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration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

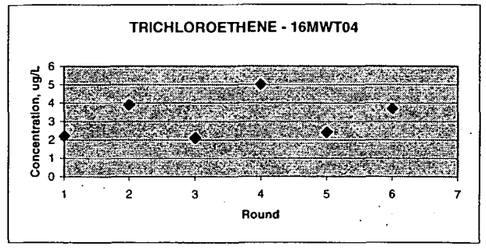
J – Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

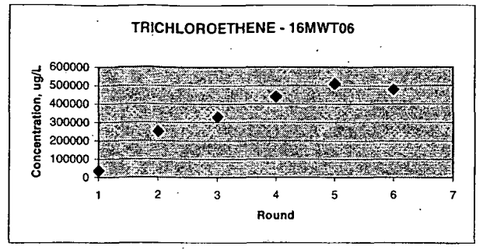
FIGURE 4-8

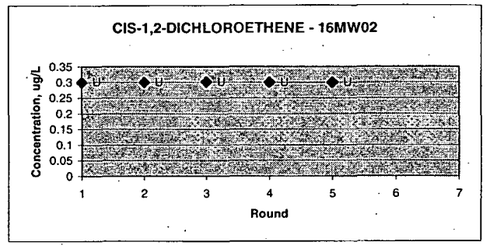
TEMPORAL PLOTS FOR TRICHLOROETHENE AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE UPPER PENNSYLVANIAN WATER BEARING ZONE
ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA
PAGE 1 OF 2

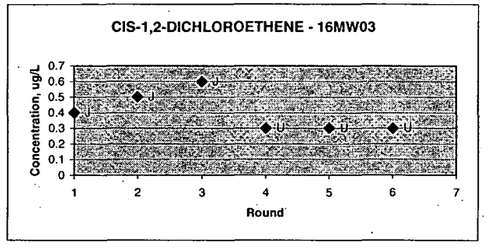


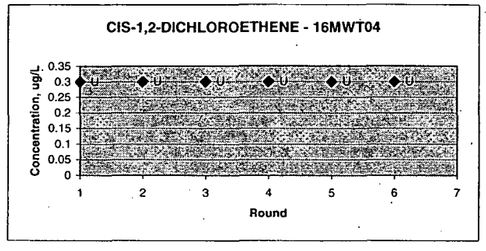


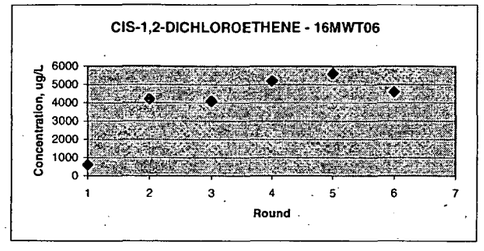


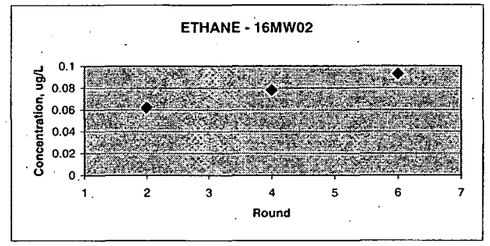


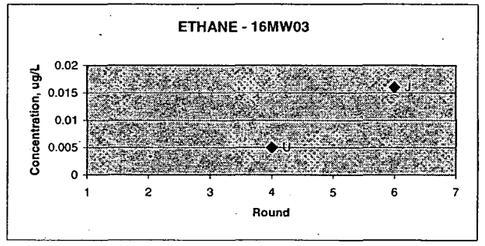


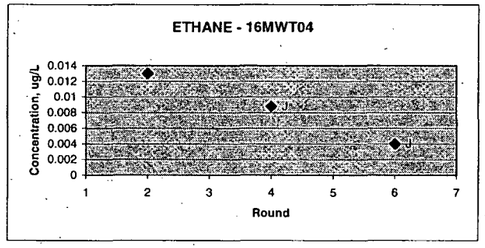


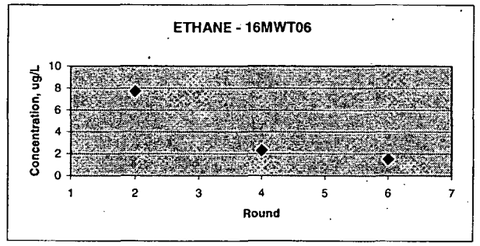


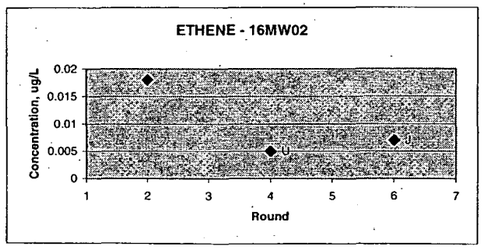


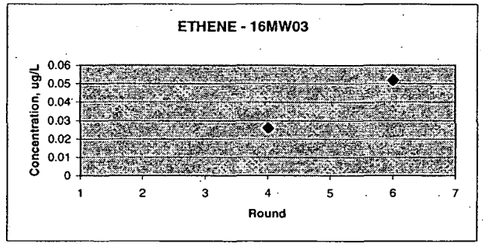


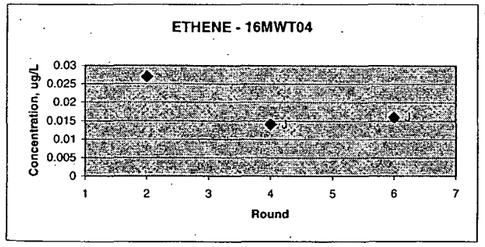


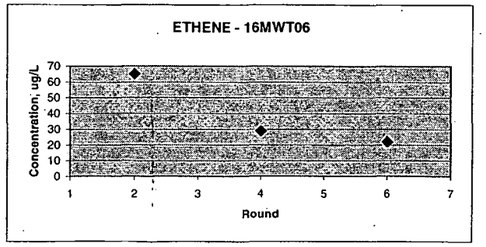


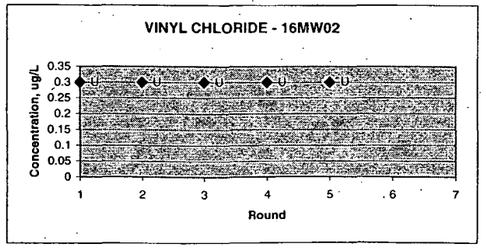


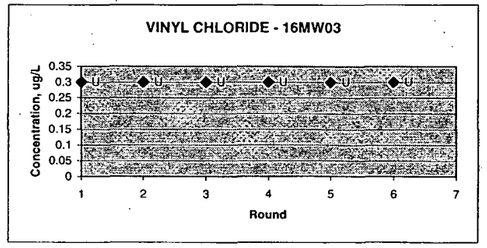


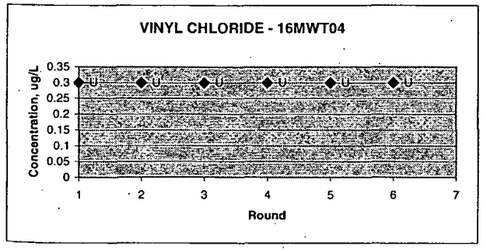












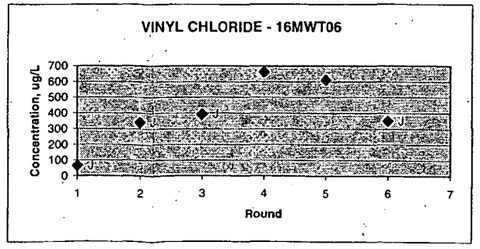
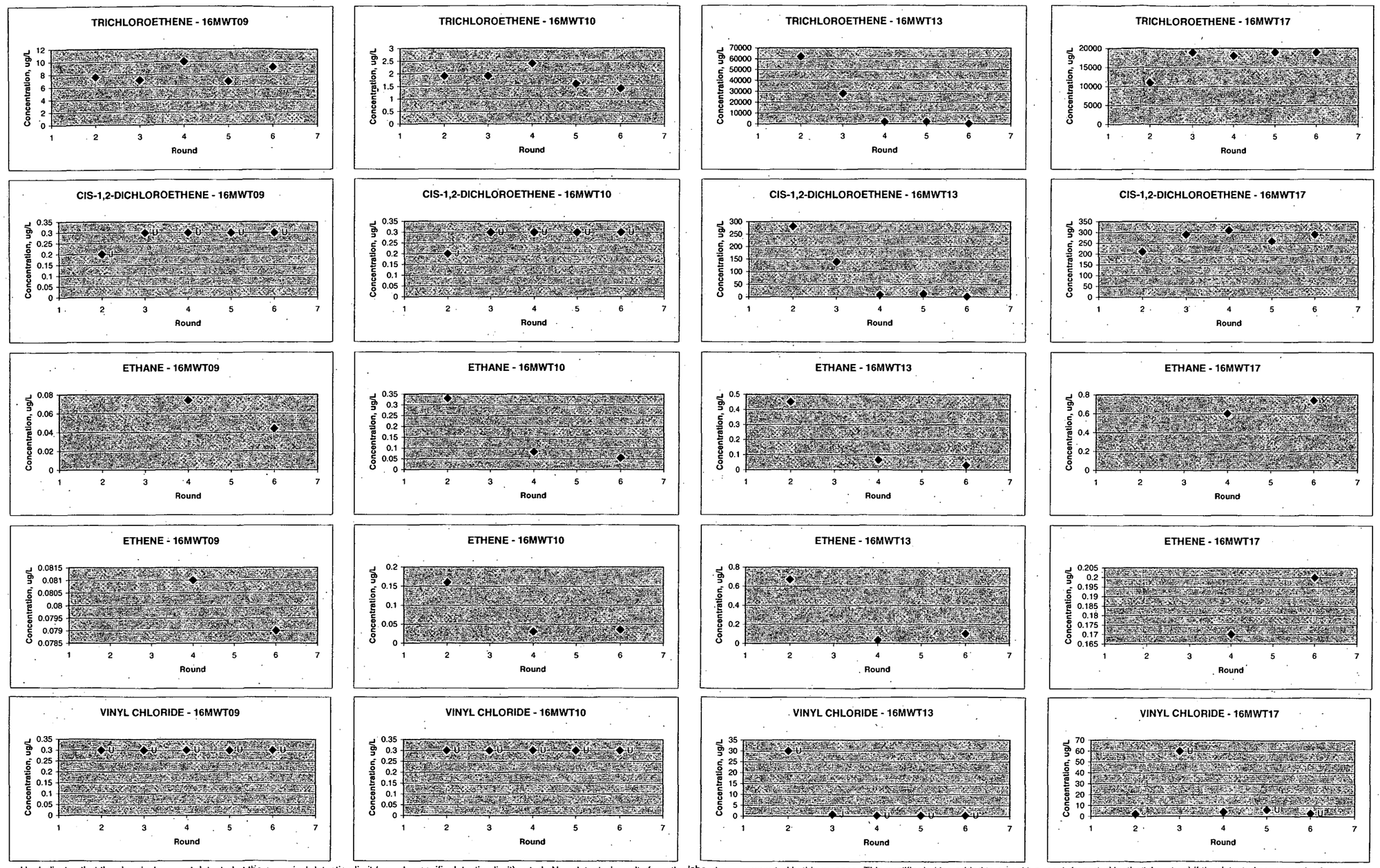


FIGURE 4-8

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

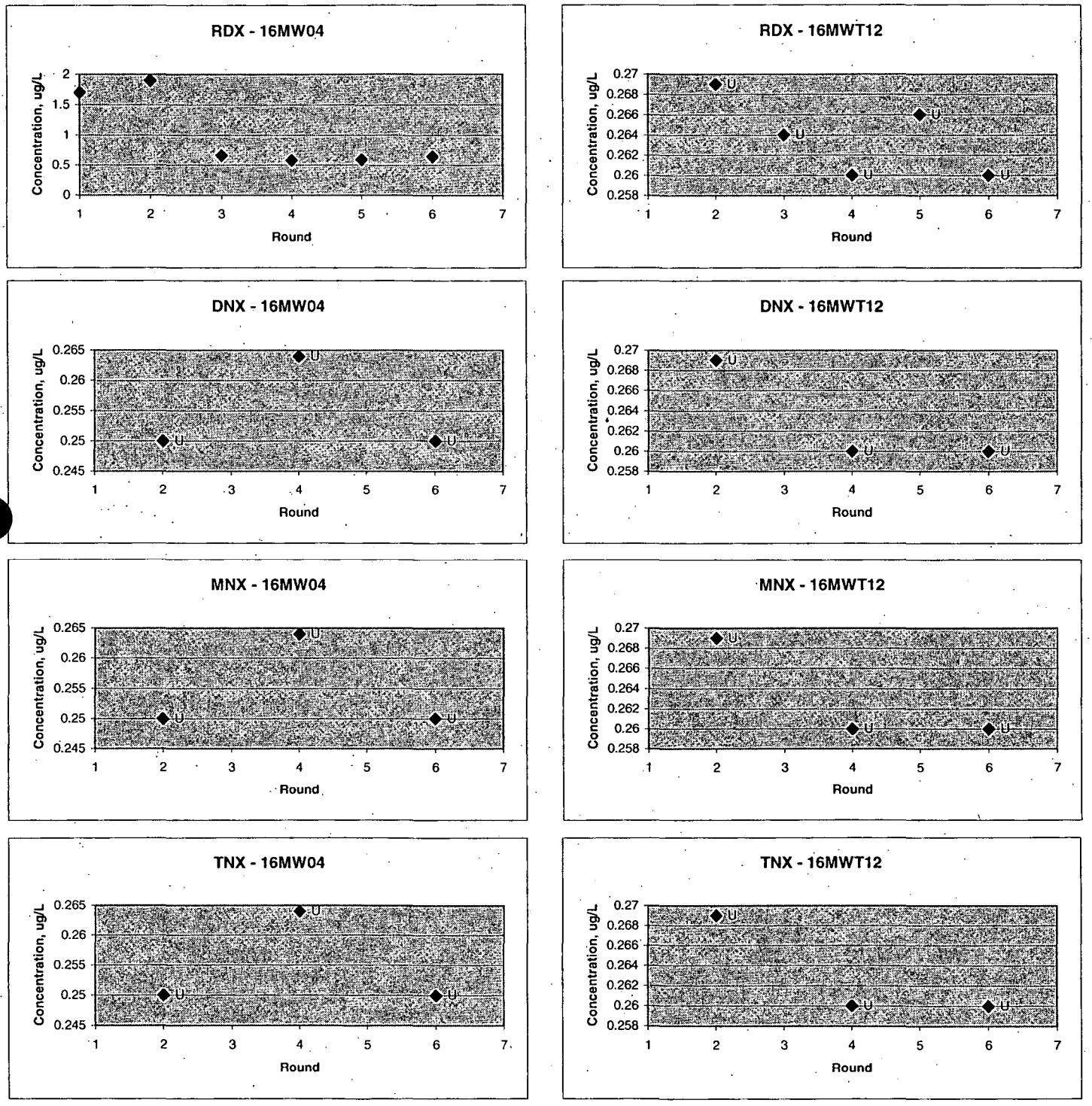


U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration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

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

FIGURE 4-9

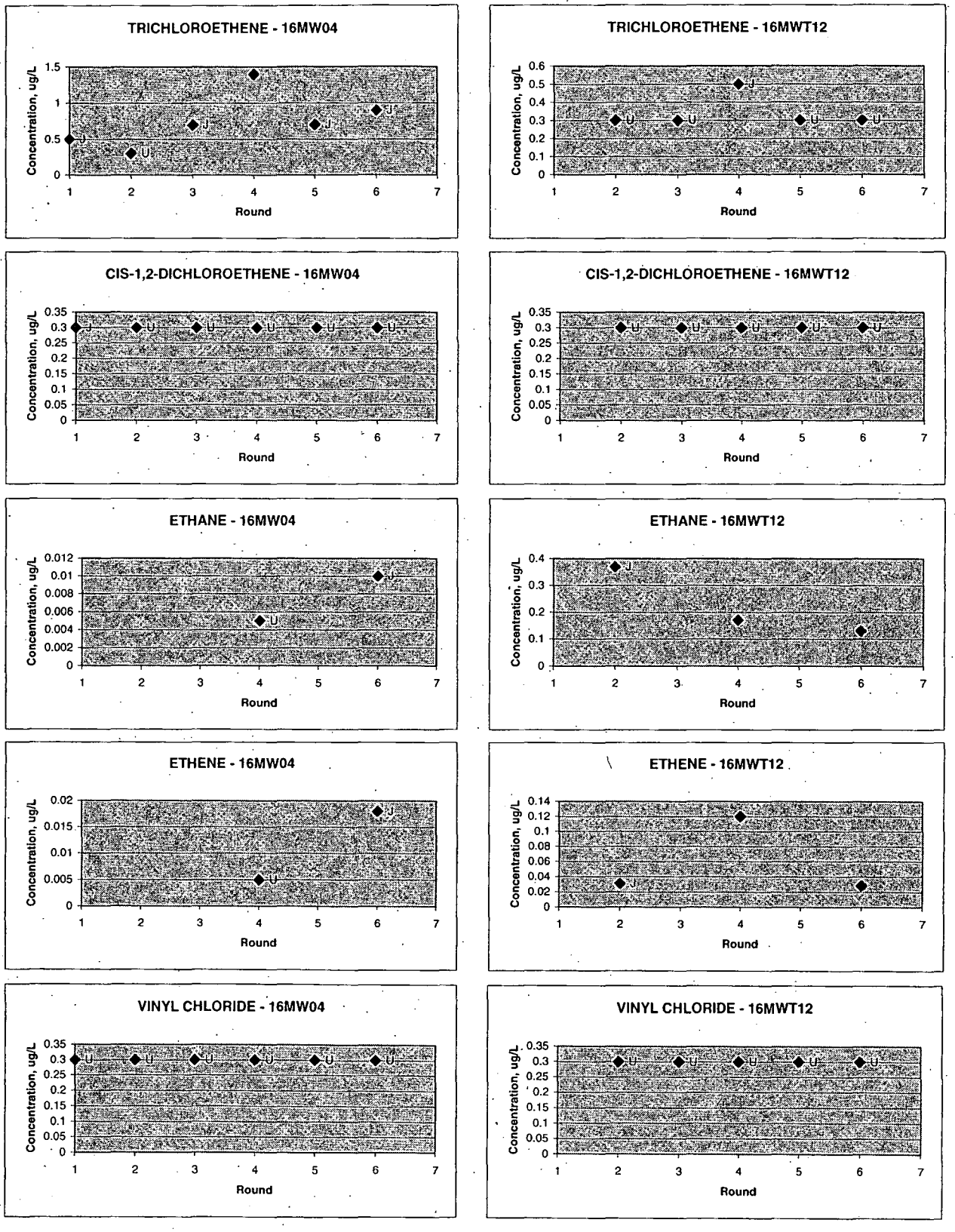
TEMPORAL PLOTS OF RDX AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE MIDDLE PENNSYLVANIAN WATER BEARING ZONE
ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA



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

FIGURE 4-10

TEMPORAL PLOTS OF TRICHLOROETHENE AND DEGRADATION PRODUCT CONCENTRATIONS
IN THE MIDDLE PENNSYLVANIAN WATER BEARING ZONE
ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA

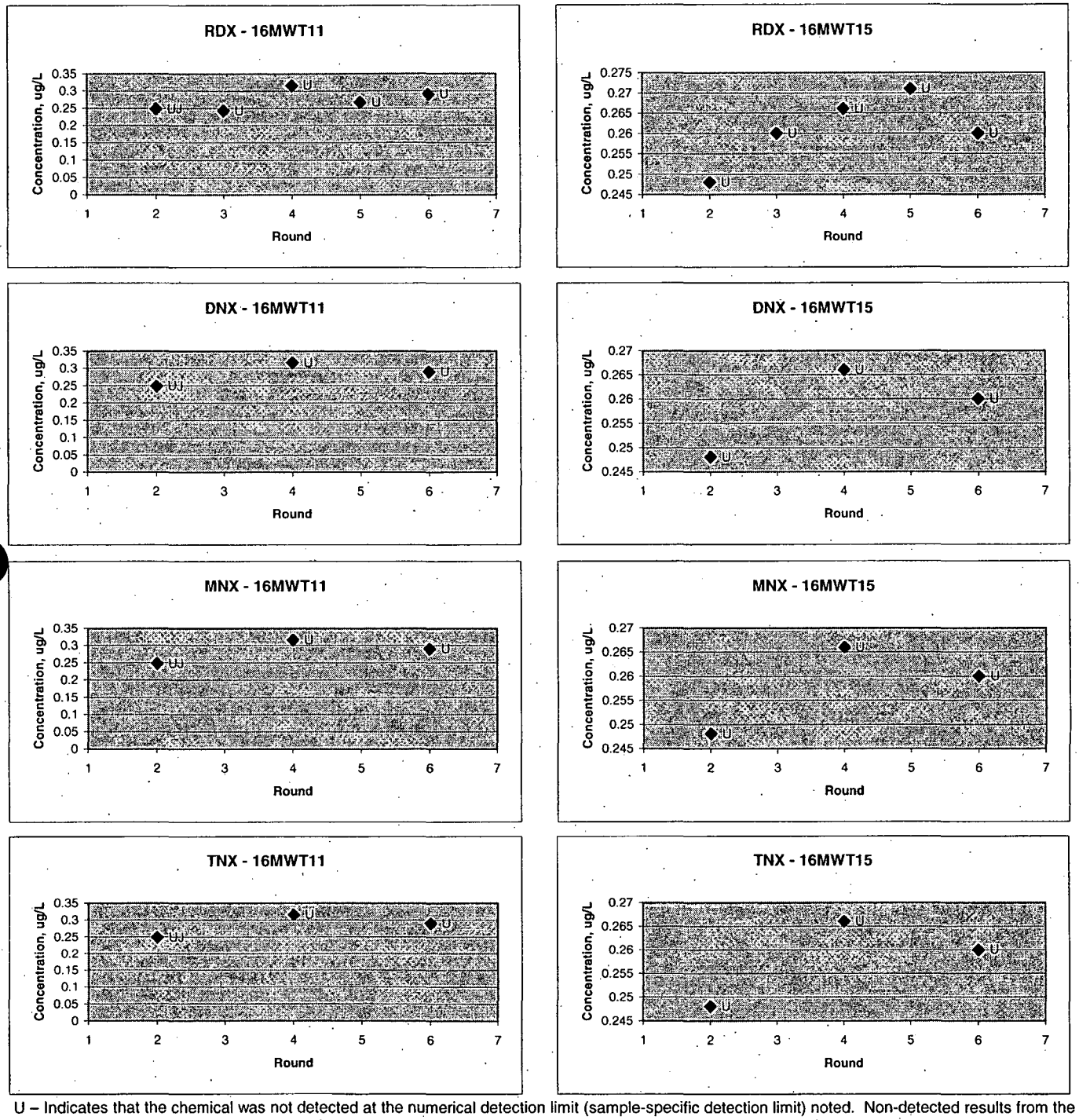


U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration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

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

FIGURE 4-11

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

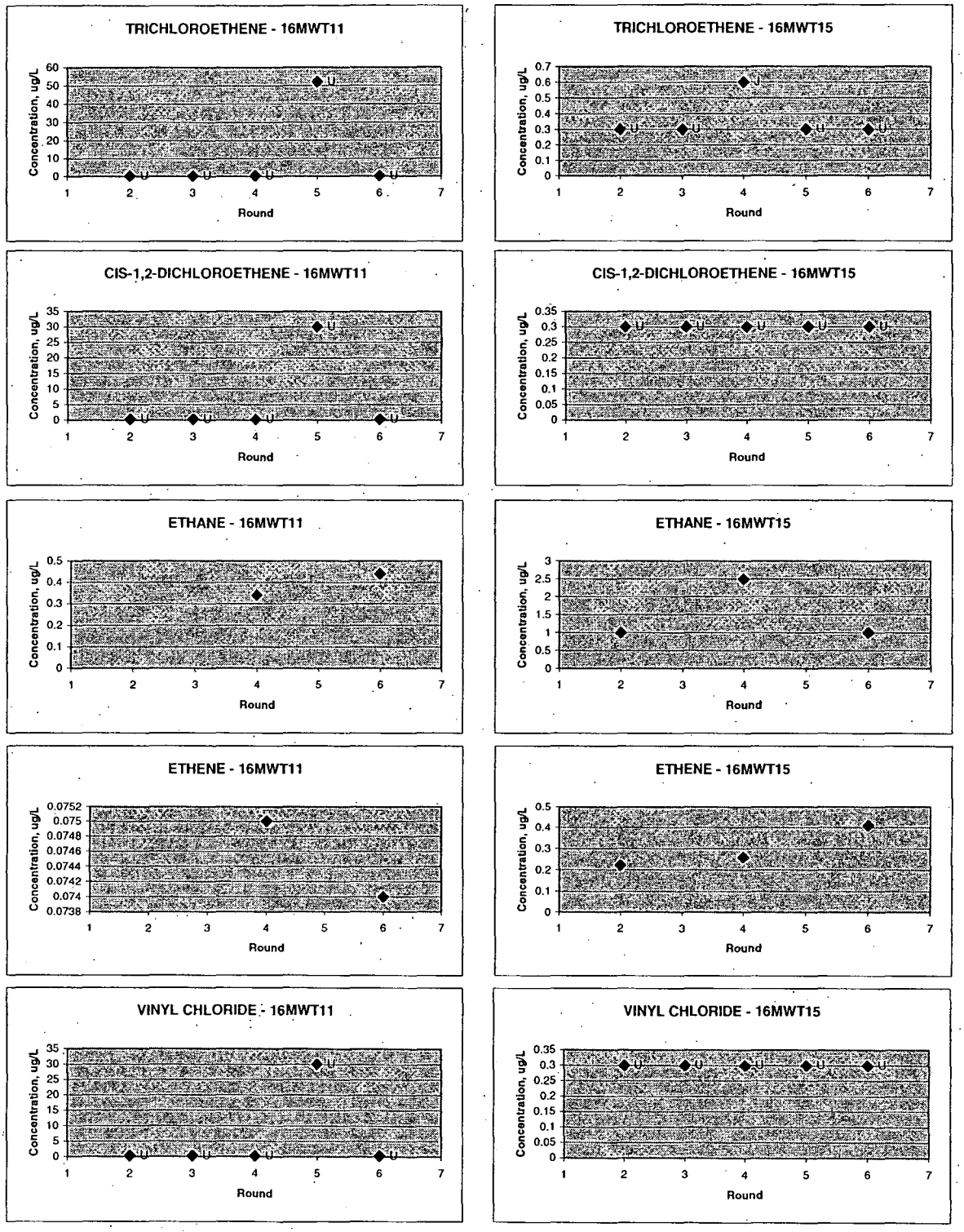


U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration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

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

FIGURE 4-12

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

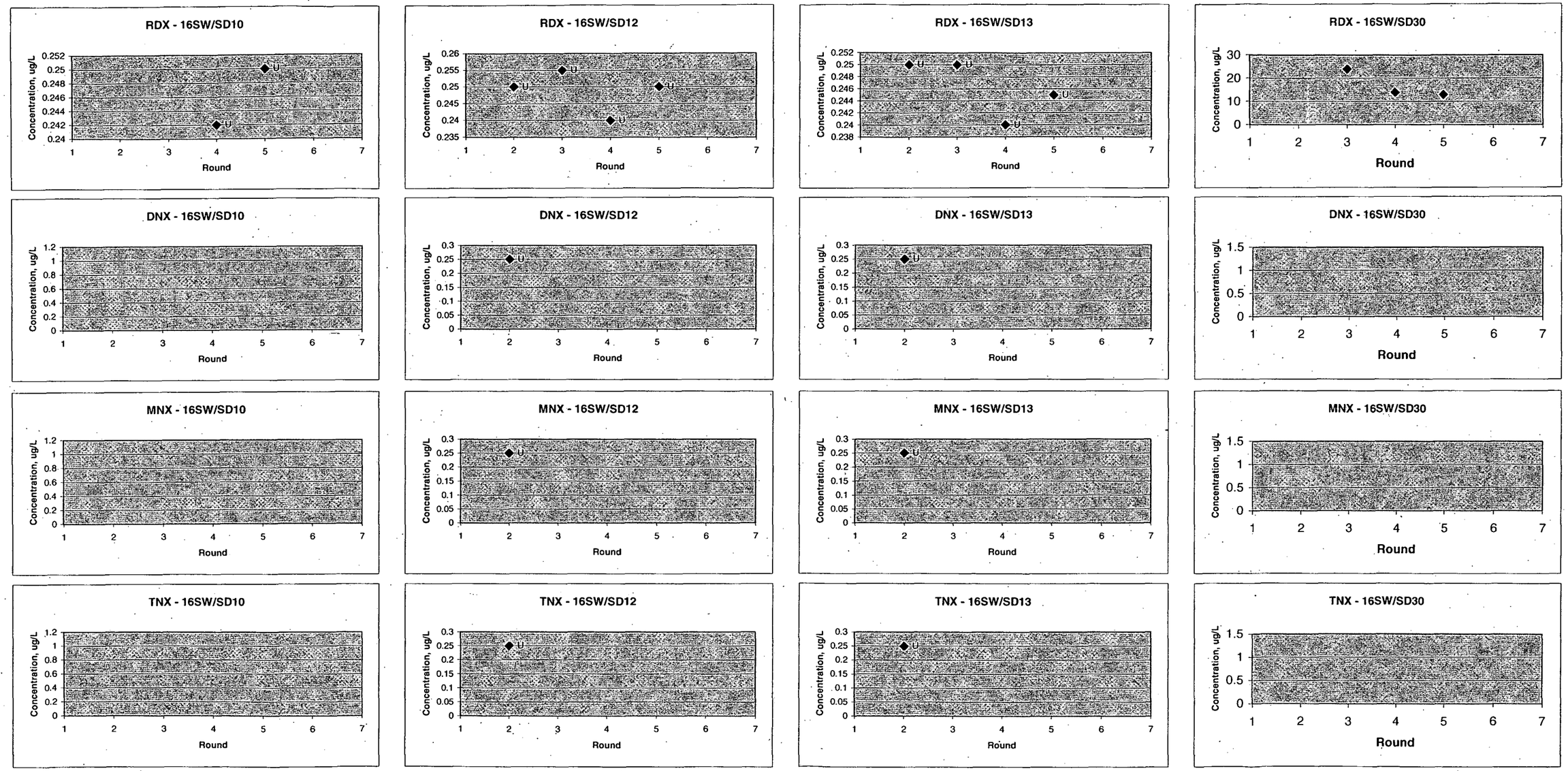


U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration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

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

FIGURE 4-13

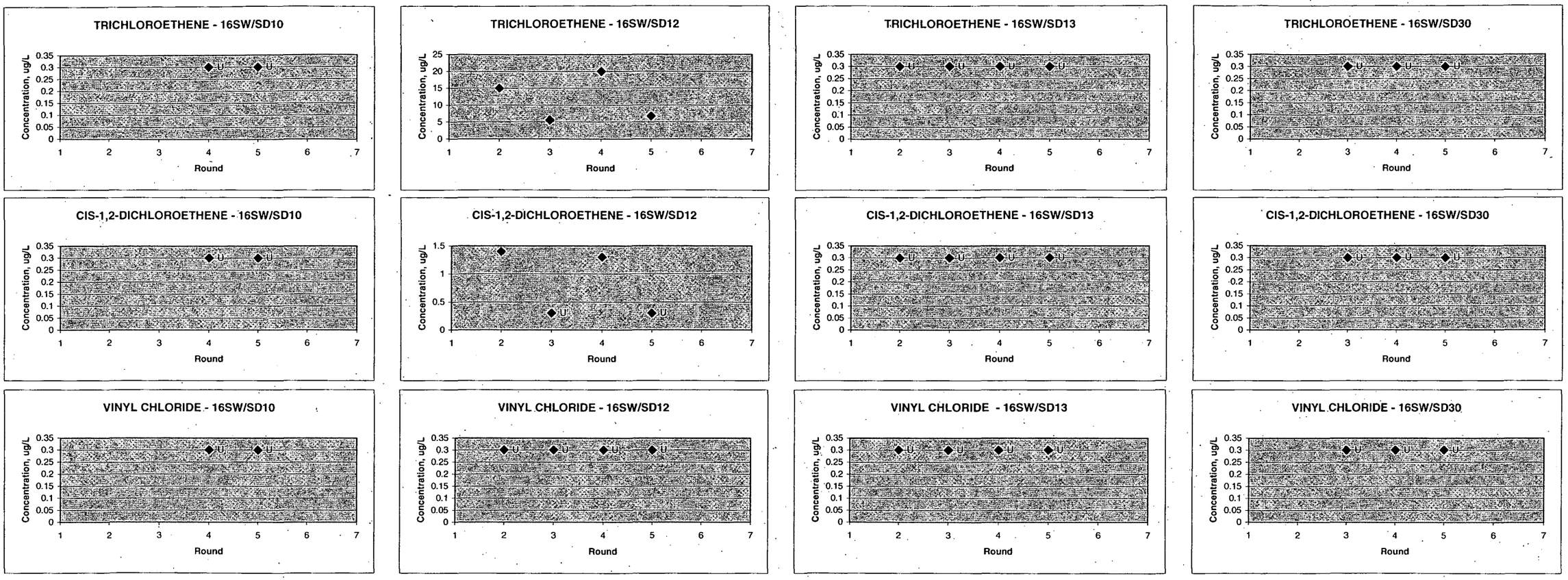
TEMPORAL PLOTS FOR RDX AND DEGRADATION PRODUCT CONCENTRATIONS
ROUNDS 1 THROUGH 6
IN SURFACE WATER
NSWC CRANE
CRANE, INDIANA



Note: Samples could not be collected during Round 6 because all locations were dry.
U – Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted. Non-detected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

FIGURE 4-14

TEMPORAL PLOTS OF TRICHLOROETHENE AND DEGRADATION PRODUCT CONCENTRATIONS
IN SURFACE WATER
ROUNDS 1 THROUGH 6
NSWC CRANE
CRANE, INDIANA



Note: Samples could not be collected during Round 6 because all locations were dry.

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

REFERENCES

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

TtNUS, 2005a. Cast High Explosives Fill/B146 Incinerator (SWMU 16) Resource Conservations and Recovery Act Facility Investigation Report, NSWC Crane, Crane, Indiana, June.

TtNUS, 2005b. Monitored Natural Attenuation Report for Cast High Explosives Fill/B146 Incinerator (SWMU 16), Round No. 4, NSWC Crane, Crane, Indiana, November.

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

APPENDIX A

SWMU 16

SAMPLE LOG SHEETS AND OTHER FIELD FORMS

ROUNDS 5 AND 6

A.1.1

SWMU 16

SURFACE WATER SAMPLE LOG SHEETS

ROUND 5

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

Sample ID No.: 16SW 1003
Sample Location: 16SW/SD 10
Sampled By: JG/TK
C.O.C. No.: 376

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

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

SAMPLING DATA:

Date: 5-08-05 / Time: 1025 / Depth: SURFACE / Method: DIRECT	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
	CLEAR	6.96	0.135	13.71	1.5	10.04	+213	—

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 16SW_____-F

Pool = 2.5' x 5' x 6"
No Flow

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

Sample ID No.: 16SW 1204
Sample Location: 16SW/SD 12
Sampled By: JG / TK
C.O.C. No.: 3716

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

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

SAMPLING DATA:

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 5-08-05 Time: 0950 Depth: (TR) D SURFACE Method: Direct	CLEAR	6.76	0.164	13.92	3.5	10.49	211	—

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	(Yes) / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	(Yes) / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[ ] No[X] 16SW NA -F

Flow = 3-8 gpm

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Terry Kozel

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

Sample ID No.: 16SW 1304
Sample Location: 16SW/SD 13
Sampled By: JG/TR
C.O.C. No.: 3715

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

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

SAMPLING DATA

Date: 5-08-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 0935								
Depth: 6"								
Method: Direct	CLEAR	6.48	0.166	12.66	3.3	8.45	+203	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 16SW NA -F

Pool 3'x6'x6"

No Flow

MAP

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s): Ty Rogal

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16SW 3003
Sample Location: 16SW/SD30
Sampled By: JG/TK
C.O.C. No.: 3716

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

SAMPLING DATA

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 5/8/05 Time: 1100 Depth: SURFACE Method: Direct	Clear	7.07	0.133	14.56	9	10.44	+207	—

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	MS/MSD	Container Requirements	PQP	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	4	(2) L Glass Amber	2	(Yes) / No
Volatiles SW-846-8260B	4°C/HCl	4	(3) 40 ml Vials	3	(Yes) / No

OBSERVATIONS / NOTES

Filtered Sample Collected Yes[ ] No[X] 16SW_____-F

FLOW:
1-5 gpm

MAP

Circle if Applicable:

MS/MSD (Yes)

Duplicate ID No.: 16FD050805 01

Signature(s):

A.1.2

SWMU 16

SURFACE WATER SAMPLE LOG SHEETS

ROUND 6

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

e[illegible]a Read-Only

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

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

FINAL SAMPLE DATA

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

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

N[illegible]documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

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

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

eData Read-Only

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

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

FINAL SAMPLE DATA

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

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

No documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

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

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

Read-Only

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

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

FINAL SAMPLE DATA

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

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

No documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

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

Tetra Tech NUS, INC.

SURFACE WATER SAMPLE LOG SHEET

Entered by Terry Rojahn on 08/27/2005

Log Status:

eData Read-Only

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

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

FINAL SAMPLE DATA

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

ANALYSIS ENTRY

Read Only Mode - Click Edit to Add New Data

ANALYSIS DATA

All Entered Analysis Data

No documents found

GENERAL OBSERVATIONS AND NOTES

Location dry - No sample collected.

FOOTER

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

A.2.1

SWMU 16

GROUNDWATER SAMPLE LOG SHEETS

ROUND 5

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GW(TR)0205
Sample Location: 16MW02 (WES-14)
Sampled By: T. ROJAHN
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-06-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1145	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: SAME	CLEAR	5.20	0.446	15.84	0.20	1.53	641	--

PURGE DATA:

Date: 5-06-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: DED. BLADDER								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Ø, PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 28.74'								
Static Water Level (WL): 15.40								
One Casing Volume(gal/L): 8.2								
Start Purge (hrs): 1000								
End Purge (hrs): 1140								
Total Purge Time (min): 100								
Total Vol. Purged (gal/L): 8.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	(Yes) No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	(Yes) No

OBSERVATIONS / NOTES:

~~Filtered Sample Collected Yes[] No[] 16GWT F~~ (TR) 13.34 x 0.163 = 2.2 gal or 8.2 L

Dedicated pump intake @ 19'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: WES 14-02-83
DATE: 5-06-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1000	15.40	0	—	—	—	—	—	—	—	START PURGE
1010	15.54	1000	100	5.74	0.482	15	2.72	14.85	277	CLEAR
1020	15.54	1800	80	5.61	0.482	5.1	2.50	14.88	438	"
1030	15.55	2650	85	5.53	0.467	3.7	2.58	15.06	384	"
1040	15.55	3500	85	5.47	0.456	0.70	2.82	15.11	469	"
1050	15.55	4350	85	5.42	0.452	0.95	2.99	15.34	548	"
1100	15.55	5200	85	5.38	0.452	0.30	2.53	15.55	581	"
1110	15.55	6050	85	5.34	0.450	0.15	2.16	15.56	608	"
1120	15.55	6900	85	5.30	0.449	0.35	1.89	15.72	630	"
1130	15.55	7750	85	5.24	0.446	0.30	1.59	15.85	632	"
1135	15.55	8175	85	5.21	0.445	0.25	1.56	15.80	639	"
1140	15.55	8600	85	5.20	0.446	0.20	1.53	15.84	641	"
1145	—	—	—	—	—	—	—	—	—	START SAMPLING

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

Pump Intake: 19'

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GW/0305
Sample Location: 16MW/03
Sampled By: Goeyett
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-6-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1655								
Method: Low flow	Clear	5.13	.359	14.85	8.7	0.81	335.8	---

PURGE DATA:

Date: 5-6-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Low								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 38.31								
Static Water Level (WL): 19.44								
One Casing Volume(gal/L): 11.4								
Start Purge (hrs): 1450								
End Purge (hrs): 1650								
Total Purge Time (min): ~~240~~ 120	170							
Total Vol. Purged (gal/L) 15.30								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 16GWT_____-F

Dedicated pump intake @ 28'

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MW03
DATE: 5-26-05 (24) 5-6-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1400	19.44	-	-	-	-	-	-	-	-	Start purge
1410	21.13	0.90	90	5.39	.337	37	1.72	15.68	246.4	clear
1420	21.27	1.80	90	5.41	.338	25	1.71	16.01	261.5	"
1430	21.44	2.70	90	5.37	.344	23	1.64	15.96	268.4	"
1440	21.48	3.60	90	5.34	.350	21	1.49	16.09	274.6	"
1450	21.53	4.50	90	5.27	.358	16	1.37	15.87	281.7	"
1500	21.59	5.40	90	5.21	.363	11	1.28	15.62	294.4	"
1510	21.64	6.30	90	5.20	.359	12	1.20	15.21	301.8	"
1520	21.79	7.20	90	5.15	.362	11	1.12	15.40	306.7	"
1530	21.87	8.10	90	5.15	.363	13	1.09	14.89	314.8	"
1540	21.97	9.00	90	5.15	.364	15	1.06	15.02	317.1	"
1550	22.09	9.90	90	5.15	.364	12	1.02	15.01	320.1	"
1600	22.11	10.80	90	5.13	.367	13	0.98	15.06	324.6	"
1610	22.14	11.70	90	5.13	.365	9.5	0.91	14.90	327.6	"
1620	22.13	12.60	90	5.14	.366	8.7	0.87	15.01	330.1	"
1630	22.14	13.50	90	5.14	.362	9.3	0.85	14.93	331.6	"
1640	22.13	14.40	90	5.12	.361	9.1	0.82	14.87	333.2	"
1650	22.12	15.30	90	5.13	.359	8.7	0.81	14.85	335.8	end purge

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

Pump Intake 28'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

WES 14-04-83

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT 0405
Sample Location: 16MWT 04
Sampled By: Gerald
C.O.C. No.: 3714
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-6-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1140								
Method: Ded. Bladder	Clear	4.06	.738	14.13	0.49	1.57	274.3	---

PURGE DATA:

Date: 5-6-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded. Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 49.16								
Static Water Level (WL): 27.79								
One Casing Volume(gal/L): 12.9								
Start Purge (hrs): 1000								
End Purge (hrs): 1135								
Total Purge Time (min): ~~1405~~ 95	100							
Total Vol. Purged (gal/L): 14.25								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 16GWT_____-F

Dedicated pump intake @ 38'

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

WES 14-04-83

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MWT04
DATE: 5-6-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1000	27.79	-	-	-	-	-	-	-	-	Start purge
1010	27.79	1.5	150	4.08	.731	0.40	2.02	14.05	332.05	clear
1020	27.79	3.0	150	4.14	.728	0.42	2.38	13.91	322.5	"
1030	27.80	4.5	150	4.12	.736	0.53	3.29	14.14	310.8	"
1040	27.79	6.0	150	4.10	.735	0.65	3.55	14.02	297.5	"
1050	27.79	7.5	150	4.09	.736	0.55	4.11	14.03	289.6	"
1100	27.79	9.0	150	4.09	.737	0.48	2.76	13.98	283.7	"
1110	27.79	10.5	150	4.07	.738	0.52	1.87	14.06	279.2	"
1120	27.79	12.0	150	4.06	.739	0.47	1.62	14.19	278.5	"
1130	27.79	13.5	150	4.06	.738	0.51	1.59	14.06	276.0	"
1135	27.79	14.25	150	4.06	.738	0.49	1.57	14.13	274.3	end purge

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

Pump Intake 38'

SIGNATURE(S): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT 0405
Sample Location: 16MWT 04
Sampled By: Goerdt
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-7-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	* DO (mg/L)	ORP (mV)	Other NA
Time: 1025								
Method: Bed. bladder	Clear	6.32	.160	15.93	7.8	0.39	268.3	---

PURGE DATA:

Date: 5-7-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: bed bladder								
Monitor Reading (ppm): –								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 27.59								
Static Water Level (WL): 13.31								
One Casing Volume(gal/L): 8.6								
Start Purge (hrs): 0850								
End Purge (hrs): 1020								
Total Purge Time (min): 90								
Total Vol. Purged (gal/L) 9.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 16GWT_____-F

Dedicated pump intake @ 22'

* Possible DO probe malfunction

Circle if Applicable:

MS/MSD	Duplicate ID No.:
Yes	~~16FD0507050~~ 72

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MWT04
DATE: 5-7-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
0850	13.31	–	–	–	–	–	–	–	–	Start purge
0900	13.76	1.2	120	6.26	.164	6.8	-0.03	14.17	251.6	clear
0910	13.74	2.4	120	6.29	.165	6.9	0.15	14.38	253.3	"
0920	13.69	3.6	120	6.30	.164	7.3	0.29	14.91	254.7	"
0930	13.66	4.8	120	6.31	.163	8.7	0.57	15.15	258.5	"
0940	13.65	5.7 ~~5.0~~ @ 90 ~~120~~ @		6.30	.162	10	0.48	15.40	261.3	"
0950	13.65	6.6	90	6.30	.162	8.7	0.42	15.63	263.7	"
1000	13.65	7.5	90	6.29	.161	8.6	0.41	15.72	264.9	"
1010	13.65	8.4	90	6.31	.161	8.1	0.37	15.72	266.8	"
1020	13.65	9.3	90	6.32	.160	7.8	0.39	15.93	268.3	end purge

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

Pump Intake: 22'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT 0606
Sample Location: 16MWT06
Sampled By: T. ROJAHN
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/07/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1715	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: SAME	CLEAR	*6.00	0.762	17.46	15	2.69	+497	---

PURGE DATA:

Date: 5-07-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Bladder Pump								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" Φ, PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 28.30								
Static Water Level (WL): 16.65								
One Casing Volume(gal/L): 7.2								
Start Purge (hrs): 1312								
End Purge (hrs): 1712								
Total Purge Time (min): 240								
Total Vol. Purged (gal/L): 10.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

~~Filtered Sample Collected Yes[] No[] 16GWT 24.67 F~~ (TC) 11.65' X 0.163 = 1.9 gallon 7.2 L

Dedicated pump intake @ 24.67

* pH paper

** ORP probe maybe ~~[illegible]~~ malfuctioning

Circle if Applicable:

MS/MSD | Duplicate ID No.: —

Signature(s): Terry Rogall

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MWT06
DATE: 5-07-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1312	16.65	0	—	—	—	—	—	—	—	START PURGE
1322	17.62	1000	100	*6.00	0.772	4.9	1.08	16.51	236	CLEAR
1332	18.33	1800	80	6.00	0.779	4.9	1.17	17.27	474	"
1342	18.57	2100	30	6.00	0.844	4.7	1.77	20.91	502	"
1352	18.74	2400	30	6.00	0.853	4.0	2.12	21.15	518	"
1402	18.92	2700	30	6.00	0.859	3.1	2.51	21.41	535	"
1412	19.01	3150	45	6.00	0.833	3.1	2.45	20.20	534	"
1422	19.15	3600	45	6.00	0.807	3.2	2.51	18.99	533	"
1432	19.26	4000	40	6.00	0.820	4.0	2.49	19.78	530	"
1442	19.35	4400	40	6.00	0.832	4.4	2.49	20.55	526	"
1452	19.45	4800	40	6.00	0.827	4.2	2.52	20.12	519	"
1502	19.55	5200	40	6.00	0.823	3.9	2.55	20.08	512	"
1512	19.65	5600	40	6.00	0.818	4.5	2.58	20.12	508	"
1522	19.73	6000	40	6.00	0.815	5.0	2.61	20.16	501	"
1532	19.84	6400	40	600	0.816	5.1	2.66	20.48	506	"
1542	19.95	6800	40	600	0.818	5.4	2.73	20.65	510	"
1552	20.05	7200	40	6.00	0.816	6.1	2.75	20.80	510	"
1602	20.15	7600	40	6.00	0.816	6.8	2.76	20.88	507	"
1612	20.23	8000	40	6.00	0.798	7.5	2.75	20.03	501	"
1622	20.32	8400	40	6.00	0.780	8.3	2.73	19.28	493	"
1632	20.40	8800	40	6.00	0.804	9.2	2.74	20.49	502	"
1642	20.49	9200	40	6.00	0.808	10.3	2.74	20.60	496	"
1652	20.57	9600	40	6.00	0.811	11	2.74	20.72	491	"
1702	20.72	10100	50	6.00	0.754	11	2.68	17.57	517	"
1712	20.90	10600	50	6.00	0.762	15	2.69	17.46	497	"
1715	—	—	—	—	—	—	—	—	—	SAMPLE TIME

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

Pump Intake 24.67'

SIGNATURE(S): Terry Rogers

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT0904
Sample Location: 16MWT09
Sampled By: T. ROJAHN
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-07-05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: 1103	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Bladder Pump	CLEAR	*5.00	0.432	14.10	1.0	1.51	**525	--

PURGE DATA:

Date: 5-07-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: SAME								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2"Ø PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 27.70								
Static Water Level (WL): 13.90								
One Casing Volume(gal/L): 8.5L								
Start Purge (hrs): 0909								
End Purge (hrs): 1059								
Total Purge Time (min): 110								
Total Vol. Purged (gal/L): 9.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

~~Filtered Sample Collected Yes[] No[]~~ 16GWT _____ F (TC) 13.8' x 0.163 = 2.2 gal or 8.5L

Dedicated pump intake @ 21.85'

* pH PAPER

** Possible malfunction

Circle if Applicable:

MS/MSD —

Duplicate ID No.: 16FD050705 01

Signature(s): [signature]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MWT09
DATE: 5-07-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
0909	13.90	0	—	—	—	—	—	—	—	START SAMPLING
0919	14.50	1100	110	*5.00	0.930	7.5	1.68	13.30	164	CLEAR
0929	14.64	2200	110	5.00	0.540	4.6	1.07	13.22	389	"
0939	14.59	3000	80	5.00	0.515	2.4	1.20	13.34	421	"
0949	14.54	3800	80	5.00	0.495	1.7	1.25	13.42	449	"
0959	14.48	4600	80	5.00	0.495	0.20	1.42	14.16	464	"
1009	14.48	5400	80	5.00	0.505	0.45	1.41	14.01	479	"
1019	14.49	6200	80	5.00	0.490	0.60	1.42	14.10	491	"
1029	14.50	7000	80	5.00	0.472	0.85	1.44	14.17	503	"
1039	14.50	7800	80	5.00	0.448	0.55	1.48	13.91	524	"
1049	14.51	8400	80	5.00	0.433	0.85	1.48	13.96	526	"
1054	14.51	8800	80	5.00	0.431	1.8	1.48	13.95	527	"
1059	14.50	9200	80	5.00	0.432	1.0	1.51	14.10	525	"
1103	—	—	—	—	—	—	—	—	—	SAMPLE TIME

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

Pump Intake: 21.85'

* pH - malfunction USED pH PAPER

SIGNATURE(S): Terry Ryan

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT 1004
Sample Location: 16MWT 10
Sampled By: Goerdt
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	* DO (mg/L)	ORP (mV)	Other NA
Date: 5-7-05								
Time: 1450								
Method: Ded Bladder	clear	3.59	.867	15.88	7.4	1.1	337.0	---

PURGE DATA:

Date: 5-7-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Ded Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 27.15								
Static Water Level (WL): 21.16								
One Casing Volume(gal/L): 3.6								
Start Purge (hrs): 1135								
End Purge (hrs): 1355								
Total Purge Time (min): 140								
Total Vol. Purged (gal/L): 17.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 16GWT_____-F

Dedicated pump intake @ 25'

* Possible DO probe malfunction

Circle if Applicable:

MS/MSD — Duplicate ID No.: —

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MWT10
DATE: 5-7-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	*DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1135	21.[illegible]	—	—	—	—	—	—	—	—	Start purge
1145	21.23	1.2	120	3.18	1.141	55	-1.71	16.93	432.7	sl. cloudy
1155	21.28	2.4	120	3.23	1.098	50	-1.35	15.69	405.4	"
1205	21.27	3.6	120	3.35	1.054	42	-1.19	15.67	384.1	"
1215	21.27	4.8	120	3.48	.987	26	-.87	15.61	372.2	"
1225	21.27	6.0	120	3.67	.960	19	-.54	15.58	364.7	clear
1235	21.27	7.2	120	3.70	.947	16	-.18	15.97	357.9	
1245	21.27	8.4	120	3.72	.932	12	-.26	15.81	357.1	
1255	21.27	9.6	120	3.76	.925	14	-.31	15.63	356.0	
1305	21.27	10.8	120	3.61	.906	16	-.05	15.85	349.1	
1315	21.30	12.0	120	3.58	.906	15	-.03	15.96	348.1	
1325	21.28	13.2	120	3.60	.884	12	.01	15.83	344.7	
1335	21.28	14.4	120	3.60	.878	13	.08	15.77	342.3	
1345	21.34	15.7	130	3.62	.863	11	.09	15.37	340.1	
1355	21.35	17.0	130	3.59	.867	7.4	1.1	15.88	337.0	end purge

Water Quality Meter (SN) 04C3884AB
Control Box type (SN) MP10 1600
Turbidity Meter (SN) 2843-4501

Pump Intake 25'

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT 1104
Sample Location: 16MWT 11
Sampled By: Goerdt
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: See Below	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Other
Time: "	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Jed Bladder	clear	—	—	—	—	—	—	—

PURGE DATA:

Date: N/A	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 98.65								
Static Water Level (WL): 96.10								
One Casing Volume(gal/L):								
Start Purge (hrs): ~~0845~~								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	5/6/05 0845 (2) L Glass Amber 1 500ml Amber	(Yes) / No
Volatiles SW-846-8260B	4°C/HCl	5/8/05 1 (3) 40 ml Vials (TA) 0910 HCS	(Yes) / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 16GWT_____-F 5/6/05 0845- Since well historically dries out, the well was not purged prior to collection of explosives.

Dedicated pump intake @ 97'

Min. Vol. Collected

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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

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

Sample ID No.: 16GWT 1204
Sample Location: 16MWT 12
Sampled By: Goerdt
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-7-05	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Time: 1600								
Method: Del Bladder	clear	4.65	2.614	16.46	1.7	-1.57	230.2	---

PURGE DATA:

Date: 5-7-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Del Bladder								
Monitor Reading (ppm): ~								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 28.50								
Static Water Level (WL): 19.92								
One Casing Volume(gal/L) 5.2								
Start Purge (hrs): 1445								
End Purge (hrs): 1555								
Total Purge Time (min): 70								
Total Vol. Purged (gal/L) 7.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW 846-8260B	4°C/HCl	(3) 40 ml Vials	Yes

OBSERVATIONS / NOTES:

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

Dedicated pump intake @ 25'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MW12
DATE: 5-7-05

Time (Hrs)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1445	19.92	–	–	–	–	–	–	–	–	Start purge
1455	20.12	1.0	100	4.55	2.093	12	-1.96	14.78	251.2	clear
1505	20.65	2.0	100	4.58	2.118	7.5	-1.65	15.42	238.9	"
1515	20.98	3.0	100	4.67	2.084	4.3	-1.69	14.72	229.6	"
1525	21.43	4.0	100	4.64	2.092	2.8	-1.67	15.26	226.3	"
1535	20.46	5.0	100	4.67	2.062	2.3	-1.55	15.68	227.4	"
1545	20.45	6.0	100	4.64	2.001	2.0	-1.52	16.69	226.0	"
1555	20.44	7.0	100	4.65	2.014	1.7	-1.57	16.46	230.2	end purge

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

Pump Intake: 25'

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT 1304
Sample Location: 16MWT 13
Sampled By: JSW
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S. U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Other NA
Date: 5/8/05								
Time: 8:10								
Method: BLADDER PUMP	CLOUDY	5.18	0.232	16.23	30(1)	0.00	100.1	---

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Date: 5/7/05								
Method: BLADDER PUMP								
Monitor Reading (ppm): NA	* PURGED DRY - SAMPLE NEXT DAY							
Well Casing Diameter & Material								
Type: 2" PVC	See Low Flow Purge Data Sheets							
Total Well Depth (TD): 20.32								
Static Water Level (WL): 10.45'								
One Casing Volume(gal/L): 5.8								
Start Purge (hrs): 8:30								
End Purge (hrs): 1100								
Total Purge Time (min): 150								
Total Vol. Purged (gal/L): 15								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber ✓	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials ✓	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] ~~16GWT~~ ~~F~~

Dedicated pump intake @ 17'

20.32'
-10.45'
9.87 (0.163) = 1.61 GAL
= 5.8 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MWT13
DATE: 5/7/05

	Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
	8:30	10.45	Ø	180	5.69	0.197	15	0.31	12.76	108.7	CLEAR
	8:40	11.58	1.8	180	5.31	0.195	40	0.26	12.71	145.4	CLEAR TO SLIGHTLY TURBID
	8:50	12.40	3.6	180	5.22	0.205	38	0.13	12.78	128.0	" "
	9:00	13.08	5.4	180	5.19	0.208	60	0.06	12.81	99.0	" "
	9:10	13.35	6.5	110	5.13	0.212	70	0.04	13.01	96.7	" "
	9:20	13.61	7.6	110	5.12	0.216	70	0.04	13.21	88.9	" "
	9:30	13.78	8.7	110	5.23	0.221	70	0.02	13.86	87.1	" "
	9:40	13.98	9.4	70	4.96	0.220	50	0.00	14.07	120.7	" "
	9:50	14.28	10.1	70	4.85	0.216	40	0.00	14.26	126.1	" "
	10:00	14.53	10.8	70	4.72	0.215	39	0.01	14.40	132.7	" "
	10:10	14.78	11.5	70	4.86	0.218	40	0.00	14.54	116.0	" "
	10:20	15.02	12.2	70	4.81	0.221	50	0.01	14.59	111.4	" "
	10:30	15.27	12.9	70	4.84	0.225	95	0.00	14.82	109.6	" "
	10:40	15.68	13.6	70	4.84	0.229	80	0.00	15.84	108.5	CLOUDY
	10:50	15.89 *	14.3	70	5.01	0.228	220	0.00	15.67	106.2	" "
	11:00	16.00 **	15.0	70	5.18	0.232	220	0.00	16.23	100.1	" "
5/8/05	8:10	14.31	Ø	80	–	–	30	–	–	–	SLIGHTLY TURBID
	8:30	14.77	1.32 (1)	80	–	–	60	–	–	–	" "
	8:45	15.18	2.64 (2)	80	–	–	75	–	–	–	" "

(1) END OF 1L BOTTLE (EST 880mL) + 320 mL PURGE
(2) END OF 2-1L BOTTLES + 3-40mL VIMS + 720 PURGE WATER = 2,600 mL/TOTAL PUMPED ~74/60 mL/MIN

* WATER LEVEL INDICATION AT TOP OF PUMP - POSSIBLE MIS-READ DUE TO OBSTRUCTION OF PUMP
** DRY WELL - PURGE COMPLETE

Water Quality Meter (SN) 0120702AF
Control Box type (SN) MP10 1334
Turbidity Meter (SN) 1728-1600

Pump Intake 17'

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT1504
Sample Location: 16MWT15
Sampled By: JSW
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5/7/05	Color	pH	S.C.	Temp.	Turbidity	* DO	ORP	Other
Time: 16:10	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: BLADDER PUMP	CLEAR	7.06	0.301	16.87	0.00	-0.04	238.4	---

PURGE DATA:

Date: 5/7/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: BLADDER PUMP - DEO								
Monitor Reading (ppm):								
Well Casing Diameter & Material Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 94.70'								
Static Water Level (WL): 56.68'								
One Casing Volume(gal/L): 22.5								
Start Purge (hrs): ~~11:40~~ 50 JSW								
End Purge (hrs): 15:50								
Total Purge Time (min): 240								
Total Vol. Purged (gal/L): 18								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	Yes / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	Yes / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] ~~16GWT_____-F~~

Dedicated pump intake @ 88'

94.70
- 56.68
38.02 x (0.163) = 6.20 GAL
= 22.5 L

* DO probe malfunction

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16MWT15
DATE: 5/7/05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
11:~~40~~50	56.68	Ø	120	6.86	0.313	7.7	-0.19	16.26	-31.6	CLEAR
12:00	58.92	1.2	120	6.69	0.318	0.60	-0.06	16.00	-82.7	CLEAR
12:10	60.19	2.4	120	6.65	0.306	0.00	-0.08	15.69	-42.1	CLEAR
12:20	61.64	3.6	120	6.72	0.302	0.00	-0.06	15.82	17.3	" "
12:30	62.89	4.8	120	6.70	0.298	0.06	-0.06	15.68	62.8	" "
12:40	64.25	6.0	120	6.69	0.300	0.02	-0.03	15.97	105.6	" "
12:50	65.~~89~~ 39	7.2	120	6.77	0.299	0.00	-0.02	15.95	128.2	" "
1:12 — 13:00	66.35	8.4	120	6.79	0.298	0.00	-0.03	15.96	131.4	" "
13:10	67.11	9.6	120	6.76	0.297	0.00	-0.02	15.70	144.7	" "
13:20	67.53	10.4	~~120~~ 80	6.80	0.303	0.03	-0.01	16.59	168.3	" "
13:30	68.32	11.2	80	6.74	0.304	0.00	-0.03	16.56	216.7	" "
13:40	69.10	12.0	80	6.86	0.303	0.00	+0.01	16.57	189.6	" "
13:50	69.41	12.8	80	6.87	0.300	0.00	-0.02	16.23	177.8	" "
2:00 — 14:00	69.52	13.6	80 ↓	7.10	0.304	0.01	-0.01	17.01	160.0	" "
14:10	69.43 *	14.0	40 ↓	7.18	0.306	0.00	-0.01	18.64	161.9	" "
14:20	69.28	14.4	40	7.21	0.320	0.00	-0.01	18.68	165.5	" "
14:30	69.30	14.8	40	7.00	0.315	0.01	-0.02	18.09	189.9	" "
14:40	69.29	15.2	40	7.04	0.312	0.01	+0.00	17.85	194.3	" "
* STOP → 14:50	69.30	15.6	40	7.03	0.312	0.00	+0.01	17.66	206.7	" "
15:00	69.31	16.0	40	6.99	0.308	0.00	-0.01	17.33	218.4	" "
15:10	69.42	16.4	40	6.96	0.304	0.00	-0.01	16.98	230.5	" "
15:20	69.33	16.8	40	6.97	0.304	0.00	-0.02	16.93	228.6	" "
15:30	69.54	17.2	40	7.04	0.305	0.00	-0.02	17.01	231.6	" "
15:40	69.69	17.6	40	7.04	0.301	0.00	-0.02	16.89	242.7	CLEAR
15:50	69.87	18.0	40	7.06	0.301	0.00	-0.04	16.87	~~230.4~~ 238.4	
	4 HRS - DONE W/ PURGE - SAMPLES COLLECTED									
		* FLOWRATE ✓ WITH DRAWDOWN STABILIZED, NOTE AT THIS RATE 1 WELL VOL IS >4 HRS								

Water Quality Meter (SN) 01L0702 AF
Control Box type (SN) MP10-133X
Turbidity Meter (SN) 1728-1600

Pump Intake 88'

SIGNATURE(S):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC CRANE, SWMU16
Project No.: N7448 CTO 0343

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

Sample ID No.: 16GWT 1704
Sample Location: 16MWT 17
Sampled By: Goerdt
C.O.C. No.: 3715
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-7-05	Color	pH	S.C.	Temp.	Turbidity	* DO	ORP	Other
Time: 1925	(Visual)	(S. U.)	(mS/cm)	(°C)	(NTU)	(mg/L)	(mV)	NA
Method: Del Bladder	Clear	5.40	.474	13.78	4.6	-17.04	173.2	---

PURGE DATA:

Date: 5-7-05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method: Del Bladder								
Monitor Reading (ppm): —								
Well Casing Diameter & Material								
Type: 2" PVC			See Low Flow Purge Data Sheets					
Total Well Depth (TD): 26.02								
Static Water Level (WL): 15.38								
One Casing Volume(gal/L): 6.4								
Start Purge (hrs): 1710								
End Purge (hrs): 1920								
Total Purge Time (min): 130								
Total Vol. Purged (gal/L): 12.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Explosives SW-846 8330 Nitroaromatics and Nitramines	4°C	(2) L Glass Amber	(Yes) / No
Volatiles SW-846-8260B	4°C/HCl	(3) 40 ml Vials	(Yes) / No

OBSERVATIONS / NOTES:

Filtered Sample Collected Yes[] No[X] 16GWT_____-F

Dedicated pump intake @ 20.8'

* DO PROBE MALFUCTION

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7448

WELL ID.: 16M WT 17
DATE: 5-7-05

Time (Hrs.)	Water Level (Ft. below TOC)	Volume (L)	Flowrate (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments (Color)
1710	15.38	–	–	–	–	–	–	–	–	Start purge
1720	15.43	0.5	50	5.40	0.961	150	-4.48	17.11	120.6	cloudy
1730	15.51	1.5	100	5.39	.633	97	-4.56	14.96	142.9	"
1740	15.58	2.5	100	5.38	.582	45	-7.19	14.58	161.9	clear
1750	15.62	3.5	100	5.40	.571	38	-8.01	14.47	161.2	
1800	15.65	4.5	100	5.42	.546	25	-8.35	14.34	160.9	
1810	15.66	5.5	100	5.42	.532	16	-10.20	14.39	161.3	
1820	15.67	6.5	100	5.44	.521	12	-11.44	14.21	161.9	
1830	15.69	7.5	100	5.44	.511	10	-14.66	13.96	162.9	
1840	15.72	8.5	100	5.44	.497	9.2	-15.17	13.81	165.4	
1850	15.74	9.5	100	5.42	.487	7.8	-16.42	13.68	168.4	
1900	15.75	10.5	100	5.41	.479	6.9	-16.75	13.71	170.4	
1910	15.74	11.5	100	5.41	.477	5.4	-16.92	13.73	170.9	
1920	15.73	12.5	100	5.40	.474	4.6	-17.04	13.78	173.2	end purge

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

Pump Intake 20.8'

SIGNATURE(S): [illegible]

A.2.2

SWMU 16

GROUNDWATER SAMPLE LOG SHEETS

ROUND 6

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/12/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT0607
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/12/05	**Static Water Level (ft.)**	17.93	**Water Quality Meter**	99K1014 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	28.30	**Pump Control Box**	MP10 1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/12/05	12:15	17.93		Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/12/05	12:25	18.32	110	Clear	6.0	919	5.34	13	21.49	397.5	NA	NA	1100
8/12/05	12:35	18.68	110	Clear	NA	923	3.18	9.8	22.41	443.4	NA	NA	1100
8/12/05	12:45	19.01	100	Clear	6.0	972	3.08	7.9	23.18	470.6	NA	NA	1000
8/12/05	12:55	19.23	60	Clear	NA	870	2.94	4.7	19.78	510.1	NA	NA	600
8/12/05	13:05	19.39	60	Clear	6.0	894	3.07	3.5	21.06	527.6	NA	NA	600
8/12/05	13:15		60	Clear	NA	897	3.20	4.8	21.31	546.9	NA	NA	600
8/12/05	13:25	19.68	60	Clear	NA	912	3.32	3.6	22.06	555.9	NA	NA	600

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/12/05	13:35	19.75	60	Clear	6.0	930	3.69	3.9	23.21	568.7	NA	NA	600
8/12/05	13:45	19.87	40	Clear	NA	945	4.13	4.8	24.30	594.1	NA	NA	400
8/12/05	13:55	20.05	40	Clear	NA	926	4.11	5.4	23.38	602.5	NA	NA	400
8/12/05	14:05	21.03	40	Clear	NA	913	4.18	5.2	22.89	NA	NA	NA	400
8/12/05	14:15	21.43	40	Clear	NA	908	4.23	5.5	22.41	640.01	NA	NA	-400
8/12/05	14:25	21.20	40	Clear	NA	913	4.26	4.9	22.53	643.1	NA	NA	800
8/12/05	14:35	20.58	70	Clear	NA	876	4.22	5.3	20.57	647.9	NA	NA	700
8/12/05	14:45	20.75	70	Clear	6.0	884	4.13	5.1	20.57	658.0	NA	NA	700
8/12/05	14:55	21.07	70	Clear	NA	857	3.91	4.4	19.31	666.5	NA	NA	700
8/12/05	15:05	21.34	70	Clear	6.0	836	3.76	3.1	18.35	666.3	NA	NA	700
8/12/05	15:15		70	Clear	NA	847	3.83	4.3	18.94	675.6	NA	NA	700
8/12/05	15:25	21.78	100	Clear	NA	839	3.79	5.6	18.72	682.6	NA	NA	1000
8/12/05	15:35	21.83	100	Clear	NA	842	3.75	5.8	19.06	690.1	NA	NA	1000
8/12/05	15:45	21.97	100	Clear	NA	845	3.61	5.1	19.66	716.5	NA	NA	1000
8/12/05	15:55	22.31	100	Clear	NA	848	3.47	5.5	19.73	714.8	NA	NA	1000
8/12/05	16:05	22.52	100	Clear	NA	862	3.22	6.1	20.33	724.3	NA	NA	1000
8/12/05	16:15	22.76	100	Clear	6.0	862	3.06	5.2	20.27	729.0	NA	NA	1000

Final Purge / Sample Data

One Casing Volume	6.3	**Method**		**Dissolved Oxygen (mg/L)**	3.06
Total Vo. Purge (L)	18.1	**Waterlevel (ft.)**	22.76	**Turbidity (NTUs)**	5.2
Start Purge (hrs.)	8/12/05	**Flowrate (mL/min)**	100	**Temp (C)**	20.27
End Purge (hrs.)	8/12/05	**Color**	Clear	**ORP (mV)**	729.0
Total Purge Time (min.)	0	**pH (S.U.)**	6.0	**Salinity**	
		Conductivity (mS/cm)	862	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/12/05	16:20	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/12/05	16:20	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/12/05	16:20	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/12/05	16:20	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2
✓	8/12/05	16:20	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/12/05	16:20	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2

General Observations and Notes

Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/12/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1105
TtNUS Project #	112G00041	**Well ID**	16MWT11
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/12/05	**Static Water Level (ft.)**	95.92	**Water Quality Meter**	99K1014 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	98.65	**Pump Control Box**	MP10 1588
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	No Data
MS/MSD Collected?	N	**Well Volumes Req.**			
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/12/05	09:50			Clear									0

Final Purge / Sample Data

One Casing Volume	NA	**Method**		**Dissolved Oxygen (mg/L)**	
Total Vo. Purge (L)	NA	**Waterlevel (ft.)**		**Turbidity (NTUs)**	
[illegible]rt Purge (hrs.)	8/12/05	**Flowrate (mL/min)**		**Temp (C)**	
End Purge (hrs.)	8/12/05	**Color**	Clear	**ORP (mV)**	
Total Purge Time (min.)	0	**pH (S.U.)**		**Salinity**	
		Conductivity (mS/cm)		**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/12/05	09:50	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/12/05	09:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	16:10	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	15:35	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	15:35	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/14/05	15:35	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2

General Observations and Notes

Due to this well historically drying out

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	John Wright	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/13/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1205
TtNUS Project #	112G00041	**Well ID**	16MWT12
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	John Wright
		Concentration	Low Concentration

Well and Sample Data

Date	8/13/05	**Static Water Level (ft.)**	21.96	**Water Quality Meter**	98F0478AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	28.50	**Pump Control Box**	US 100
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2	**Turbidity Meter**	4557-3303
MS/MSD Collected?	N	**Well Volumes Req.**			
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	09:00	21.96	100	Clear									0
8/13/05	09:10	22.26	100	Clear	6.37	1.858	1.78	5.7	16.23	247.8	NA	NA	1000
8/13/05	09:20	22.49	100	Clear	6.63	1.850	0.87	2.4	15.89	188.7	NA	NA	1000
8/13/05	09:30	22.53	100	Clear	6.66	1.812	0.70	0.00	16.01	171.4	NA	NA	1000
8/13/05	09:40	22.55	100	Clear	6.63	1.765	0.61	0.00	16.01	162.5	NA	NA	1000
8/13/05	09:50	22.58	100	Clear	6.55	1.695	0.54	0.00	16.11	160.8	NA	NA	1000
8/13/05	10:00	22.61	100	Clear	6.50	1.582	0.51	0.00	16.17	158.4	NA	NA	1000
8/13/05	10:10	22.63	100	Clear	6.51	1.487	0.47	0.00	16.21	156.9	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	10:20	22.61	100	Clear	6.53	1.424	0.44	0.00	16.10	150.6	NA	NA	1000
8/13/05	10:30	22.63	100	Clear	6.51	1.419	0.42	0.00	16.31	149.7	NA	NA	1000
8/13/05	10:40	22.63	100	Clear	6.57	1.255	0.39	0.00	16.25	152.5	NA	NA	1000
8/13/05	10:50	22.63	100	Clear	6.71	1.228	0.38	0.00	16.33	152.9	NA	NA	1000
8/13/05	11:00	22.64	100	Clear	6.79	1.184	0.36	0.00	16.76	157.5	NA	NA	1000
8/13/05	11:10	22.62	100	Clear	6.68	1.165	0.36	0.00	16.75	155.9	NA	NA	1000

Final Purge / Sample Data

One Casing Volume	4.04	**Method**		**Dissolved Oxygen (mg/L)**	0.36
Total Vo. Purge (L)	calc	**Waterlevel (ft.)**	22.62	**Turbidity (NTUs)**	0.00
Start Purge (hrs.)	8/13/05	**Flowrate (mL/min)**	100	**Temp (C)**	16.75
End Purge (hrs.)	8/13/05	**Color**	Clear	**ORP (mV)**	155.9
Total Purge Time (min.)	0	**pH (S.U.)**	6.68	**Salinity**	NA
		Conductivity (mS/cm)	1.165	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/13/05	11:24	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/13/05	11:24	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/13/05	11:24	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	11:24	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	11:24	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/13/05	11:24	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2

General Observations and Notes

Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	John Wright	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/13/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1305
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	John Wright
		Concentration	Low Concentration

Well and Sample Data

Date	8/13/05	**Static Water Level (ft.)**	12.31	**Water Quality Meter**	98F0478AB
Purge Method	-Select-	**Total Well Depth (ft.)**	20.32	**Pump Control Box**	US 100
Sampling Method				**Turbidity Meter**	4557-3303
MS/MSD Collected?	N	**Well Riser Diameter (in.)**	2		
Duplicate Sample Collected?	N	**Well Volumes Req.**			
Corresponding Duplicate Sample ID		**Monitor Reading (ppm)**	NA		

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	13:15	12.31	100	Clear									-1000
8/13/05	13:25	12.63	100	Clear	6.80	.214	6.23	28	21.45	149.9	NA	NA	0
8/13/05	13:36	12.96	70	Clear	7.31	.205	1.82	6.1	19.80	113.9	NA	NA	770
8/13/05	13:45	13.12	40	Clear	7.22	.211	1.19	13	20.82	103.5	NA	NA	360
8/13/05	13:55	13.20	40	Clear	7.36	.217	1.03	19	21.23	95.8	NA	NA	760
8/13/05	14:05	13.34	40	Clear	7.36	.222	0.85	24	20.94	89.6	NA	NA	400
8/13/05	14:15	13.54	40	Clear	7.38	.227	0.68	24	20.51	84.9	NA	NA	400
8/13/05	14:25	13.69	40	Clear	7.31	.233	0.56	20	20.41	83.7	NA	NA	400

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	14:35	13.75	40	Clear	7.23	.241	0.51	18	22.86	92.5	NA	NA	400
8/13/05	14:45	13.82	40	Clear	7.12	.244	0.56	19	23.05	82.5	NA	NA	400
8/13/05	14:56	13.98	40	Clear	7.13	.233	0.55	15	21.62	90.0	NA	NA	440
8/13/05	15:05	14.06	40	Clear	7.12	.228	0.48	9.1	21.22	98.6	NA	NA	-400
8/13/05	15:15	14.17	40	Clear	7.08	.222	0.45	9.4	21.05	102.0	NA	NA	760
8/13/05	15:25	14.25	40	Clear	6.98	.218	0.42	9.1	21.22	103.6	NA	NA	-400
8/13/05	15:35	14.34	40	Clear	6.93	.216	0.41	9.1	20.77	113.6	NA	NA	800
8/13/05	15:45	14.46	20	Clear	6.87	.223	0.41	7.2	22.14	113.4	NA	NA	200
8/13/05	15:55	14.54	20	Clear	6.83	.231	0.45	6.8	23.51	114.0	NA	NA	200
8/13/05	16:05	14.55	20	Clear	6.69	.231	0.46	5.9	23.68	114.1	NA	NA	200
8/13/05	16:15	14.62	20	Clear	6.79	.234	0.47	5.7	23.75	113.9	NA	NA	200
8/13/05	16:25	14.69	20	Clear	6.77	.236	0.47	5.5	23.55	112.5	NA	NA	200
8/13/05	16:35	14.74	20	Clear	6.79	.236	0.47	4.5	23.47	111.0	NA	NA	200
8/13/05	16:45	14.85	20	Clear	6.82	.235	0.44	4.2	22.55	109.6	NA	NA	200
8/13/05	16:56	14.97	20	Clear	6.84	.233	0.42	4.0	21.88	108.9	NA	NA	220
8/13/05	17:05	15.06	20	Clear	6.83	.233	0.41	3.4	21.75	108.9	NA	NA	180
8/13/05	17:15	15.15	20	Clear	6.82	.234	0.41	5.8	21.63	108.3	NA	NA	200

Final Purge / Sample Data

One Casing Volume	4.95	**Method**		**Dissolved Oxygen (mg/L)**	0.41
Total Vo. Purge (L)		**Waterlevel (ft.)**	15.15	**Turbidity (NTUs)**	5.8
Start Purge (hrs.)	8/13/05	**Flowrate (mL/min)**	20	**Temp (C)**	21.63
End Purge (hrs.)	8/13/05	**Color**	Clear	**ORP (mV)**	108.3
Total Purge Time (min.)	0	**pH (S.U.)**	6.82	**Salinity**	
		Conductivity (mS/cm)	.234	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/14/05	14:20	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	14:20	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/14/05	14:20	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	14:20	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/14/05	14:20	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	14:20	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/13/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

SMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GW0406
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	Low Concentration

Well and Sample Data

Date	8/13/05	**Static Water Level (ft.)**	29.70	**Water Quality Meter**	98H1228 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	49.16	**Pump Control Box**	MP10-1088
Sampling Method		**Well Riser Diameter (in.)**	2	**Turbidity Meter**	1733-1600
MS/MSD Collected?		**Well Volumes Req.**			
Duplicate Sample Collected?		**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	09:10	29.70	130	Clear									0
8/13/05	09:20	29.70	150	Clear	3.66	0.712	10.95	2.0	16.29	344			1500
8/13/05	09:30	29.70	150	Clear	3.57	0.705	5.98	2.0	15.66	347			1500
8/13/05	09:40	29.72	150	Clear	3.54	0.704	1.96	1.00	15.61	347			1500
8/13/05	09:50	29.73	150	Clear	3.48	0.707	1.86	1.05	15.78	345			1500
8/13/05	10:00	29.73	150	Clear	3.43	0.707	2.00	1.1	15.88	344			1500
8/13/05	10:10	29.73	150	Clear	3.41	0.706	2.08	0.35	15.84	342			1500
8/13/05	10:20	29.73	150	Clear	3.43	0.705	2.09	0.25	15.78	342			1500

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	10:30	29.73	150	Clear	3.38	0.706	2.05	0.55	15.85	341			1500
8/13/05	10:40	29.73	150	Clear	3.33	0.703	2.01	0.50	15.79	340			1500

Final Purge / Sample Data

One Casing Volume	12.0	**Method**		**Dissolved Oxygen (mg/L)**	2.01
Total Vo. Purge (L)	13.3	**Waterlevel (ft.)**	29.73	**Turbidity (NTUs)**	0.50
Start Purge (hrs.)	8/13/05	**Flowrate (mL/min)**	150	**Temp (C)**	15.79
End Purge (hrs.)	8/13/05	**Color**	Clear	**ORP (mV)**	340
Total Purge Time (min.)	0	**pH (S.U.)**	3.33	**Salinity**	
		Conductivity (mS/cm)	0.703	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/13/05	10:45	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	10:45	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/13/05	10:45	SW846 9056	Sulfate and Chloride	None	1	Plastic	1L Amber		112G00041-8152005-2
✓	8/13/05	10:45	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/13/05	10:45	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/13/05	10:45	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	-SELECT-		112G00041-8152005-2

General Observations and Notes

Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	Terry Rojahn	**Printed By**	Joseph Lucas
Created Date	8/13/05	**Modified Date**	1/20/06	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1505
TtNUS Project #	112G00041	**Well ID**	16MWT15
Task/Contract #	CTO 0377	**Well Type**	-Select-
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	Low Concentration

Well and Sample Data

Date	8/13/05	**Static Water Level (ft.)**	58.97	**Water Quality Meter**	98H1228 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	94.70	**Pump Control Box**	MP10-1088
Sampling Method	-Select-	**Well Riser Diameter (in.)**	2	**Turbidity Meter**	1733-1600
MS/MSD Collected?		**Well Volumes Req.**			
Duplicate Sample Collected?					
Corresponding Duplicate Sample ID		**Monitor Reading (ppm)**	NA		

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	13:18	58.97	100	Clear									0
8/13/05	13:28	60.81	90	Clear	6.38	0.343	2.63	5.1	18.28	-60			900
8/13/05	13:38	62.13	110	Clear	6.45	0.330	2.61	0.75	18.21	-44			1100
8/13/05	13:48	63.21	90	Clear	6.54	0.325	3.70	0.75	18.15	-14			900
8/13/05	13:58	64.18	90	Clear	6.64	0.322	3.30	0.90	18.00	21			900
8/13/05	14:08	65.2	90	Clear	6.70	0.321	3.38	0.80	17.92	43			900
8/13/05	14:18	66.11	90	Clear	6.72	0.345	4.82	0.65	17.91	60			900
8/13/05	14:28	67.05	90	Clear	6.72	0.318	4.53	0.60	17.66	72			900

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	14:38	67.82	90	Clear	6.72	0.318	4.01	0.45	17.61	74			900
8/13/05	14:48	68.63	90	Clear	6.74	0.318	3.19	0.50	17.76	82			900
8/13/05	14:48	68.63	90	Clear	6.74	0.318	3.19	0.50	17.76	82			900
8/13/05	14:58	69.00	60	Clear	6.89	0.371	3.74	0.45	19.20	48			600
8/13/05	15:08	60.30	60	Clear	6.92	0.333	4.83	0.40	19.67	66.7			600
8/13/05	15:18	69.58	50	Clear	6.96	0.334	5.59	0.50	19.80	73			500
8/13/05	15:28	69.80	50	Clear	6.95	0.332	4.99	0.50	19.65	74			500
8/13/05	15:38	70.07	50	Clear	6.96	0.332	3.78	0.55	19.57	82			500
8/13/05	15:48	70.30	50	Clear	6.94	0.332	1.50	0.65	19.66	91			500
8/13/05	15:58	70.54	50	Clear	6.93	0.331	1.23	0.65	19.62	86			500
8/13/05	16:08	70.78	50	Clear	6.94	0.331	1.15	0.50	19.56	78			500
8/13/05	16:18	71.02	50	Clear	6.95	0.330	0.94	0.50	19.47	76			500
8/13/05	16:28	71.31	50	Clear	6.95	0.330							500
8/13/05	16:38	71.55	50	Clear	6.95	0.330	0.98	0.45	19.47	63			500
8/13/05	16:48	71.73	50	Clear	6.97	0.328	1.61	0.50	19.37	57			500
8/13/05	16:58	71.95	50	Clear	6.96	0.326	0.92	0.45	19.21	61			500
8/13/05	17:08	72.19	50	Clear	6.95	0.327	0.87	0.50	19.27	55			500
8/13/05	17:18	72.41	50	Clear	6.95	0.326	1.09	0.65	19.23	61			500

Final Purge / Sample Data

One Casing Volume	22.0	**Method**		**Dissolved Oxygen (mg/L)**	1.09
Total Vo. Purge (L)		**Waterlevel (ft.)**	72.41	**Turbidity (NTUs)**	0.65
Start Purge (hrs.)	8/13/05	**Flowrate (mL/min)**	50	**Temp (C)**	19.23
End Purge (hrs.)	8/13/05	**Color**	Clear	**ORP (mV)**	61
Total Purge Time (min.)	0	**pH (S.U.)**	6.95	**Salinity**	
		Conductivity (mS/cm)	0.326	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/14/05	14:30	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/14/05	14:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/14/05	14:30	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	14:30	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	14:30	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	14:30	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2

General Observations and Notes

End purge after 4 Hrs. - will allow the well time to recover and sample tomorrow.

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/13/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16TB08120501
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	-Select-
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	1

Well and Sample Data

Date		**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	1	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method		**Well Riser Diameter (in.)**		**Turbidity Meter**	
MS/MSD Collected?		**Well Volumes Req.**			
Duplicate Sample Collected?		**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

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

Final Purge / Sample Data

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

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/12/05	08:30	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	2	Glass	40ml vials		112G00041-8152005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/13/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1005
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	-Select-
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/13/05	**Static Water Level (ft.)**	23.08	**Water Quality Meter**	99K1014 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	27.15	**Pump Control Box**	MP10 1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	13:05	23.08	100	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/13/05	13:15	23.58	100	Clear	3.0	1128	2.48	40	18.86	620.1	NA	NA	1000
8/13/05	13:25	23.59	100	Clear	NA	1136	1.44	24	18.92	687.8	NA	NA	1000
8/13/05	13:35	23.59	100	Clear	NA	1124	1.36	18	19.30	730.4	NA	NA	1000
8/13/05	13:45	23.59	100	Clear	NA	1066	1.52	12	19.84	757.5	NA	NA	1000
8/13/05	13:55	23.59	100	Clear	NA	1042	1.69	10	19.98	774.2	NA	NA	1000
8/13/05	14:05	23.59	100	Clear	NA	1019	1.73	8.7	20.09	798.9	NA	NA	1900
8/13/05	14:15	23.61	100	Clear	3.0	906	1.98	14	17.51	829.7	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	14:25	23.68	140	Clear	NA	897	1.98	16	17.23	845.9	NA	NA	1400
8/13/05	14:35	23.69	140	Clear	NA	888	2.02	13	17.46	864.8	NA	NA	1400
8/13/05	14:45	23.69	140	Clear	NA	877	2.08		17.48	877.8	NA	NA	1400
8/13/05	14:55	23.69	140	Clear	NA	868	2.16	8.5	17.80	883.4	NA	NA	1400
8/13/05	15:05	23.69	140	Clear	3.0	854	2.20	6.9	17.85	890.5	NA	NA	1400

Final Purge / Sample Data

One Casing Volume	2.5	**Method**		**Dissolved Oxygen (mg/L)**	2.20
Total Vo. Purge (L)	15.4	**Waterlevel (ft.)**	23.69	**Turbidity (NTUs)**	6.9
Start Purge (hrs.)	8/13/05	**Flowrate (mL/min)**	140	**Temp (C)**	17.85
End Purge (hrs.)	8/13/05	**Color**	Clear	**ORP (mV)**	890.5
Total Purge Time (min.)	0	**pH (S.U.)**	3.0	**Salinity**	NA
		Conductivity (mS/cm)	854	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/13/05	15:15	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/13/05	15:15	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/13/05	15:15	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	15:15	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/13/05	15:15	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	15:15	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	James Goerdt	**Printed By**	Joseph Lucas
Created Date	8/13/05	**Modified Date**	1/7/06	**Printed Date**	5/2/06

Project Information

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GW0306
TtNUS Project #	112G00041	**Well ID**	16MW03
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/13/05	**Static Water Level (ft.)**	21.80	**Water Quality Meter**	99K1014 AB
Purge Method	Low flow - Bladder	**Total Well Depth (ft.)**	38.31	**Pump Control Box**	MP10 1588
Sampling Method	Low flow - Bladder	**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?		**Well Volumes Req.**			
Duplicate Sample Collected?		**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	08:35	21.80	100	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/13/05	08:45	21.13	100	Clear	5.0	309	2.42	21	15.67	356.4	NA	NA	1000
8/13/05	08:55	22.40	100	Clear	NA	318	2.16	16	15.80	361.2	NA	NA	1000
8/13/05	09:05	23.25	100	Clear	NA	323	1.67	13	16.04	423.7	NA	NA	1000
8/13/05	09:15	23.51	100	Clear	NA	326	1.50	11	16.01	446.8	NA	NA	1000
8/13/05	09:25	23.69	100	Clear	NA	330	1.48	9.2	16.17	469.0	NA	NA	1000
8/13/05	09:35	23.79	100	Clear	NA	333	1.48	8.3	16.34	489.6	NA	NA	1000
8/13/05	09:45	23.83	100	Clear	na	335	1.51	8.3	16.47	509.0	NA	NA	1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/13/05	09:55	23.87	100	Clear	NA	337	1.47	8.0	16.62	526.0	NA	NA	1000
8/13/05	10:05	23.92	100	Clear	NA	338	1.52	10	16.86	541.5	NA	NA	1000
8/13/05	10:15	23.89	100	Clear	5.0	339	1.48	9.6	16.86	558.5	NA	NA	1000
8/13/05	10:25	23.90	100	Clear	NA	338	1.49	8.7	16.93	562.2	NA	NA	1000
8/13/05	10:35	23.89	100	Clear	5.0	339	1.50	8.4	17.14	566.9	NA	NA	1000

Final Purge / Sample Data

One Casing Volume	10.0	**Method**		**Dissolved Oxygen (mg/L)**	1.50
Total Vo. Purge (L)	12.0	**Waterlevel (ft.)**	23.89	**Turbidity (NTUs)**	8.4
Start Purge (hrs.)	8/13/05	**Flowrate (mL/min)**	100	**Temp (C)**	17.14
End Purge (hrs.)	8/13/05	**Color**	Clear	**ORP (mV)**	566.9
Total Purge Time (min.)	0	**pH (S.U.)**	5.0	**Salinity**	NA
		Conductivity (mS/cm)	339	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/13/05	10:40	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/13/05	10:40	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/13/05	10:40	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/13/05	10:40	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/13/05	10:40	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/13/05	10:40	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2

General Observations and Notes

Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	John Wright	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/14/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16FD08140501
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	2
WBS Code #	0000	**Sampled By**	John Wright
		Concentration	1

Well and Sample Data

Date		**Static Water Level (ft.)**		**Water Quality Meter**	
Purge Method	1	**Total Well Depth (ft.)**		**Pump Control Box**	
Sampling Method		**Well Riser Diameter (in.)**		**Turbidity Meter**	
MS/MSD Collected?		**Well Volumes Req.**			
Duplicate Sample Collected?	Y	**Monitor Reading (ppm)**			
Corresponding Duplicate Sample ID					

Purge Entries

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

Final Purge / Sample Data

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

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/14/05	00:00	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/14/05	00:00	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	00:00	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/14/05	00:00	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	00:00	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	00:00	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	John Wright	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/14/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT1705
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	John Wright
		Concentration	Low Concentration

Well and Sample Data

Date	8/14/05	**Static Water Level (ft.)**	15.91	**Water Quality Meter**	98F0478AB
Purge Method	-Select-	**Total Well Depth (ft.)**	26.02	**Pump Control Box**	US 100
Sampling Method		**Well Riser Diameter (in.)**	2	**Turbidity Meter**	4557-3303
MS/MSD Collected?	N	**Well Volumes Req.**			
Duplicate Sample Collected?	Y	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/14/05	09:15	15.91	100	Clear									0
8/14/05	09:25	16.17	100	Slightly Turbid	6.75	0.862	26.87	35	18.29	86.7	NA	NA	1000
8/14/05	09:35	16.19	100	Clear	6.70	0.747	21.29	9.5	18.04	84.1	NA	NA	1000
8/14/05	09:45	16.22	100	Clear	6.60	0.714	20.63	5.4	18.05	80.9	NA	NA	1000
8/14/05	09:55	16.23	100	Clear	6.48	0.691	19.98	4.5	18.15	82.1	NA	NA	1000
8/14/05	10:05	16.24	100	Clear	6.43	0.687	20.30	4.7	18.12	85.2	NA	NA	1000
8/14/05	10:15	16.19	100	Clear	6.36	0.671	20.48	2.7	18.16	89.2	NA	NA	1000
8/14/05	10:25	16.22	100	Clear	6.31	0.658	20.43	2.5	18.29	92.3	NA	NA	1000

Final Purge / Sample Data

One Casing Volume	6.25	**Method**		**Dissolved Oxygen (mg/L)**	20.43
Total Vo. Purge (L)		**Waterlevel (ft.)**	16.22	**Turbidity (NTUs)**	2.5
Start Purge (hrs.)	8/14/05	**Flowrate (mL/min)**	100	**Temp (C)**	18.29
End Purge (hrs.)	8/14/05	**Color**	Clear	**ORP (mV)**	92.3
Total Purge Time (min.)	0	**pH (S.U.)**	6.31	**Salinity**	
		Conductivity (mS/cm)	0.658	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/14/05	10:40	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/14/05	10:40	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/14/05	10:40	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	10:40	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	10:40	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	10:40	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2

General Observations and Notes

Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	Terry Rojahn	**Modified By**		**Printed By**	Joseph Lucas
Created Date	8/14/05	**Modified Date**		**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT0406
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	Terry Rojahn
		Concentration	Low Concentration

Well and Sample Data

Date	8/14/05	**Static Water Level (ft.)**	13.52	**Water Quality Meter**	98H1228 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	27.59	**Pump Control Box**	MP10-1088
Sampling Method		**Well Riser Diameter (in.)**	2	**Turbidity Meter**	1733-1600
MS/MSD Collected?		**Well Volumes Req.**			
Duplicate Sample Collected?		**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/14/05	09:19	13.52	120	Clear									0
8/14/05	09:29	14.00	120	Clear	6.10	0.192	1.55	2.0	19.36	82			1200
8/14/05	09:39	13.99	100	Clear	6.11	0.179	1.25	0.70	19.27	123			1000
8/14/05	09:49	13.99	100	Clear	6.16	0.173	1.34	0.50	19.34	134			1000
8/14/05	09:59	14.01	100	Clear	6.18	0.171	1.85	0.65	19.38	136			1000
8/14/05	10:09	14.02	100	Clear	6.15	0.171	1.95	0.40	19.37	141			1000
8/14/05	10:19	14.03	100	Clear	6.14	0.170	1.92	0.60	19.47	150			1000
8/14/05	10:29	14.03	100	Clear	6.12	0.169	1.87	0.70	19.51				1000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/14/05	10:39	14.04	100	Clear	6.12	0.168	1.94	0.70	19.53				1000
8/14/05	10:49	14.04	100	Clear	6.10	0.168	2.02	0.70	19.60	168			1000

Final Purge / Sample Data

One Casing Volume	8.7	**Method**		**Dissolved Oxygen (mg/L)**	2.02
Total Vo. Purge (L)	9.2	**Waterlevel (ft.)**	14.04	**Turbidity (NTUs)**	0.70
Start Purge (hrs.)	8/14/05	**Flowrate (mL/min)**	100	**Temp (C)**	19.60
End Purge (hrs.)	8/14/05	**Color**	Clear	**ORP (mV)**	168
Total Purge Time (min.)	0	**pH (S.U.)**	6.10	**Salinity**	
		Conductivity (mS/cm)	0.168	**Other**	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/14/05	10:55	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	3	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	10:55	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/14/05	10:55	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	3	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	10:55	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	6	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	10:55	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	9	Glass	40ml vials		112G00041-8152005-2
✓	8/14/05	10:55	SW846 9056	Sulfate and Chloride	4 ° C	3	Plastic	1L HDPE		112G00041-8152005-2

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/14/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GWT0905
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/14/05	**Static Water Level (ft.)**	15.76	**Water Quality Meter**	99K1014 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	27.70	**Pump Control Box**	MP10 1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/14/05	12:55	15.76	130	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/14/05	13:05	16.30	130	Clear	4.83	982	1.34	4.7	16.28	303.6	NA	NA	1300
8/14/05	13:15	16.45	130	Clear	4.64	730	0.80	1.8	16.22	387.8	NA	NA	1300
8/14/05	13:25	16.45	130	Clear	4.33	614	0.81	0.0	16.58	512.4	NA	NA	1300
8/14/05	13:35	16.45	130	Clear	4.29	586	0.92	0.0	16.60	592.7	NA	NA	1300
8/14/05	13:45	16.45	130	Clear	4.28	564	1.04	0.0	16.81	621.9	NA	NA	1300
8/14/05	13:55	16.45	130	Clear	4.25	544	0.99	0.0	16.92	647.7	NA	NA	1300
8/14/05	14:05	16.45	130	Clear	4.16	523	1.05	0.0	17.22	653.8	NA	NA	1300

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/14/05	14:15	16.45	130	Clear	4.13	521	1.06	0.0	17.51	659.0	NA	NA	1300
8/14/05	14:25	16.45	130	Clear	4.11	522	1.09	0.0	17.77	664.8	NA	NA	1300

Final Purge / Sample Data

One Casing Volume	7.2	**Method**		**Dissolved Oxygen (mg/L)**	1.09
Total Vo. Purge (L)	9.7	**Waterlevel (ft.)**	16.45	**Turbidity (NTUs)**	0.0
Start Purge (hrs.)	8/14/05	**Flowrate (mL/min)**	130	**Temp (C)**	17.77
End Purge (hrs.)	8/14/05	**Color**	Clear	**ORP (mV)**	664.8
Total Purge Time (min.)	0	**pH (S.U.)**	4.11	**Salinity**	
		Conductivity (mS/cm)	522	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/14/05	14:30	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	14:30	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/14/05	14:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1
✓	8/14/05	14:30	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	14:30	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	14:30	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2

General Observations and Notes

Notes

- End of Report -

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

Created By	James Goerdt	**Modified By**	**Printed By**	Joseph Lucas
Created Date	8/14/05	**Modified Date**	**Printed Date**	5/2/06

Project Information

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Facility Name	CRANE NSWC	**Sample ID #**	16GW0206
TtNUS Project #	112G00041	**Well ID**	
Task/Contract #	CTO 0377	**Well Type**	Monitoring Well Data
WBS Code #	0000	**Sampled By**	James Goerdt
		Concentration	Low Concentration

Well and Sample Data

Date	8/14/05	**Static Water Level (ft.)**	15.91	**Water Quality Meter**	99K1014 AB
Purge Method	-Select-	**Total Well Depth (ft.)**	28.74	**Pump Control Box**	MP10 1588
Sampling Method		**Well Riser Diameter (in.)**	2"	**Turbidity Meter**	3655-3802
MS/MSD Collected?	N	**Well Volumes Req.**			
Duplicate Sample Collected?	N	**Monitor Reading (ppm)**	NA		
Corresponding Duplicate Sample ID					

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/14/05	08:55	15.91	50	Clear	NA	NA	NA	NA	NA	NA	NA	NA	0
8/14/05	09:05	16.98	50	Clear	6.66	546	2.53	1.5	17.26	72.5	NA	NA	500
8/14/05	09:15		150	Clear	6.58	502	1.74	1.1	16.73	103.6	NA	NA	1500
8/14/05	09:25	16.15	150	Clear	6.56	485	2.23	1.1	16.76	125.6	NA	NA	1500
8/14/05	09:35	16.15	150	Clear	6.49	470	2.12	0.87	16.72	160.1	NA	NA	1500
8/14/05	09:45		150	Clear	6.43	451	1.87	0.86	16.69	216.5	NA	NA	1500
8/14/05	09:55	16.91	150	Clear	6.37	440	1.53	0.0	16.72	271.7	NA	NA	1500
8/14/05	10:05	16.91	150	Clear	6.31	427	1.33	0.0	16.62	334.8	NA	NA	1500

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Purge Entries

Date	Time	Water Level (ft.)	Flow Rate (mL/min)	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTUs)	Temp °C	ORP (mV)	Salinity (%)	Other	Incremental Volume (mL)
8/14/05	10:15	16.91	150	Clear	6.24	420	1.24	0.0	16.60	386.8	NA	NA	1500
8/14/05	10:25	16.91	150	Clear	6.12	414	1.14	0.2	16.67	456.5	NA	NA	1500
8/14/05	10:35	16.91	150	Clear	5.98	407	1.01	0.0	16.57	515.2	NA	NA	1500
8/14/05	10:45	16.91	150	Clear	5.92	403	0.95	0.0	16.64	521.7	NA	NA	1500
8/14/05	10:50	16.91	150	Clear	5.91	402	0.95	0.0	16.63	527.4	NA	NA	750

Final Purge / Sample Data

One Casing Volume	7.7	**Method**		**Dissolved Oxygen (mg/L)**	0.95
Total Vo. Purge (L)	16.25	**Waterlevel (ft.)**	16.91	**Turbidity (NTUs)**	0.0
Start Purge (hrs.)	8/14/05	**Flowrate (mL/min)**	150	**Temp (C)**	16.63
End Purge (hrs.)	8/14/05	**Color**	Clear	**ORP (mV)**	527.4
Total Purge Time (hrs.)	0	**pH (S.U.)**	5.91	**Salinity**	
		Conductivity (mS/cm)	402	**Other**	NA

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Analysis Records

Collected	Date	Time	Analysis / Method	Description of Analysis	Preservative	Count	Type	Requirements	Comments	Chain#
✓	8/14/05	10:50	SW846 9056	Sulfate and Chloride	4 ° C	1	Plastic	1L HDPE	-	112G00041-8152005-2
✓	8/14/05	10:50	SW-846-8330	Explosives Nitroaromatics and Nitramines	4 ° C	2	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	10:50	SW-846 8260B	Volatile Organic Compounds	4 ° C / HCL	3	Glass	40ml vials		112G00041-8152005-2
✓	8/14/05	10:50	EPA 353.2	Nitrate + Nitrite (as N)	4 ° C / H2SO4	1	Plastic	1L HDPE		112G00041-8152005-2
✓	8/14/05	10:50	Modified SW-846-8330	Explosives RDX Degradation Products	4 ° C	1	Glass	1L Amber		112G00041-8152005-2
✓	8/14/05	10:50	DGPM-01/AM20GAX	Methane Ethane and Ethene	4 ° C / NA3PO4	2	Glass	40ml vials		112G00041-8152005-1

General Observations and Notes

No Notes

- End of Report -

A.3.1

SWMU 16

CHAIN OF CUSTODY RECORDS

ROUND 5

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

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

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

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

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	Nitroaromatics & Nitramines SW8468330	COMMENTS
5/03	1200	13GWT0906	13MW T09	-	-	GW	G	2	2	
5/03	1420	13GWT2804	13MW T28	-	-	GW	G	1	1	
5/03	1750	13GWT0105	13MW T01	-	-	GW	G	2	2	
5/04	1050	13GWT2105	13MW T21	-	-	GW	G	2	2	
5/04	1118	13GWT4004	13MW T40	-	-	GW	G	2	2	
5/04	1405	13GWT1105	13MW T11	-	-	GW	G	2	2	
5/04	1420	13GWT1705	13MW T17	-	-	GW	G	2	2	
5/04	1425	13GWT4604	13MW T46	-	-	GW	G	2	2	

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

COMMENTS

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

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FORM NO. TtNUS-001

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

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

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

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

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Nitroaromatics & Nitramines SW846 8330	TYPE OF ANALYSIS: VOLATILES SW 846 8260B	COMMENTS
5/04	1658	13GWT3704	13GW T37	–	–	GW	G	2	2		
5/05	1015	13GWT4504	13GW T45	–	–	GW	G	2	2		
5/05	1018	13GWT1405	13GW T14	–	–	GW	G	2	2		
5/05	1130	13GWT5103	13GW T51	–	–	GW	G	2	2		
5/05	1250	13GWT3104	13GW T31	–	–	GW	G	2	2		
5/05	1330	13GWT3404	13GW T34	–	–	GW	G	4	4		DO MS/MSD
5/05	1355	13GWT4704	13GW T47	–	–	GW	G	2	2		
5/05	1625	13GWT1505	13GW T15	–	–	GW	G	2	2		
5/05	1630	13GWT1305	13GW T13	–	–	GW	G	2	2		
5/05	0000	13FD050505 01	QC	–	–	GW	G	2	2		FROM 13GWT3404
5/06	0700	T8050605 01	QC	–	–	QC	G	2	–	2	
5/06	1140	16GW0405	16MW 04	–	–	GW	G	5	2	3	
5/06	1145	16GW0205	02	–	–	GW	G	5	2	3	
5/06	1655	16GW0305	05	–	–	GW	G	5	2	3	

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

COMMENTS

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

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

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

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

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

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

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

COMMENTS

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

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FORM NO. TtNUS-001

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

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

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

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

DATE YEAR 2005	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: EXP. NITROAROMATICS & NITRAMINES SW8468330	Volatiles SW 8468260B							COMMENTS
5/08	0950	16SW1204	16SW/SD12	-	-	SW	G	5	2	3							
5/08	1025	16SW1003	16SW/SD10	-	-	SW	G	5	2	3							
5/08	1100	16SW3003	16SW/SD30	-	-	SW	G	13	4	9							DO MS/MSD
5/08	1300	13SW3004	13SW/SD30	-	-	SW	G	2	2	-							
5/08	1315	13SW1604	13SW/SD16	-	-	SW	G	2	2	-							
5/08	1338	13SW1504	13SW/SD15	-	-	SW	G	2	2	-							
5/08	1350	13SW1404	13SW/SD14	-	-	SW	G	2	2	-							
5/08	1410	13SW2204	13SW/SD22	-	-	SW	G	2	2	-							
5/08	1433	13SW2003	13SW/SD20	-	-	SW	G	2	2	-							
5/08	1448	13SW1903	13SW/SD19	-	-	SW	G	2	2	-							
5/08	0000	16FD0508050 1	QC	-	-	SW	G	5	2	3							FROM 16SW3004 S (TB)

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

COMMENTS

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

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FORM NO. TINUS-001

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

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

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

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

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

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

COMMENTS

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

4/02R
FORM NO. TINUS-001

A.3.2

SWMU 16

CHAIN OF CUSTODY RECORDS

ROUND 6

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	John Wright
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	8/15/05
Task/Contract #	CTO 0377	**Field Op Leader (FOL)**	Terry Rojahn	**Modified By**	
WBS Code #	0000	**FOL Phone**	412-921-8857	**Modified Date**	
Chain of Custody ID	112G00041-8152005-1	**Carrier**	Fedex	**Printed By**	Joseph Lucas
		Carrier/Waybill No.	8447 8135 6509	**Printed Date**	5/2/06

Chain of Custody Information

Chain of Custody #	**112G00041-8152005-1**	**Lab Name**	Microseeps, Inc.	**Relenquished By**	John Wright
		Address	220 William Pitt Way	**Date**	8/15/05
Carrier	Fedex	**City, State, Zip**	Pittsburgh, PA 15238	**Time**	16:43
Carrier/Waybill No.	8447 8135 6509	**Lab Contact**	Deb Hallo	**Received By:**	Fedex
		Lab Telephone	412-826-5245	**Date**	8/15/05
				Time	17:43

ple Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/12/05	16GWT0607	16:20	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT06	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/13/05	16GW0306	10:40	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MW03	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/13/05	16GW0406	10:45	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MW04	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/13/05	16GWT1005	15:15	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT10	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/13/05	16GWT1205	11:24	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT12	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/14/05	16FD08140501	00:00	DGPM-01/AM20GAX	Methane Ethane and Ethene	DUP	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/14/05	16GW0206	10:50	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MW02	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
/05	16GWT0406	10:55	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT04	GW	4 ° C / NA3PO4	2	Glass	40ml vials	

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

Date	Sample ID#	Time	Analysis	Description	Loc ID	Matrix	Preservative	No.	Type	Requirements	Comments
8/14/05	16GWT0905	14:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT09	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/14/05	16GWT1105	15:35	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT11	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/14/05	16GWT1305	14:20	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT13	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/14/05	16GWT1505	14:30	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT15	GW	4 ° C / NA3PO4	2	Glass	40ml vials	
8/14/05	16GWT1705	10:40	DGPM-01/AM20GAX	Methane Ethane and Ethene	16MWT17	GW	4 ° C / NA3PO4	2	Glass	40ml vials	

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Chain of Custody Information

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

Sample Records

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

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

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

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

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

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

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

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

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

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

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

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

General Observations and Notes

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

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Chain of Custody Information

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

Sample Records

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

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Sample Records

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

General Observations and Notes

No Notes

- End of Report -

Tetra Tech NUS, Inc.

CHAIN OF CUSTODY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Facility Name	CRANE NSWC	**Project Manager (PM)**	Ralph Basinski	**Created By**	Terry Rojahn
TtNUS Project #	112G00041	**PM Telephone**	412-921-8308	**Created Date**	8/29/05
Task/Contract #	CTO 0377	**Field Op Leader (FOL)**	Terry Rojahn	**Modified By**	
WBS Code #	0000	**FOL Phone**	412-921-8857	**Modified Date**	
Chain of Custody ID	112G00041-8292005-4	**Carrier**	Federal Express	**Printed By**	Joseph Lucas
		Carrier/Waybill No.	8447 8135 6542	**Printed Date**	5/2/06

Chain of Custody Information

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

Sample Records

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

General Observations and Notes

No Notes

- End of Report -

A.4.1

SWMU 16

WATER LEVEL MEASUREMENTS

ROUND 5

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name:	NSWC CRANE	**Project No.:**	7448
Location:	SWMU 16	**Personnel:**	T. Rojahn/J. Wright
Weather Conditions:	Mostly Sunny and 70s	**Measuring Device:**	M-Scope
Tidally Influenced:	Yes ___ No _X_	**Remarks:**	----

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet bgs)	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
WES-14-01-83	5/6/2005	1534	766.67	50.70	31.62	NA	735.05	
WES-14-02-83	5/6/2005	1609	766.54	25.80	15.40	NA	751.14	
WES-14-03-83	5/6/2005	1511	763.93	35.40	19.44	NA	744.49	
WES-14-04-83	5/6/2005	1520	762.99	46.00	27.67	NA	735.32	
WES-14-05-83	5/6/2005	1526	769.40	50.70	33.80	NA	735.6	
16MWT01	5/6/2005	1415	764.50	24.00	15.55	NA	748.95	
16MWT02	5/6/2005	1503	760.36	18.00	11.68	NA	748.68	
16MWT03	5/6/2005	1453	764.41	35.00	27.85	NA	736.56	
16MWT04	5/6/2005	1437	766.14	25.00	13.13	NA	753.01	
16MWT05	5/6/2005	1443	766.88	40.00	31.10	NA	735.78	
16MWT06	5/6/2005	1416	764.44	25.00	16.69	NA	747.75	
16MWT07	5/6/2005	1418	762.87	25.50	Dry	NA	Dry	
16MWT08	5/6/2005	1420	761.56	99.00	96.16	NA	665.4	
16MWT09	5/6/2005	1427	764.28	25.00	13.82	NA	750.46	
16MWT10	5/6/2005	1430	764.43	25.00	21.07	NA	743.36	
16MWT11	5/6/2005	1433	765.24	98.00	96.10	NA	669.14	
16MWT12	5/6/2005	1542	755.45	26.50	19.85	NA	735.6	
16MWT13	5/6/2005	1500	759.57	19.00	10.42	NA	749.15	
16MWT14	5/6/2005	---	Abandoned	25.00	Abandoned	NA	Abandoned	
16MWT15	5/6/2005	1457	759.69	92.00	56.57	NA	703.12	
16MWT16	5/6/2005	1745	764.74	40.00	33.47	NA	731.27	
16MWT17	5/6/2005	1408	766.53	24.00	15.38	NA	751.15	
16MWT18	5/6/2005	1728	764.44	105.00	95.68	NA	668.76	
16MWT19	5/6/2005	1648	609.31	16.00	3.36	NA	605.95	
16MWT20	5/6/2005	1646	609.93	16.00	3.81	NA	606.12	
16MWT21	5/6/2005	1518	763.05	96.00	64.90	NA	698.15	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name:	NSWC CRANE	**Project No.:**	7448
Location:	SWMU 16	**Personnel:**	T. Rojahn/J. Wright
Weather Conditions:	Mostly Sunny and 70s	**Measuring Device:**	M-Scope
Tidally Influenced:	Yes ___ No _X_	**Remarks:**	----

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet bgs)	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
STAFF GAUGES							Surface Water Elevation	
16SG01	5/6/2005	---	750.58	NA	DRY	NA	NA	Flow = 0 gpm
16SG02	5/6/2005	---	734.32	NA	DRY	NA	NA	Flow = 0 gpm
16SG03	5/6/2005	---	761.79	NA	DRY	NA	NA	Flow = 0 gpm
16SG04	5/6/2005	---	762.44	NA	DRY	NA	NA	Flow = 0 gpm
16SG05	5/6/2005	---	763.21	NA	DRY	NA	NA	Flow = 0 gpm
16SG06	5/6/2005	1624	603.53	NA	3.67	NA	599.86	Flow = 20-25 gpm
16SG07	5/6/2005	1633	601.53	NA	**Staff washed away	NA	**Staff washed away	Flow = 790 gpm
16SG08	5/6/2005	1651	590.00	NA	4.22	NA	585.78	Flow = 1-5 gpm
16SG09	5/6/2005	1655	583.26	NA	DRY	NA	NA	Flow = 0 gpm

* All measurements to the nearest 0.01 foot

**Staff replaced 6/7/2005

A.4.2

SWMU 16

WATER LEVEL MEASUREMENTS

ROUND 6

Ground Water Level
Entered by John Wright on 08/12/2005

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

Sample ID No	
Sample Location ID	SWMU 16
Sampled By:	
Log Completed:	

Well ID	Date	Time	Ref. Elev.	Tot. Depth	Level Ind.	Elevation	Thickness	PID/FID	Tidally Influenced	Comments
16MW01	08/12/2005	10:25			33.07	e	NA	NA		older WES Well. No "T" in well ID.
16MW02	08/12/2005	10:54			15.76	e	NA	NA		older WES Well. No "T" in well ID.
16MW03	08/12/2005	10:33			20.69	e	NA	NA		older WES Well. No "T" in well ID.
16MW04	08/12/2005	10:22			29.61	e	NA	NA		older WES Well. No "T" in well ID.
16MW05	08/12/2005	10:27			35.72	e	NA	NA		older WES Well. No "T" in well ID.
16MWT01	08/12/2005	09:49	764.50		14.49	750.01	NA	NA		
16MWT02	08/12/2005	10:12	760.36		13.10	747.26	NA	NA		
16MWT03	08/12/2005	10:09	764.41		30.08	734.33	NA	NA		
16MWT04	08/12/2005	10:02	766.14		14.49	751.65	NA	NA		
16MWT05	08/12/2005	10:05	766.88		33.06	733.82	NA	NA		
16MWT06	08/12/2005	09:50	764.44		17.93	746.51	NA	NA		
16MWT07	08/12/2005	09:52	762.87		Dry	e	NA	NA		

16MWT08	08/12/2005	09:53	761.56		95.81	665.75	NA	NA		
16MWT09	08/12/2005	09:55	764.28		15.49	748.79	NA	NA		
16MWT10	08/12/2005	09:59	764.43		23.40	741.03	NA	NA		
16MWT11	08/12/2005	09:51	765.24		95.92	669.32	NA	NA		
16MWT12	08/12/2005	10:30	755.45		21.86	733.59	NA	NA		
16MWT13	08/12/2005	10:14	759.57		12.08	747.49	NA	NA		
16MWT15	08/12/2005	10:15	759.69		58.95	700.74	NA	NA		
16MWT16	08/12/2005	10:43	764.74		33.33	731.41	NA	NA		
16MWT17	08/12/2005	09:46	766.53		15.79	750.74	NA	NA		
16MWT18	08/12/2005	10:40	764.44		95.48	668.96	NA	NA		
16MWT19	08/12/2005	11:14			8.18	e	NA	NA		No well tag
16MWT20	08/12/2005	11:12			7.76	e	NA	NA		No well tag
16MWT21	08/12/2005	10:20			65.92	e	NA	NA		

Tetra Tech NUS, Inc.

SURFACE WATER MEASUREMENT LOG

S[illegible]U 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Surface Water Measurements

Location ID	Date	Time	Flow Rate (est.)	Type	Measurement	Flow Width	Flow Depth	Flow Velocity
13SG01	8/9/05	10:20	Dry	Dry				
13SG02	8/9/05	10:28	Dry	Dry				
1[illegible]3	8/9/05	10:38	Dry	Dry				
13SG04	8/9/05	10:51	Dry	Dry				
13SG05	8/9/05	11:22	Dry	Dry				
13SG06	8/9/05	11:38	Dry	Dry				
13SG07	8/9/05	11:55	Dry	Dry				

A.5.1

SWMU 16

EQUIPMENT CALIBRATION FORMS

ROUND 5

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME: NSWC CRANE Summer 08 INSTRUMENT NAME/MODEL: YSI / 600 XL

SITE NAME: Mine Fill B (13) Mine Fill A (9) MANUFACTURER: YSI

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

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
5-3-05	JG/JW	7.12	3.89	1093	8.85	236.5 15.85	6.99	4.00	1000	9.50	237.5 15.98		
5-4-05	JG/JW	7.05	3.92	1021	9.62	236.5 17.41	7.00	4.00	1000	9.53	237.5 17.35		
5-5-05	JG	7.06	3.94	987	9.38	236.6 17.60	7.00	4.00	1000	9.36	237.5 17.48		
5-6-05	JG	6.99	3.94	1012	9.76	234.5 18.18	7.00	4.00	1000	9.32	237.5 18.23		
5-7-05	JG	7.02	4.06	1101	8.21	232.7 19.01	7.00	4.00	1000	9.51	237.5 18.87		
5-8-05	JG	7.09	3.92	982	8.99	234.5 19.57	7.00	4.00	1000	8.83	237.5 19.41	replaced DO membrane	
5-17-05	JG	6.89	3.88	963	9.20	237.7 15.48	7.00	4.00	1001	8.88	237.5 18.40	"not used"	
5-18-05	JG		Not used				–	–	–	–	–		
5-19-05	JG	6.99	4.01 checked				–	–	–	–	–		
5-21-05	JG	6.99	4.02	988	7.41	235.8 19.11	4.00 ↔ 7.00		999	8.96	237.5 19.20		
5-22-05	JG	–	–	1082	9.78	236.7 18.26	–	–	999	8.98	237.5 18.33	pH bulb is broken	
5-23-05	JG	–	–	1004	9.93	236.2 19.53	–	–	1000	8.82	237.5 19.54		
6-1-05	CD	10.00	4.39	938	6.66	213.7 18.86	7.00	4.00	1000	8.96	~~237.7 18.56~~ 237.5 18.58		replaced DO membrane replaced pH bulb
											~~237.5 18.46~~ CD		
6-2-05	CD	5.68	6.73	1003	8.90	237.6 18.98	7.01	4.02	1000	8.80	237.5 18.87		
6-3-05	CD	5.35	3.92	1041	8.97	236.1 20.20	7.11	4.01	1000	8.76	237.5 20.01		
6-4-05	CD	7.13	4.14	1010	8.83	237.0 20.33	7.05	4.00	1000	8.76	237.5 20.02		
6-5-05	CD	7.10	3.25	1044	8.56	232.2 22.35	7.00	4.00	1000	8.34	237.5 22.29		

Summer 8

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE SWMU 09

INSTRUMENT NAME/MODEL: YSI / 6600 XLM

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

MANUFACTURER: YSI

PROJECT No.: 7448/0004 2/6878

SERIAL NUMBER: 01L0702AF

Date of Calibration	Person Performing Calibration	INITIAL READINGS PH 7	PH 4	COND	DO	ORP	FINAL READINGS PH 7	PH 4	COND	DO	ORP	Calibration Standard (Lot No.)	Remarks and Comments
5-3-05	JG/JW	6.83	3.92	1136	9.71	241.2 16.76	7.00	4.00	1000	9.54	235.0 16.65	PH 4 4098 PH 7 4110	pH
5-4-05	JG/JW	7.06	3.99	1001	10.46	235.7 16.56	7.00	4.00	1000	9.61 ~~100~~	234.9 16.61	SpC 4554 ORP 0341234	
5-5-05	JW/JG	7.03	4.09	990	6.54	232.0 17.26	7.00	4.00	1000	9.48	235.0 17.25		
5-6-05	JW	7.05	3.87	1122	11.65	234.6 19.68	7.00	4.00	1000	8.98	234.4 19.95		
5-7-05	JW	—	-	—	—	—	—	-	—	—	—		USE 5/6/05 CALIBRATION DONE WITH INSTRUMENT
5-9-05	JW	6.93	4.16	992	4.93	229.6 19.37	7.00	4.00	1000	8.85	235.1 19.02		
5-18-05	TR	7.08	3.89	992	8.13	236.1 19.02	7.00	4.00	1000	9.10	235.0 18.0		
5-19-05	JG	6.90	3.79	1160	8.52	236.3 19.35	7.00	4.00	999	8.72	235.0 19.61		
5-20-05	JG	6.99	4.04	1002	9.10	241.3 19.94	7.00	4.00	999	8.88	235.0 19.95		
5-21-05	JG	7.12	3.98	995	11.07	232.3 18.93	7.00	4.00	1000	9.00	235.0 18.89		
5-22-05	JG	7.17	4.24	1040	8.61	227.0 19.55	7.00	4.00	1000	8.78	235.0 19.57		
5-23-05	JG	7.02	3.97	1016	6.77	235.2 19.70	7.00	4.00	1000	8.85	235.0 19.61		
5-24-05	JG	6.80	4.11	962	7.35	237.9 18.96	7.00	4.00	1000	9.06	235.0 18.83		
6-1-05	CD	6.85	3.72	1063	11.47	229.8 17.79	7.00	4.00	1000	8.88	235.0 17.86	PH 4 4098 PH 7 4110	replaced DO membrane
6-2-05	CD	6.99	4.01	991	9.06	234.7 19.07	7.00	4.00	1000	8.80	235.0 18.91		
6-3-05	CD	6.94	3.97	997	8.66	235.4 20.01	7.00	4.00	1000	8.72	235.1 19.93		
6-4-05	CD	7.04	4.02	1000	8.83	234.0 20.08	7.00	4.00	1000	8.76	235.0 20.03		

SWMU 8

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NSWC CRANE SWMU 09

INSTRUMENT NAME/MODEL: YSI / 600 XL

SITE NAME: Mine Fill B (13)

MANUFACTURER: YSI

PROJECT No.: 7448/00042

SERIAL NUMBER: 99E00409 AA

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

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

PROJECT No.: 74458/05042/6878

INSTRUMENT NAME/MODEL: Turbidimeter

MANUFACTURER: LaMotte

SERIAL NUMBER: 1728-1600

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: NSWC CRANE

INSTRUMENT NAME/MODEL: Turbidimeter

SITE NAME: Mine Fill B(13)

MANUFACTURER: Lamotte

PROJECT No.: 7448

SERIAL NUMBER: 2843-4501

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

INSTRUMENT NAME/MODEL: Turbidimeter

SITE NAME: Mine Fill B (J3)

MANUFACTURER: LaMotte

PROJECT No.: 7448

SERIAL NUMBER: 0359-4197

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : NSWC CRANE

INSTRUMENT NAME/MODEL: MINI RAE 2000

SITE NAME: SWMU 13, 16 & 12

MANUFACTURER: RAE SYSTEMS

PROJECT No.: 7448 & 6878

SERIAL NUMBER: 110-003829

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
5/3/05	SAME	TR	—	—	0.0/100	0.0/100	00324-04	EXP. DATE 11/15/05
5/6/05	"	TR	—	—	0.0/100	0.0/100	"	"
5/13/05	"	TR	—	—	0.0/116	0.0/100	"	"

A.5.2

SWMU 16

EQUIPMENT CALIBRATION FORMS

ROUND 6

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Calibration Records

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Calibration Records

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Calibration Records

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Calibration Records

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Calibration Records

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

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

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

Calibration Records

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

APPENDIX B

SMWU 16

MISCELLANEOUS FIELD DOCUMENTATION

ROUNDS 5 AND 6

B.1.1

SWMU 16

SITE LOGBOOK

ROUND 5

NSWC CRANE

N7448

SWMU 13 & 16

1376

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

©SCIENTIFIC BINDERY PRODUCTIONS, 60 EAST 13TH STREET, CHICAGO, ILLINOIS 60605

Start Round 5

MON. - 5-02-05

Work continued from Page

TRAVEL DAY

1235 Hrs - Arrive @ B 3245
- Open EQ. Packages from warehouse & window
- Set up YSI units
- Meet w/ T. Brent
- Missing (2) regulators - call U.S. Env. to have them shipped to site ASAP
- Check nitrogen tanks and order 4 new cylinders item 102s
- Get vehical passes from T/Brent
- Intitiate camera pass paperwork w/T. Brent
- H&S meetings (J. Wright & J. Goerdt)
  - Training Doc.
  - MSD. DATA SHEETS
- Prep to leave site to purchase supplies

700 Hrs - Left B 3245 for Sam's Club.

756 Hrs - Check out @ Sam's Club
Purchased - Zip lock bags
Water & Paper towels

END

SIGNATURE

DATE 5-2-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

SAMPLE SUMMARY:

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

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

TUES 5-03-05

Work continued from Page

0705 Hrs - Arrive @ B-3245
- Prep. for GW sampling (J.G & J.W)
- Prep. to collect water levels @ Mine Fill B
- Cali. YSIs, Lamotes & Mini RAE (PID)
- Obtain Camera Pass for Navy
- T. Brent Checked w/ Army - NO activity @ B-165 ok to do water level round

1040 Hrs - Left B-3245 for Mine Fill B

1050 Hrs - Arrive @ Mine Fill B
- obtain water level from wells that J.G & JW are purging (13MWT29 & 09 respectively)
- continue taking water levels @ Mine Fill B

1210 Hrs - Break for lunch (TR & JW)

1240 Hrs - Drop off JWs rental @ B-3245

1310 Hrs - Drop off JGs Lunch @ 13MWT28
- Continue taking water levels this time w/ JW
- JW is doing well inventory @ same time electronical

1835 Hrs - Finish water levels of Monitoring well & Staff gauges @ Mine Fill B (SEE Pages 164 & 165)

1845 Hrs - Arrive @ B 3245
Drop off Equipment

1900 Hrs - Leave B 3245 for motel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 · MADE IN USA

Work continued to Page

SIGNATURE DATE 5/03/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

 TUES 5-03-05

STAFF GAUGE ID	TIME	W.L	AVE W - AVE D - SEC/FT	Flow Rate
1356 01	1122	1.77	—	< 1 gpm
02	1111	3.73	~~8" 0.07'~~ (TR)	~1-2 gpm
03	1809	1.96		No Flow
04	1812	2.45		< 1 GPM
05	1816	3.89		< 1 GPM
06	~~15:39~~ 17:39 INV	DRY		DRY
07	1455	1.69		STAG.
08	1437	5.13		1-5 GPM
09	1430	4.21		1-5 GPM
10	1144	4.84		1-5 gpm
11	1830	2.51		~1 GPM
12	1621	6.85	11" 0.03' 1 ft/sec	148 gpm
13	1634	6.06		6 GPM
14	1636	6.41		5-10 GPM
15	1641	5.24	12" 0.07' 1 ft/sec	377 gpm
16	1725	DRY		DRY
17	1708	DRY		DRY
18	1726	8.19	18" 0.05' 1 ft/sec	404 gpm

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 30433 MADE IN USA

TUES 5-03-05 (Con't)

Work continued from Page

Weather - Mostly Sunny 60's

WELL ID	TIME	WL	PID
13MWT01	1103	7.71	0.1
02	1118	16.19	0.0
03	1100	9.72	0.1
04	1130	14.27	0.0
05	1125	5.96	0.5
06	1056	11.66	0.6
07	1140	3.49	0.1
08	1133	4.85	0.2
09	1025	9.15	(JW)
10	1136	13.69	0.0
11	1150	9.03	0.0
12	1154	10.14	0.0
13	1802	05.13	0.0
14	1750	14.10	0.0
15	1200	13.88	0.0
16	1400	12.33	0.0
17	1405	9.91	0.0
18	1203	19.41	0.0
19	1745	10.40	0.0
20	1452	4.94	0.0
21	1410	9.30	0.0
22	1434	8.21	0.0
23	14:49	8.60	0.0
24	14:47	9.27	0.0
25	1439	6.65	0.0
26	1443	9.81	0.0
27	1157	9.27	0.0
28	1015	77.88	(JG)
29	1806	5.61	0.0
30	17:58	11.55	0.0
31	1733	10.74	0.0
32	1730	9.02	0.0
33	1740	10.41	0.0
34	14:32	5.26	0.0
35	1149	63.94	0.0
36	1458	18.83	0.0
37	1509	13.64	0.0
38	1507	61.81	0.0
39	1517	13.36	0.0
40	1529	18.15	0.0
41	1524	66.52	0.0
42	1545	20.38	0.0
43	1352	8.17	0.6
44	1339	64.36	0.1
45	1408	70.76	0.0
46	1516	56.61	0.0
47	1820	7.15	0.0
48	1605	10.29	0.0
49	1608	7.25	0.0
50	1611	7.90	0.0
51	1614	5.80	0.0

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5-03-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE ~~COMP~~ TIME	COMMENTS
13GWT4504	0923	1040	9.3 L	NA	(TR)
13GWT2105	0930	1040	7.0 L	1050	(JW)
13GWT4004	0945	1115	8.3 L	1118	(JG)
13GWT1105	1305	1400	5.3 L	1405	(TR)
13GWT1705	1250	1410	8.0 L	1420	(JW)
13GWT4604	1250	1420	9.0 L	1425	(JG)
13GWT3704	1505	1655	14.6 L	1658	(JG)

SCIENTIFIC BINDERY PRODUCTS., CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

CREW
J. Wright
J. Goerdt
T. Rojahn

PROJECT NO. 7448
BOOK NO. 1376

WED. 5-04-05

Work continued from Page

Weather - Mostly Sunny & 60's

0710 Hrs - ARRIVE @ B-3245
- PREP. FOR GROUNDWATER SAMPLING CALI. VSLS & LaMottes
- SELECT WELLS FOR CREW to SAMPLE this date

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

1100 Hrs - JW & TR BREAK FOR LUNCH

1155 Hrs - RETURN to FIELD OFFICE
TR & J.W. - OFFICE CHECK IN W/ OFFICE

1225 Hrs - Return to MINE FILL B - drop JW OFF @ 13MWT17 & CHECK on JG

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

1450 Hrs - FINISH @ 13MWT11 CHECK on JG - PICK up Jims PAPERWORK & SAMPLES

1520 Hrs - RETURN to B 3245
- PROCESS PAPERWORK FOR SAMPLES collected 5/03-04/05 (SEE COC # 3713)
- PREP. SAMPLES FOR SHIPPING
- JW - ENTERING PAPERWORK ELECTRONICALLY
- CHECK IN W T. BRENT - get Figures of NEW drilling locations @ B-55.

1730 Hrs - LEAVE SITE FOR FED EX

1800 Hrs - Drop off SAMPLES @ FED. EX on AB # 8447813546 42

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5/04/05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY 5-05-05:

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
13GWT4504	SEE PAGE 166 →			1015	(TR)
13GWT1405	0930	1015	10.3 L	1048	(JG)
13GWT5103	1000	1120	8.0 L	1130	(JW)
13GWT3104	1045	1245	12.8 L	1250	(JG)
13GWT3404	1055	1325	18.2 L	1330	(TA)
13GWT4704	1225	1345	9.6 L	1355	(JW)
13GWT1505	1440	1620	9.0 L	1625	(TR)
13GWT1305	1445	1625	14.3 L	1630	(JG)

Note: Lino out SWMU 9 DPT locations

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

THURS 5-05-05

Work continued from Page

Weather - Partly Cloudy & 60's

Arrive @ site 0650 Hrs

- Prep. for GW sampling Cal. YSIs & LaMottes
- Fax COC # 3713 to LAB & OFFICE
- Select wells for sampling

0830 Hrs - Lay out DPT locations @ SWMU 9 BLDG 55

0915 Hrs - Arrive @ Public Works - left Donna 2 Knowing that SWMU 9 is laid out

0955 Hrs - Arrive @ SWMU 13

1015 Hrs - Start sampling 13MWT45 (purged 5/4/05)
See pages 166 & 168 for details

1055 Hrs - Start purge @ 13MWT34
See page 168 for details

1440 Hrs - Start purge @ 13MWT15
See page 168 for details

1720 Hrs - Arrive @ B-3245
- Drop off EQ & refrigerate samples
- Pick up paperwork (JW & JG)
- Secure Nitrogen cylinders
- Dr. Oxygen dropped off 2 more cylinders & picked up 2

1748 Hrs - Left B-3245 for Bloomington

Evening - Complete COC # 3714 & E-mail R. Basinski & R. Clark on daily activities

END

SIGNATURE

DATE 5-05-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

SAMPLE SUMMARY

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
16GWT1104	NA	NA	NA	0845	(JG) WELL DRIES OUT RAPIDLY sampling incomplete
16GW0405	1000	1135	14.05L	1140	(JG)
16GW0205	1000	1140	8.6L	1145	(TA)
16GW0305	1400	1650	15.3L	1655	(JG)

Collected staff gauge & well measurements

SW work on Electronic Form Entry this morning

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60603 MADE IN USA

FRI. 5-06-05

Work continued from Page

WEATHER: Mostly sunny & 70's

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

0945 Hrs - Arrive @ SWMU 16 WES14
SEE PAGE 170 FOR DETAILS

1230 Hr - Lunch

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

1915 Hrs - Arrive @ B-3245 Prep paperwork for shipment
SEE COC #3714
JW - Basic MWT 16 & 18
TR - Prep samples for shipment on AB# 0947 8135 4697

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

1835 Hrs - Drop off samples @ FED. EX.

END

SIGNATURE Terry Lopat

DATE 5-06-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

FRI 05-06-05 (Con't)

Staff Gauge ID	W.L.	Time	MEAS. W	MEAS. D	sec/ft	Flow Rate
135601 → 05	DRY	1320-1609 ~~1320-1609~~ (TK)	—	—	0	DRY
135606	3.67	1624	20-25 gpm			→
135607	STAFF GAUGE WASHED AWAY	1633	.22' x 4' 0.5 sec/ft .22' x 4' x 2 ft/sec			790 gpm
135608	4.22	1651	—			1-5 gpm
135609	DRY	1655	—			0

Note:
JWI ~~Keep~~ (TK) Kept Above INFO. Electronically & Page 173

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60635 MADE IN USA

FRI. 05-06-05 Con't

Work continued from Page

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

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Taylor

DATE 5-06-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY 5-07-05:

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
TB0507050	NA	NA	NA	0800	TR
16GWT0904	0909	1059	9.2 L	1103	(TR) Also DUP 16FD0507050
16GWT0606	1312	1712	10.6 L	1715	TR
16GWT1304	0830	1100	15.0 L	NA	JW
16GWT1504	1150	1550	18.0 L	1610	JW
16GWT0405	0850	1020	9.3 L	1025	JG
16GWT1004	1135	1335	12.0 L	1400	JG
16GWT1204	1445	1555	7.0 L	1600	JG
16GWT1704	1714	1920	12.0 L	1925	JG

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

JW
JG
TR

PROJECT NO. 7448

BOOK NO. 1376

SAT 05-07-05

Work continued from Page

WEATHER - Mostly Sunny & 70's

0650 Hrs - Arrive @ B-3245
- Select & Prep. PAPERWORK FOR WELLS to be sampled this date
- PREP SUV FOR GW sampling

0830 Hrs - Arrive @ BWMW 16
- Drop off VOA vials FOR JW

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

1210 Hrs - LEFT SITE FOR SUBWAY - PICKED UP SUBS FOR JW & JG

1230 Hrs - RETURN to SWMW 16 - GIVE SUBS to JW & JG

1250 Hrs - ARRIVE @ 16 MWT06
SEE PAGE 174 FOR DETAILS

1800 Hrs - FINISH @ 16MWT06 - RETURN to B-3245
- DROP OFF EQ.
- REFRIGERATE SAMPLES

1820 Hrs - LEFT B-3245 FOR Bloomington

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Troy Rogers

DATE 5-07-05

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

SAMPLE SUMMARY :

FINISHED collecting samples @ 16 MW1 13 & 11

Collected SW samples @ SWMU's 13 & 16

JW worked on Electronic Form Entry this afternoon

SCIENTIFIC SINDERY PRODUCTS, CHICAGO

SUN 5-08-05

Work continued from Page

WEATHER: Partly Cloudy, Temp 80's

0650 HRS - ARRIVE @ B-3245

- PREP. to SAMPLE (TR) & SURFACE WATER
- PAPERWORK (COCs & 5/07 SAMPLE SUMMARY)
- PREP. SUV FOR SW SAMPLING
- (JW) collect GW SAMPLES @ 16MWT 13 & 11
- (JG) YSI & LaMotte CALI.

0910 Hrs - ARRIVE @ SWMU 16 to collect SURFACE WATER SAMPLES

SAMPLE ID	TIME	Comments
16SW1304	0935	JG/TR
16SW1204	0950	JG/TR
16SW1003	1025	JG/TR/JW
16SW3003	1100	JG/TR/JW MS/MSD 16FD0508050501
13SW3003	1300	
13SW1604	~~1300~~ 1315	JG/TR
13SW1504	~~1315~~ 1338	
13SW1404	~~1338~~ 1350	
13SW2204	~~1350~~ 1410	
13SW/SD11	—	DRY
13SW2003	1433	JG/TR
13SW1903	1448	JG/TR

(TR)

Note: JW WORKED ON ELECTRONIC FORMS THIS AFTERNOON

1510 Hrs - ARRIVE @ B-3245

- DISCUSSED ELECTRONIC FORMS
- PAPERWORK (COCs 3715 & 3716, SAMPLE SUMMARY)
- SECURED SAMPLES IN FRIG

1745 HRS - LEFT B3245

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers DATE 5/08/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS., CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

MON 5-09-05

PROJECT NO. 7448

BOOK NO. 1376

Work continued from Page

WEATHER - Mostly Cloudy TEMP 80's

0650 Hrs - ARRIVE @ B-3245
PREP. to WORK @ SWMU 9 this date

1630 Hrs - PREP. SAMPLES FOR SHIPMENT
ON COCs 3715 & 3716

1830 Hrs - DROP OFF SAMPLES @ FED EX. ON
AB# 8447 8135 4653

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers

DATE 5-09-05

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

VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60405 MADE IN USA

Tues. 5/17/05

Work continued from Page

0650 Hrs - Arrive @ B-3245
- Work on SWMU 12 until 0900

0900 Hrs - Prep. to sample sediment @ SWMU 13

SAMPLE ID	SAMPLE TIME	COMMENTS
13SD4201	0943	Samplers JG & TK
13SD4101	1028	
13SD4001	1105	
13SD3901	1125	
13SD3801	1140	
13SD3701	1150	
13SD3601	1205	MS/MSD & 13FD051705 01
13SD4301	1320	
13SD4401	1335	
13SD4501	1355	

1220 Hrs - Lunch

1250 Hrs - Stop @ Demo Range check in w/ Walt Waggoner to see if it is ok to sample @ SE01 locations 13SD43 → 45
OK w/ Walt

1410 Hrs - Stop @ Demo Range and let Walt know that we (JG & TK) are clear of Demo Range

1423 Hrs - Return to B-3245
- Process & Complete COC # 3717 Sed. Samples
- Organize SWMU 12 Round 2 paperwork
  - Prep. Table showing well ID & past purge times, pump used & days to complete sampling
- Organize office

1800 Hrs - Leave B 3245 for Bloomington

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers DATE 5/17/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B.1.2

SWMU 16

DAILY ACTIVITIES RECORD

ROUND 6

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/08/2005	**Weather/Temp**		**Created By**	John Wright
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	8/8/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	
Task/Contract #		**Visitors**		**Modified Date**	
WBS Code #	xxx			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/8/05	16:00	John Wright	Arrived at Base and checked in with security. Issued gate pass and went to field office to prepare for E-Data use. Met with Terry R. and Jim G. and trained in E-Data demo and Crane-specific projects (SWMUS 13/16 and 12).

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/08/2005	**Weather/Temp**		**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	8/8/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	xxx			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/8/05	11:45	Terry Rojahn	Arrive at B-3245
8/8/05	16:00	Terry Rojahn	John Wright and Jim Goerdt arrive at B-3245
8/8/05	18:15	Terry Rojahn	Leave B-3245 for Sam's Club
8/8/05	18:45	Terry Rojahn	Arrive at Sam's Club - purchase supplies
8/8/05	19:30	Terry Rojahn	Leave Sam's Club For Motel - Last Entry

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/09/2005	**Weather/Temp**	Hazy, Hot & Humid, Temp. High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/9/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/9/05	06:58	Terry Rojahn	Arrive at B-3245:
8/9/05	09:07	Terry Rojahn	Attempted to calibrate PID - Problem with battery (shuts down right away)
8/9/05	09:51	Terry Rojahn	Turbidity meter also bad (stuck on 2.31)
8/9/05	10:25	Terry Rojahn	Arrive at Mine FIll B -Measure water levels and staff gauges
8/9/05	12:20	Terry Rojahn	Lunch break
8/9/05	12:56	Terry Rojahn	Return to B-3245
8/9/05	13:30	Terry Rojahn	Returned to Mine Fill B (all wells measured and 8 staff gauges checked)
[illegible]/05	16:20	Terry Rojahn	Start measuring water levels at SWMU 9.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/9/05	18:37	Terry Rojahn	Complete water levels at SWMU 9: return to B-3245
8/9/05	19:00	Terry Rojahn	Leave B-3245 for motel

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/10/2005	**Weather/Temp**	Hazy, Hot & Humid, Temp 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/10/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/10/05	06:55	Terry Rojahn	Arrive at B-3245: Organize office - more space for toughbook entry.
8/10/05	08:40	Terry Rojahn	Arrive @ SWMU 12: Park one car @ bottom of RR Tracks and drive second car to north end of track - collect water levels (WL) on RR tracks. Also
8/10/05	11:05	Terry Rojahn	Arrive at B-3245 to sync toughbooks for changes to surface water/staff gauge data forms.
8/10/05	11:25	Terry Rojahn	Lunch Break
[illegible]/05	11:50	Terry Rojahn	Return to B-3245: Called U.S. Environmental to order pH probe
8/10/05	13:00	Terry Rojahn	Return to SWMU 12 and 13 Water level and staff gauge measurements.
8/10/05	16:15	Terry Rojahn	Finish water level and staff gauge measurements and return to B-3245.
8/10/05	18:00	Terry Rojahn	Left B-3245 for Fed. Ex.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/10/05	18:30	Terry Rojahn	Drop off samples @ Fed. Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/11/2005	**Weather/Temp**	Hot, Humid & Partly Sunny ; Temp. High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC			**Created Date**	8/11/05
TtNUS Project #	112G00041	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Modified By**	Terry Rojahn
Task/Contract #	0000			**Modified Date**	3/9/06
WBS Code #	0000	**Subcontractor Personnel**		**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/11/05	06:55	Terry Rojahn	Arrive at B3245: Fax COC #3261 to Laucks (H. Prentice). Select wells for sampling this date. Calibrate Turbidity meter. Discuss computer generated Groundwater Form with JW. Prep SUV for groundwater sampling. Discuss the shipment of a pH replacement probe w/ US Environmental
8/11/05	11:00	Terry Rojahn	Arrive at SWMU 13 to sample 13MWT17 and 13MWT15. Returned to B-3245 briefly between wells to check on Microseep sample containers (they did arrive) and to fax E. Sedlmyer yesterday's COC.
8/11/05	17:15	Terry Rojahn	Arrive at B-3245: Drop off equipment, gas cylinders and secure samples in frig.
[illegible]/05	17:30	Terry Rojahn	Leave B-3245 for motel. Sample Summary: completed the sampling of monitoring wells 13MWT11, 5, 17, 34, 37 and 41 (10 of 17 wells completed to date at SWMU 13). Monitoring well 13MWT51 was purged but not sampled - well was purged dry. The initial water level at 13MWT51 has dropped significantly from prior rounds. Well may have been impacted by new water line installed just next to it.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/12/2005	**Weather/Temp**	Hot & Humid, Temp low 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/12/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/12/05	07:05	Terry Rojahn	Arrive at B-3245:
8/12/05	08:40	Terry Rojahn	Calibrate turbidity meters (JW & TR)
8/12/05	09:17	Terry Rojahn	Got weekend work letters from T. Brent.
8/12/05	09:30	Terry Rojahn	Arrive at SWMU 16 to measure water levels and staff gauges.
8/12/05	11:20	Terry Rojahn	Finish water level & staff gauge measurements at SWMU 16.
8/12/05	11:35	Terry Rojahn	Lunch break
8/12/05	12:15	Terry Rojahn	Arrive at B-3245:
8/12/05	18:03	Terry Rojahn	Left B-3245 for Fed. Ex.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/12/05	18:35	Terry Rojahn	Drop off samples on COC #3262 @ Fed. Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/13/2005	**Weather/Temp**	Hot & Humid, 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/13/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000	**Visitors**		**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/13/05	07:15	Terry Rojahn	Arrive at B-3245:
8/13/05	08:30	Terry Rojahn	Arrive @ SWMU 16 set up @ 16MW04
8/13/05	12:05	Terry Rojahn	Finish @ 16MW04 - pick up lunch @ subway
8/13/05	12:20	Terry Rojahn	Arrive @ B-3245: Track Fed Ex coolers (Sat.pick up) - not picked up as of yet by Laucks. Attemped to call Laucks -no response.
8/13/05	12:50	Terry Rojahn	Return to SWMU 16 to purge monitoring well 16MWT15
8/13/05	17:30	Terry Rojahn	Finish purge @ 16MWT15 - return to B-3245 -drop off equipment and secure samples in frig. Track coolers - still being held at Fed. Ex. - call Laucks and leave message on same
8/13/05	18:00	Terry Rojahn	Leave B-3245 for motel. Sample Summary: purged and sampled 16MWT10 &12 and 16MW03 & 04

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/14/2005	**Weather/Temp**	Mostly Cloudy, Temp.90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/14/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/14/05	07:05	Terry Rojahn	Arrive @ B-3245: Prep to sample Ground water @ SWMU 16
8/14/05	08:50	Terry Rojahn	Arrive at SWMU 16
8/14/05	10:55	Terry Rojahn	Start collecting sample 16GWT0406.
8/14/05	14:20	Terry Rojahn	Arrive @ 16MWT15
8/14/05	14:30	Terry Rojahn	Start collecting sample 16GWT1505
8/14/05	14:41	Terry Rojahn	Security check by Crane Security Officer.
8/14/05	16:05	Terry Rojahn	Collect 16GWT1505 & depart @ SWMU 16 for SWMU 13.
[illegible]/05	16:15	Terry Rojahn	Arrive @ SWMU 13 - set up at 13MWT51.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/14/05	16:46	Terry Rojahn	Finish collecting Groundwater at 13MWT51 - leave SWMU 13 for B-3245.
8/14/05	16:55	Terry Rojahn	Arrive at B-3245: Secure eq. & samples.
8/14/05	17:23	Terry Rojahn	Leave B-3245 for Bloomington
8/14/05	17:25	Terry Rojahn	Sample Summary: Completed all ground water sampling at SWMU 16 this date.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/15/2005	**Weather/Temp**	Overcast, High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/15/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000	**Visitors**		**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/15/05	07:00	Terry Rojahn	Arrive at B-3245: Sedlmyer and asked him to track the shipment (was to be picked up at Fed. Ex. by Laucks Lab on Saturday).
8/15/05	10:30	Terry Rojahn	Arrive at SWMU13 (13MWT04)
8/15/05	13:53	Terry Rojahn	Finish collecting groundwater sample at monitoring well 13MWT04.
8/15/05	14:00	Terry Rojahn	Arrive at B3245:
[illegible]/05	18:10	Terry Rojahn	Leave B-3245 for Fed. Ex.
8/15/05	18:40	Terry Rojahn	Arrive at Fed. Ex - drop off samples
8/15/05	19:15	Terry Rojahn	Picked up supplies at Home Depo.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/16/2005	**Weather/Temp**	Lt. Rain /overcast, Mid 80s & Humid	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J.Wright;T. Rojahn	**Created Date**	8/16/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/16/05	07:00	Terry Rojahn	Arrive at B-3245:
8/16/05	10:20	Terry Rojahn	Arrived at SWMU 13.
8/16/05	10:30	Terry Rojahn	Collect surface water sample at location 13SW14.
8/16/05	10:50	Terry Rojahn	Collect surface water sample at location 13SW15.
8/16/05	11:15	Terry Rojahn	Collect surface water sample at location 13SW16.
8/16/05	11:30	Terry Rojahn	Collect surface water sample at location 13SW30..Also
8/16/05	11:50	Terry Rojahn	Pick up lunch at Subway.
8/16/05	12:00	Terry Rojahn	Arrive at B-3245:

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
8/16/05	12:55	Terry Rojahn	Return to SWMU 13.
8/16/05	13:05	Terry Rojahn	Check surface water location 13SW11 - DRY.
8/16/05	13:15	Terry Rojahn	Check surface water location 13SW22 - DRY.
8/16/05	13:30	Terry Rojahn	Collect surface water sample at location 13SW20.
8/16/05	13:45	Terry Rojahn	Collect surface water sample at location 13SW19.
8/16/05	14:05	Terry Rojahn	Check on JG at monitoring well 13MWT14 - got JG 's Toughbook to sync at B-3245.
8/16/05	14:15	Terry Rojahn	Arrive at B-3245:
8/16/05	18:30	Terry Rojahn	JW and TR left B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/17/2005	**Weather/Temp**	Hot and humid, Temp 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	8/17/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	
Task/Contract #		**Visitors**		**Modified Date**	
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/17/05	00:00	Terry Rojahn	For detailed information - see log under Phase 3 SWMU 9 project for this date.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/27/2005	**Weather/Temp**	Mostly cloudy, humid & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;T. Rojahn	**Created Date**	8/27/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/27/05	16:55	Terry Rojahn	07:05:00 - Arrive at B-3245:
8/27/05	16:56	Terry Rojahn	The above was copied from SWMU 12's (Round 4)Daily Activity Log for this date.
8/27/05	17:50	Terry Rojahn	Arrive at SWMU 13 to check on JG. JG almost done sampling at monitoring well 13MWT09.
8/27/05	18:00	Terry Rojahn	JG finished sampling at 13MWT09.
/05	18:15	Terry Rojahn	Leave base for Bloomington. SAMPLE SUMMARY THIS DATE: Checked all surface water sampling locations at SWMU 16 - all 4 were dry. Also

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/29/2005	**Weather/Temp**	Mostly cloudy, hunid & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	Goerdt;Rojahn	**Created Date**	8/29/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/29/05	15:00	Terry Rojahn	See SWMU 12 Round 4 Daily Log for this date's (8/29/05) activities.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	09/29/2005	**Weather/Temp**	Mostly sunny & 60's	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Westerhoff;D. Hickey;J. Wright;T. Rojahn	**Created Date**	9/29/05
TtNUS Project #	112G00041			**Modified By**	
Task/Contract #		**Subcontractor Personnel**	EFS;Jay McFall;Capitol Drilling & Sawing ;David Cribbs	**Modified Date**	
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
9/29/05	08:30	Terry Rojahn	Arrive at SWMU 8 with DW - meet with Ted Butler & Pam Hock (Army H&S) receive Safety & Building Availability Permit.
9/29/05	09:50	Terry Rojahn	Fire Inspector arrived on site - DW received Hot Work Permit.
9/29/05	10:10	Terry Rojahn	D. Cribbs began coring concrete.
9/29/05	10:45	Terry Rojahn	Start drilling at 09SB25.
[illegible]/05	12:40	Terry Rojahn	Finish coring inside B106 and completed 09SB22
9/29/05	13:00	Terry Rojahn	Lunch
9/29/05	13:35	Terry Rojahn	Return to SWMU 8 - start coring inside B107 and continued drilling inside B-106. DW over seeing H& S at B106 and TR over seeing coring activites at B-107. B-107 active - checked w/ Tom Hess for permission to core. OK to core 4 of 5 while workers are in the bldg. Workers are done at 1500Hrs.
9/29/05	15:30	Terry Rojahn	Completed the 4 of 5 corings at B107 and moved back to B-106 - SB30 drilling rig hit refusal only a couple inches below the floor. Believe rig hit an old sump moved SB30 about 5' from the wall.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
9/29/05	16:07	Terry Rojahn	2inches to refusal - abandoned hole - will pick another location W/T. Brent.
9/29/05	07:00	Terry Rojahn	Arrive at B-3245 - pick up H&S equipment and check in with Tom Brent.
9/29/05	08:00	Terry Rojahn	Do building walk through with bldg. supervisor (Tom Hess) - showed Mr Hess all boring locations in bldgs 106 &107. Mr Hess showed TTNUS how to turn on overhead exhaust fans. Objects blocking boring locations were already moved.
9/29/05	14:45	Terry Rojahn	Complete coring - sump confirmed - SB30 right on east edge of sump - 4' void below floor.
9/29/05	15:07	Terry Rojahn	2inches to refusal - abandoned hole - will pick another location W/T. Brent to place the last boring (SB30) in B106.

- End of Report -

APPENDIX B

SMWU 16

MISCELLANEOUS FIELD DOCUMENTATION

ROUNDS 5 AND 6

B.1.1

SWMU 16

SITE LOGBOOK

ROUND 5

NSWC CRANE

N7448

SWMU 13 & 16

1376

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

©SCIENTIFIC BINDERY PRODUCTIONS, 60 EAST 13TH STREET, CHICAGO, ILLINOIS 60605

Start Round 5

MON. - 5-02-05

Work continued from Page

TRAVEL DAY

1235 Hrs - Arrive @ B 3245
- Open EQ. Packages from warehouse & window
- Set up YSI units
- Meet w/ T. Brent
- Missing (2) regulators - call U.S. Env. to have them shipped to site ASAP
- Check nitrogen tanks and order 4 new cylinders item 102s
- Get vehical passes from T/Brent
- Intitiate camera pass paperwork w/T. Brent
- H&S meetings (J. Wright & J. Goerdt)
  - Training Doc.
  - MSD. DATA SHEETS
- Prep to leave site to purchase supplies

700 Hrs - Left B 3245 for Sam's Club.

756 Hrs - Check out @ Sam's Club
Purchased - Zip lock bags
Water & Paper towels

END

SIGNATURE

DATE 5-2-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

SAMPLE SUMMARY:

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

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

TUES 5-03-05

Work continued from Page

0705 Hrs - Arrive @ B-3245
- Prep. for GW sampling (J.G & J.W)
- Prep. to collect water levels @ Mine Fill B
- Cali. YSIs, Lamotes & Mini RAE (PID)
- Obtain Camera Pass for Navy
- T. Brent Checked w/ Army - NO activity @ B-165 ok to do water level round

1040 Hrs - Left B-3245 for Mine Fill B

1050 Hrs - Arrive @ Mine Fill B
- obtain water level from wells that J.G & JW are purging (13MWT29 & 09 respectively)
- continue taking water levels @ Mine Fill B

1210 Hrs - Break for lunch (TR & JW)

1240 Hrs - Drop off JWs rental @ B-3245

1310 Hrs - Drop off JGs Lunch @ 13MWT28
- Continue taking water levels this time w/ JW
- JW is doing well inventory @ same time electronical

1835 Hrs - Finish water levels of Monitoring well & Staff gauges @ Mine Fill B (SEE Pages 164 & 165)

1845 Hrs - Arrive @ B 3245
Drop off Equipment

1900 Hrs - Leave B 3245 for motel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 · MADE IN USA

Work continued to Page

SIGNATURE DATE 5/03/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

 TUES 5-03-05

STAFF GAUGE ID	TIME	W.L	AVE W - AVE D - SEC/FT	Flow Rate
1356 01	1122	1.77	—	< 1 gpm
02	1111	3.73	~~8" 0.07'~~ (TR)	~1-2 gpm
03	1809	1.96		No Flow
04	1812	2.45		< 1 GPM
05	1816	3.89		< 1 GPM
06	~~15:39~~ 17:39 INV	DRY		DRY
07	1455	1.69		STAG.
08	1437	5.13		1-5 GPM
09	1430	4.21		1-5 GPM
10	1144	4.84		1-5 gpm
11	1830	2.51		~1 GPM
12	1621	6.85	11" 0.03' 1 ft/sec	148 gpm
13	1634	6.06		6 GPM
14	1636	6.41		5-10 GPM
15	1641	5.24	12" 0.07' 1 ft/sec	377 gpm
16	1725	DRY		DRY
17	1708	DRY		DRY
18	1726	8.19	18" 0.05' 1 ft/sec	404 gpm

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 30433 MADE IN USA

TUES 5-03-05 (Con't)

Work continued from Page

Weather - Mostly Sunny 60's

WELL ID	TIME	WL	PID
13MWT01	1103	7.71	0.1
02	1118	16.19	0.0
03	1100	9.72	0.1
04	1130	14.27	0.0
05	1125	5.96	0.5
06	1056	11.66	0.6
07	1140	3.49	0.1
08	1133	4.85	0.2
09	1025	9.15	(JW)
10	1136	13.69	0.0
11	1150	9.03	0.0
12	1154	10.14	0.0
13	1802	05.13	0.0
14	1750	14.10	0.0
15	1200	13.88	0.0
16	1400	12.33	0.0
17	1405	9.91	0.0
18	1203	19.41	0.0
19	1745	10.40	0.0
20	1452	4.94	0.0
21	1410	9.30	0.0
22	1434	8.21	0.0
23	14:49	8.60	0.0
24	14:47	9.27	0.0
25	1439	6.65	0.0
26	1443	9.81	0.0
27	1157	9.27	0.0
28	1015	77.88	(JG)
29	1806	5.61	0.0
30	17:58	11.55	0.0
31	1733	10.74	0.0
32	1730	9.02	0.0
33	1740	10.41	0.0
34	14:32	5.26	0.0
35	1149	63.94	0.0
36	1458	18.83	0.0
37	1509	13.64	0.0
38	1507	61.81	0.0
39	1517	13.36	0.0
40	1529	18.15	0.0
41	1524	66.52	0.0
42	1545	20.38	0.0
43	1352	8.17	0.6
44	1339	64.36	0.1
45	1408	70.76	0.0
46	1516	56.61	0.0
47	1820	7.15	0.0
48	1605	10.29	0.0
49	1608	7.25	0.0
50	1611	7.90	0.0
51	1614	5.80	0.0

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5-03-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE ~~COMP~~ TIME	COMMENTS
13GWT4504	0923	1040	9.3 L	NA	(TR)
13GWT2105	0930	1040	7.0 L	1050	(JW)
13GWT4004	0945	1115	8.3 L	1118	(JG)
13GWT1105	1305	1400	5.3 L	1405	(TR)
13GWT1705	1250	1410	8.0 L	1420	(JW)
13GWT4604	1250	1420	9.0 L	1425	(JG)
13GWT3704	1505	1655	14.6 L	1658	(JG)

SCIENTIFIC BINDERY PRODUCTS., CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

CREW
J. Wright
J. Goerdt
T. Rojahn

PROJECT NO. 7448
BOOK NO. 1376

WED. 5-04-05

Work continued from Page

Weather - Mostly Sunny & 60's

0710 Hrs - ARRIVE @ B-3245
- PREP. FOR GROUNDWATER SAMPLING CALI. VSLS & LaMottes
- SELECT WELLS FOR CREW to SAMPLE this date

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

1100 Hrs - JW & TR BREAK FOR LUNCH

1155 Hrs - RETURN to FIELD OFFICE
TR & J.W. - OFFICE CHECK IN W/ OFFICE

1225 Hrs - Return to MINE FILL B - drop JW OFF @ 13MWT17 & CHECK on JG

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

1450 Hrs - FINISH @ 13MWT11 CHECK on JG - PICK up Jims PAPERWORK & SAMPLES

1520 Hrs - RETURN to B 3245
- PROCESS PAPERWORK FOR SAMPLES collected 5/03-04/05 (SEE COC # 3713)
- PREP. SAMPLES FOR SHIPPING
- JW - ENTERING PAPERWORK ELECTRONICALLY
- CHECK IN W T. BRENT - get Figures of NEW drilling locations @ B-55.

1730 Hrs - LEAVE SITE FOR FED EX

1800 Hrs - Drop off SAMPLES @ FED. EX on AB # 8447813546 42

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 5/04/05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY 5-05-05:

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
13GWT4504	SEE PAGE 166 →			1015	(TR)
13GWT1405	0930	1015	10.3 L	1048	(JG)
13GWT5103	1000	1120	8.0 L	1130	(JW)
13GWT3104	1045	1245	12.8 L	1250	(JG)
13GWT3404	1055	1325	18.2 L	1330	(TA)
13GWT4704	1225	1345	9.6 L	1355	(JW)
13GWT1505	1440	1620	9.0 L	1625	(TR)
13GWT1305	1445	1625	14.3 L	1630	(JG)

Note: Lino out SWMU 9 DPT locations

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 MADE IN USA

THURS 5-05-05

Work continued from Page

Weather - Partly Cloudy & 60's

Arrive @ site 0650 Hrs

- Prep. for GW sampling Cal. YSIs & LaMottes
- Fax COC # 3713 to LAB & OFFICE
- Select wells for sampling

0830 Hrs - Lay out DPT locations @ SWMU 9 BLDG 55

0915 Hrs - Arrive @ Public Works - left Donna 2 Knowing that SWMU 9 is laid out

0955 Hrs - Arrive @ SWMU 13

1015 Hrs - Start sampling 13MWT45 (purged 5/4/05)
See pages 166 & 168 for details

1055 Hrs - Start purge @ 13MWT34
See page 168 for details

1440 Hrs - Start purge @ 13MWT15
See page 168 for details

1720 Hrs - Arrive @ B-3245
- Drop off EQ & refrigerate samples
- Pick up paperwork (JW & JG)
- Secure Nitrogen cylinders
- Dr. Oxygen dropped off 2 more cylinders & picked up 2

1748 Hrs - Left B-3245 for Bloomington

Evening - Complete COC # 3714 & E-mail R. Basinski & R. Clark on daily activities

END

SIGNATURE

DATE 5-05-05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

SAMPLE SUMMARY

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
16GWT1104	NA	NA	NA	0845	(JG) WELL DRIES OUT RAPIDLY sampling incomplete
16GW0405	1000	1135	14.05L	1140	(JG)
16GW0205	1000	1140	8.6L	1145	(TA)
16GW0305	1400	1650	15.3L	1655	(JG)

Collected staff gauge & well measurements

SW work on Electronic Form Entry this morning

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60603 MADE IN USA

FRI. 5-06-05

Work continued from Page

WEATHER: Mostly sunny & 70's

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

0945 Hrs - Arrive @ SWMU 16 WES14
SEE PAGE 170 FOR DETAILS

1230 Hr - Lunch

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

1915 Hrs - Arrive @ B-3245 Prep paperwork for shipment
SEE COC #3714
JW - Basic MWT 16 & 18
TR - Prep samples for shipment on AB# 0947 8135 4697

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

1835 Hrs - Drop off samples @ FED. EX.

END

SIGNATURE Terry Lopat

DATE 5-06-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

FRI 05-06-05 (Con't)

Staff Gauge ID	W.L.	Time	MEAS. W	MEAS. D	sec/ft	Flow Rate
135601 → 05	DRY	1320-1609 ~~1320-1609~~ (TK)	—	—	0	DRY
135606	3.67	1624	20-25 gpm			→
135607	STAFF GAUGE WASHED AWAY	1633	.22' x 4' 0.5 sec/ft .22' x 4' x 2 ft/sec			790 gpm
135608	4.22	1651	—			1-5 gpm
135609	DRY	1655	—			0

Note:
JWI ~~Keep~~ (TK) Kept Above INFO. Electronically & Page 173

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60635 MADE IN USA

FRI. 05-06-05 Con't

Work continued from Page

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

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Taylor

DATE 5-06-05

DISCLOSED TO AND UNDERSTOOD BY | DATE | WITNESS | DATE

SAMPLE SUMMARY 5-07-05:

SAMPLE ID	START PURGE	END PURGE	VOL PURGED	SAMPLE TIME	COMMENTS
TB0507050	NA	NA	NA	0800	TR
16GWT0904	0909	1059	9.2 L	1103	(TR) Also DUP 16FD0507050
16GWT0606	1312	1712	10.6 L	1715	TR
16GWT1304	0830	1100	15.0 L	NA	JW
16GWT1504	1150	1550	18.0 L	1610	JW
16GWT0405	0850	1020	9.3 L	1025	JG
16GWT1004	1135	1335	12.0 L	1400	JG
16GWT1204	1445	1555	7.0 L	1600	JG
16GWT1704	1714	1920	12.0 L	1925	JG

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

JW
JG
TR

PROJECT NO. 7448

BOOK NO. 1376

SAT 05-07-05

Work continued from Page

WEATHER - Mostly Sunny & 70's

0650 Hrs - Arrive @ B-3245
- Select & Prep. PAPERWORK FOR WELLS to be sampled this date
- PREP SUV FOR GW sampling

0830 Hrs - Arrive @ BWMW 16
- Drop off VOA vials FOR JW

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

1210 Hrs - LEFT SITE FOR SUBWAY - PICKED UP SUBS FOR JW & JG

1230 Hrs - RETURN to SWMW 16 - GIVE SUBS to JW & JG

1250 Hrs - ARRIVE @ 16 MWT06
SEE PAGE 174 FOR DETAILS

1800 Hrs - FINISH @ 16MWT06 - RETURN to B-3245
- DROP OFF EQ.
- REFRIGERATE SAMPLES

1820 Hrs - LEFT B-3245 FOR Bloomington

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Troy Rogers

DATE 5-07-05

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

SAMPLE SUMMARY :

FINISHED collecting samples @ 16 MW1 13 & 11

Collected SW samples @ SWMU's 13 & 16

JW worked on Electronic Form Entry this afternoon

SCIENTIFIC SINDERY PRODUCTS, CHICAGO

SUN 5-08-05

Work continued from Page

WEATHER: Partly Cloudy, Temp 80's

0650 HRS - ARRIVE @ B-3245

- PREP. to SAMPLE (TR) & SURFACE WATER
- PAPERWORK (COCs & 5/07 SAMPLE SUMMARY)
- PREP. SUV FOR SW SAMPLING
- (JW) collect GW SAMPLES @ 16MWT 13 & 11
- (JG) YSI & LaMotte CALI.

0910 Hrs - ARRIVE @ SWMU 16 to collect SURFACE WATER SAMPLES

SAMPLE ID	TIME	Comments
16SW1304	0935	JG/TR
16SW1204	0950	JG/TR
16SW1003	1025	JG/TR/JW
16SW3003	1100	JG/TR/JW MS/MSD 16FD0508050501
13SW3003	1300	
13SW1604	~~1300~~ 1315	JG/TR
13SW1504	~~1315~~ 1338	
13SW1404	~~1338~~ 1350	
13SW2204	~~1350~~ 1410	
13SW/SD11	—	DRY
13SW2003	1433	JG/TR
13SW1903	1448	JG/TR

(TR)

Note: JW WORKED ON ELECTRONIC FORMS THIS AFTERNOON

1510 Hrs - ARRIVE @ B-3245

- DISCUSSED ELECTRONIC FORMS
- PAPERWORK (COCs 3715 & 3716, SAMPLE SUMMARY)
- SECURED SAMPLES IN FRIG

1745 HRS - LEFT B3245

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers DATE 5/08/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS., CHICAGO 60605 MADE IN USA

TITLE NSWC CRANE

MON 5-09-05

PROJECT NO. 7448

BOOK NO. 1376

Work continued from Page

WEATHER - Mostly Cloudy TEMP 80's

0650 Hrs - ARRIVE @ B-3245
PREP. to WORK @ SWMU 9 this date

1630 Hrs - PREP. SAMPLES FOR SHIPMENT
ON COCs 3715 & 3716

1830 Hrs - DROP OFF SAMPLES @ FED EX. ON
AB# 8447 8135 4653

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers

DATE 5-09-05

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

VOID THIS PAGE

SCIENTIFIC BINDERY PRODUCTS, CHICAGO 60405 MADE IN USA

Tues. 5/17/05

Work continued from Page

0650 Hrs - Arrive @ B-3245
- Work on SWMU 12 until 0900

0900 Hrs - Prep. to sample sediment @ SWMU 13

SAMPLE ID	SAMPLE TIME	COMMENTS
13SD4201	0943	Samplers JG & TK
13SD4101	1028	
13SD4001	1105	
13SD3901	1125	
13SD3801	1140	
13SD3701	1150	
13SD3601	1205	MS/MSD & 13FD051705 01
13SD4301	1320	
13SD4401	1335	
13SD4501	1355	

1220 Hrs - Lunch

1250 Hrs - Stop @ Demo Range check in w/ Walt Waggoner to see if it is ok to sample @ SE01 locations 13SD43 → 45
OK w/ Walt

1410 Hrs - Stop @ Demo Range and let Walt know that we (JG & TK) are clear of Demo Range

1423 Hrs - Return to B-3245
- Process & Complete COC # 3717 Sed. Samples
- Organize SWMU 12 Round 2 paperwork
  - Prep. Table showing well ID & past purge times, pump used & days to complete sampling
- Organize office

1800 Hrs - Leave B 3245 for Bloomington

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Terry Rogers DATE 5/17/05

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B.1.2

SWMU 16

DAILY ACTIVITIES RECORD

ROUND 6

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

MU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/08/2005	**Weather/Temp**		**Created By**	John Wright
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	8/8/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	
Task/Contract #		**Visitors**		**Modified Date**	
WBS Code #	xxx			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/8/05	16:00	John Wright	Arrived at Base and checked in with security. Issued gate pass and went to field office to prepare for E-Data use. Met with Terry R. and Jim G. and trained in E-Data demo and Crane-specific projects (SWMUS 13/16 and 12).

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/08/2005	**Weather/Temp**		**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**		**Created Date**	8/8/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	xxx			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/8/05	11:45	Terry Rojahn	Arrive at B-3245
8/8/05	16:00	Terry Rojahn	John Wright and Jim Goerdt arrive at B-3245
8/8/05	18:15	Terry Rojahn	Leave B-3245 for Sam's Club
8/8/05	18:45	Terry Rojahn	Arrive at Sam's Club - purchase supplies
8/8/05	19:30	Terry Rojahn	Leave Sam's Club For Motel - Last Entry

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/09/2005	**Weather/Temp**	Hazy, Hot & Humid, Temp. High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/9/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/9/05	06:58	Terry Rojahn	Arrive at B-3245:
8/9/05	09:07	Terry Rojahn	Attempted to calibrate PID - Problem with battery (shuts down right away)
8/9/05	09:51	Terry Rojahn	Turbidity meter also bad (stuck on 2.31)
8/9/05	10:25	Terry Rojahn	Arrive at Mine FIll B -Measure water levels and staff gauges
8/9/05	12:20	Terry Rojahn	Lunch break
8/9/05	12:56	Terry Rojahn	Return to B-3245
8/9/05	13:30	Terry Rojahn	Returned to Mine Fill B (all wells measured and 8 staff gauges checked)
[illegible]/05	16:20	Terry Rojahn	Start measuring water levels at SWMU 9.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/9/05	18:37	Terry Rojahn	Complete water levels at SWMU 9: return to B-3245
8/9/05	19:00	Terry Rojahn	Leave B-3245 for motel

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/10/2005	**Weather/Temp**	Hazy, Hot & Humid, Temp 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/10/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/10/05	06:55	Terry Rojahn	Arrive at B-3245: Organize office - more space for toughbook entry.
8/10/05	08:40	Terry Rojahn	Arrive @ SWMU 12: Park one car @ bottom of RR Tracks and drive second car to north end of track - collect water levels (WL) on RR tracks. Also
8/10/05	11:05	Terry Rojahn	Arrive at B-3245 to sync toughbooks for changes to surface water/staff gauge data forms.
8/10/05	11:25	Terry Rojahn	Lunch Break
[illegible]/05	11:50	Terry Rojahn	Return to B-3245: Called U.S. Environmental to order pH probe
8/10/05	13:00	Terry Rojahn	Return to SWMU 12 and 13 Water level and staff gauge measurements.
8/10/05	16:15	Terry Rojahn	Finish water level and staff gauge measurements and return to B-3245.
8/10/05	18:00	Terry Rojahn	Left B-3245 for Fed. Ex.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/10/05	18:30	Terry Rojahn	Drop off samples @ Fed. Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/11/2005	**Weather/Temp**	Hot, Humid & Partly Sunny ; Temp. High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC			**Created Date**	8/11/05
TtNUS Project #	112G00041	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Modified By**	Terry Rojahn
Task/Contract #	0000			**Modified Date**	3/9/06
WBS Code #	0000	**Subcontractor Personnel**		**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/11/05	06:55	Terry Rojahn	Arrive at B3245: Fax COC #3261 to Laucks (H. Prentice). Select wells for sampling this date. Calibrate Turbidity meter. Discuss computer generated Groundwater Form with JW. Prep SUV for groundwater sampling. Discuss the shipment of a pH replacement probe w/ US Environmental
8/11/05	11:00	Terry Rojahn	Arrive at SWMU 13 to sample 13MWT17 and 13MWT15. Returned to B-3245 briefly between wells to check on Microseep sample containers (they did arrive) and to fax E. Sedlmyer yesterday's COC.
8/11/05	17:15	Terry Rojahn	Arrive at B-3245: Drop off equipment, gas cylinders and secure samples in frig.
[illegible]/05	17:30	Terry Rojahn	Leave B-3245 for motel. Sample Summary: completed the sampling of monitoring wells 13MWT11, 5, 17, 34, 37 and 41 (10 of 17 wells completed to date at SWMU 13). Monitoring well 13MWT51 was purged but not sampled - well was purged dry. The initial water level at 13MWT51 has dropped significantly from prior rounds. Well may have been impacted by new water line installed just next to it.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/12/2005	**Weather/Temp**	Hot & Humid, Temp low 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/12/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/12/05	07:05	Terry Rojahn	Arrive at B-3245:
8/12/05	08:40	Terry Rojahn	Calibrate turbidity meters (JW & TR)
8/12/05	09:17	Terry Rojahn	Got weekend work letters from T. Brent.
8/12/05	09:30	Terry Rojahn	Arrive at SWMU 16 to measure water levels and staff gauges.
8/12/05	11:20	Terry Rojahn	Finish water level & staff gauge measurements at SWMU 16.
8/12/05	11:35	Terry Rojahn	Lunch break
8/12/05	12:15	Terry Rojahn	Arrive at B-3245:
8/12/05	18:03	Terry Rojahn	Left B-3245 for Fed. Ex.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/12/05	18:35	Terry Rojahn	Drop off samples on COC #3262 @ Fed. Ex.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/13/2005	**Weather/Temp**	Hot & Humid, 90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/13/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000	**Visitors**		**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/13/05	07:15	Terry Rojahn	Arrive at B-3245:
8/13/05	08:30	Terry Rojahn	Arrive @ SWMU 16 set up @ 16MW04
8/13/05	12:05	Terry Rojahn	Finish @ 16MW04 - pick up lunch @ subway
8/13/05	12:20	Terry Rojahn	Arrive @ B-3245: Track Fed Ex coolers (Sat.pick up) - not picked up as of yet by Laucks. Attemped to call Laucks -no response.
8/13/05	12:50	Terry Rojahn	Return to SWMU 16 to purge monitoring well 16MWT15
8/13/05	17:30	Terry Rojahn	Finish purge @ 16MWT15 - return to B-3245 -drop off equipment and secure samples in frig. Track coolers - still being held at Fed. Ex. - call Laucks and leave message on same
8/13/05	18:00	Terry Rojahn	Leave B-3245 for motel. Sample Summary: purged and sampled 16MWT10 &12 and 16MW03 & 04

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/14/2005	**Weather/Temp**	Mostly Cloudy, Temp.90s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/14/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/14/05	07:05	Terry Rojahn	Arrive @ B-3245: Prep to sample Ground water @ SWMU 16
8/14/05	08:50	Terry Rojahn	Arrive at SWMU 16
8/14/05	10:55	Terry Rojahn	Start collecting sample 16GWT0406.
8/14/05	14:20	Terry Rojahn	Arrive @ 16MWT15
8/14/05	14:30	Terry Rojahn	Start collecting sample 16GWT1505
8/14/05	14:41	Terry Rojahn	Security check by Crane Security Officer.
8/14/05	16:05	Terry Rojahn	Collect 16GWT1505 & depart @ SWMU 16 for SWMU 13.
[illegible]/05	16:15	Terry Rojahn	Arrive @ SWMU 13 - set up at 13MWT51.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
8/14/05	16:46	Terry Rojahn	Finish collecting Groundwater at 13MWT51 - leave SWMU 13 for B-3245.
8/14/05	16:55	Terry Rojahn	Arrive at B-3245: Secure eq. & samples.
8/14/05	17:23	Terry Rojahn	Leave B-3245 for Bloomington
8/14/05	17:25	Terry Rojahn	Sample Summary: Completed all ground water sampling at SWMU 16 this date.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/15/2005	**Weather/Temp**	Overcast, High 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J. Wright;T. Rojahn	**Created Date**	8/15/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000	**Visitors**		**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/15/05	07:00	Terry Rojahn	Arrive at B-3245: Sedlmyer and asked him to track the shipment (was to be picked up at Fed. Ex. by Laucks Lab on Saturday).
8/15/05	10:30	Terry Rojahn	Arrive at SWMU13 (13MWT04)
8/15/05	13:53	Terry Rojahn	Finish collecting groundwater sample at monitoring well 13MWT04.
8/15/05	14:00	Terry Rojahn	Arrive at B3245:
[illegible]/05	18:10	Terry Rojahn	Leave B-3245 for Fed. Ex.
8/15/05	18:40	Terry Rojahn	Arrive at Fed. Ex - drop off samples
8/15/05	19:15	Terry Rojahn	Picked up supplies at Home Depo.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/16/2005	**Weather/Temp**	Lt. Rain /overcast, Mid 80s & Humid	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;J.Wright;T. Rojahn	**Created Date**	8/16/05
TtNUS Project #	112G00041			**Modified By**	Terry Rojahn
Task/Contract #	0000	**Subcontractor Personnel**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/16/05	07:00	Terry Rojahn	Arrive at B-3245:
8/16/05	10:20	Terry Rojahn	Arrived at SWMU 13.
8/16/05	10:30	Terry Rojahn	Collect surface water sample at location 13SW14.
8/16/05	10:50	Terry Rojahn	Collect surface water sample at location 13SW15.
8/16/05	11:15	Terry Rojahn	Collect surface water sample at location 13SW16.
8/16/05	11:30	Terry Rojahn	Collect surface water sample at location 13SW30..Also
8/16/05	11:50	Terry Rojahn	Pick up lunch at Subway.
8/16/05	12:00	Terry Rojahn	Arrive at B-3245:

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Daily Activity

Date	Time	Author	Notes
8/16/05	12:55	Terry Rojahn	Return to SWMU 13.
8/16/05	13:05	Terry Rojahn	Check surface water location 13SW11 - DRY.
8/16/05	13:15	Terry Rojahn	Check surface water location 13SW22 - DRY.
8/16/05	13:30	Terry Rojahn	Collect surface water sample at location 13SW20.
8/16/05	13:45	Terry Rojahn	Collect surface water sample at location 13SW19.
8/16/05	14:05	Terry Rojahn	Check on JG at monitoring well 13MWT14 - got JG 's Toughbook to sync at B-3245.
8/16/05	14:15	Terry Rojahn	Arrive at B-3245:
8/16/05	18:30	Terry Rojahn	JW and TR left B-3245 for Bloomington.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/17/2005	**Weather/Temp**	Hot and humid, Temp 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	T. Rojahn	**Created Date**	8/17/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	
Task/Contract #		**Visitors**		**Modified Date**	
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/17/05	00:00	Terry Rojahn	For detailed information - see log under Phase 3 SWMU 9 project for this date.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/27/2005	**Weather/Temp**	Mostly cloudy, humid & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	J. Goerdt;T. Rojahn	**Created Date**	8/27/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/27/05	16:55	Terry Rojahn	07:05:00 - Arrive at B-3245:
8/27/05	16:56	Terry Rojahn	The above was copied from SWMU 12's (Round 4)Daily Activity Log for this date.
8/27/05	17:50	Terry Rojahn	Arrive at SWMU 13 to check on JG. JG almost done sampling at monitoring well 13MWT09.
8/27/05	18:00	Terry Rojahn	JG finished sampling at 13MWT09.
/05	18:15	Terry Rojahn	Leave base for Bloomington. SAMPLE SUMMARY THIS DATE: Checked all surface water sampling locations at SWMU 16 - all 4 were dry. Also

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	08/29/2005	**Weather/Temp**	Mostly cloudy, hunid & 80s	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	Goerdt;Rojahn	**Created Date**	8/29/05
TtNUS Project #	112G00041	**Subcontractor Personnel**		**Modified By**	Terry Rojahn
Task/Contract #	0000	**Visitors**		**Modified Date**	3/9/06
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV			**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
8/29/05	15:00	Terry Rojahn	See SWMU 12 Round 4 Daily Log for this date's (8/29/05) activities.

- End of Report -

Tetra Tech NUS, Inc.

DAILY ACTIVITY LOG

SWMU 13 and 16 Round 6 Sampling - CRANE NSWC

Project Information

Activity Date	09/29/2005	**Weather/Temp**	Mostly sunny & 60's	**Created By**	Terry Rojahn
Facility Name	CRANE NSWC	**TtNUS Personnel**	D. Westerhoff;D. Hickey;J. Wright;T. Rojahn	**Created Date**	9/29/05
TtNUS Project #	112G00041			**Modified By**	
Task/Contract #		**Subcontractor Personnel**	EFS;Jay McFall;Capitol Drilling & Sawing ;David Cribbs	**Modified Date**	
WBS Code #	0000			**Printed By**	Joseph Lucas
Client	SOUTHDIV	**Visitors**		**Printed Date**	5/2/06

Daily Activity

Date	Time	Author	Notes
9/29/05	08:30	Terry Rojahn	Arrive at SWMU 8 with DW - meet with Ted Butler & Pam Hock (Army H&S) receive Safety & Building Availability Permit.
9/29/05	09:50	Terry Rojahn	Fire Inspector arrived on site - DW received Hot Work Permit.
9/29/05	10:10	Terry Rojahn	D. Cribbs began coring concrete.
9/29/05	10:45	Terry Rojahn	Start drilling at 09SB25.
[illegible]/05	12:40	Terry Rojahn	Finish coring inside B106 and completed 09SB22
9/29/05	13:00	Terry Rojahn	Lunch
9/29/05	13:35	Terry Rojahn	Return to SWMU 8 - start coring inside B107 and continued drilling inside B-106. DW over seeing H& S at B106 and TR over seeing coring activites at B-107. B-107 active - checked w/ Tom Hess for permission to core. OK to core 4 of 5 while workers are in the bldg. Workers are done at 1500Hrs.
9/29/05	15:30	Terry Rojahn	Completed the 4 of 5 corings at B107 and moved back to B-106 - SB30 drilling rig hit refusal only a couple inches below the floor. Believe rig hit an old sump moved SB30 about 5' from the wall.

DAILY ACTIVITY LOG

Daily Activity

Date	Time	Author	Notes
9/29/05	16:07	Terry Rojahn	2inches to refusal - abandoned hole - will pick another location W/T. Brent.
9/29/05	07:00	Terry Rojahn	Arrive at B-3245 - pick up H&S equipment and check in with Tom Brent.
9/29/05	08:00	Terry Rojahn	Do building walk through with bldg. supervisor (Tom Hess) - showed Mr Hess all boring locations in bldgs 106 &107. Mr Hess showed TTNUS how to turn on overhead exhaust fans. Objects blocking boring locations were already moved.
9/29/05	14:45	Terry Rojahn	Complete coring - sump confirmed - SB30 right on east edge of sump - 4' void below floor.
9/29/05	15:07	Terry Rojahn	2inches to refusal - abandoned hole - will pick another location W/T. Brent to place the last boring (SB30) in B106.

- End of Report -

APPENDIX C

SWMU 16

HEALTH AND SAFETY DOCUMENTATION

ROUNDS 5 AND 6

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220
Tel 412.921.7090 • Fax 412.921.4040 • www.tetratech.com

PITT-04-5-067

April 29, 2005

Project Nos. 1245, 7448, 6878, 00042

Mr. William Gates (Code ES31)
Commander, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29119-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order Nos. 0331, 0343, 0357, 0376

Subject: Personnel Clearance for Site Visit

Dear Mr. Gates:

The purpose of this letter is to inform you of upcoming site activities to be performed by Tetra Tech NUS, Inc. (TtNUS) employees under the CLEAN contract, and to attest that the individuals identified herein are in compliance with applicable OSHA regulations. This information is being submitted as specified in Section H.14 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62467-94-D-0888. The specific OSHA regulations involved for this project pertain to employee health and safety training and medical surveillance requirements, as identified in OSHA 29 CFR 1910.120.

The subject project and planned activities include staking locations of intrusive sampling; installation/development and sampling of monitoring wells; surface water, seep and sediment sampling; and soil sampling using DPT and hand augering techniques at the NSWC Crane site in Indiana. This is scheduled to be conducted from May 2, 2005 through June 8, 2005. The individuals that will perform these tasks are employees of TtNUS. In performing these activities, the field team will adhere to the following Health and Safety Plans (HASPs):

- HASP for RCRA Facility Investigation at Building 106 Pond (SWMU 8) and Roads and Grounds Area (SWMU 15), dated November 2004, prepared under CTO 0331.
- HASP for Cast High Explosives Fill and B-146 Incinerator, dated August 2004, prepared under CTO 0343.
- HASP for Mine Fill A (SWMU 12), Revision 1, dated August 2004, prepared under CTO 0357.
- HASP for Risk Assessment and Corrective Measures Study (SWMU 9), dated February 2005, prepared under CTO 0376.

The following individuals will participate in the planned activities described above:

Jim Goerdt
Terry Rojahn
John Wright
Jeff Schubert

TETRA TECH NUS, INC.

In addition, Roger Clark will also visit Tetra Tech NUS, Inc. work sites at NWSC Crane during this period. However, he will be not participating in any intrusive activities (e.g., drilling, sampling, etc.) and will be restricted from approaching work areas while any intrusive activities are performed.

If you have any questions, concerns, or if I can be of further assistance, please do not hesitate to contact me.

Very truly yours,

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

MMS/mlg

cc: Mr. B. Gorman (Code ES34)
Ms. Debra Humbert, TtNUS, Inc.
Mr. Mark Perry, TtNUS, Inc.
Mr. Keith Henn, TtNUS, Inc.
Mr. Terry Rojahn, TtNUS, Inc.
Mr. Roger Clark, TtNUS, Inc.
File copy CTO 0331, 0343, 0357, 0376

NUS CORPORATION

Certificate of Training

THIS CERTIFIES THAT

TERRY ROJAHN

has successfully completed a course of instruction on

SUPERFUND TRAINING CLASS

prepared and conducted by the
NUS Corporation, Pittsburgh, Pennsylvania

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

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

E. Dennis Escher, P.E.
Vice President

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Terry R. Rojahn

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 25, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

Basinski, Ralph

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

Ralph:

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

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

If there are any questions, let me know.

Matt

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

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WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

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

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

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

STATUS

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

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

3. ☐ **NOT QUALIFIED**

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

COMMENTS:

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

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

Signature: Peter P Greaney MD

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

APPLIED EDUCATIONAL SERIES

James D. Goerdt

APPLIED ASSOCIATES INTERNATIONAL INC.

CERTIFICATE

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

ISSUE DATE: December 13, 1991

EXPIRATION: December 13, 1992

CERTIFICATE: HAZ9112001058

STEVEN L. WILLIAMS
President

THOMAS O. MURRAY
Certified Industrial Hygenist

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

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Jim Goerdt

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER AND SUPERVISOR REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

October 22, 2004

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Goerdt, James	COMPANY:	TT/NUS
SSN:	481-86-2691	POSITION:	Environmental Scientist
DATE OF EXAM:	11/07/2003	LOCATION:	TT/NUS-Pittsburgh
EXPIRATION DATE:	11/07/2005	SITE:	Pittsburgh

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

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

STATUS

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

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

3. ☐ NOT QUALIFIED

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

COMMENTS:

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

Name of Physician: Scott Hardy, M.D. Date: 11/11/03

Signature: Scott Hardy MD

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

CERTIFICATE OF TRAINING

CHMR

Center for Hazardous Materials Research

University of Pittsburgh Applied Research Center
320 William Pitt Way • Pittsburgh, PA 15238

(412) 826-5320 or 1-800-334-CHMR

THIS CERTIFIES THAT

JOHN S. WRIGHT

has successfully completed a course of instruction in

OCCUPATIONAL HEALTH AND SAFETY

40-Hour Basic Health and Safety Training
Complying with 29 CFR 1910.120(e)(3)(i)

prepared and conducted by the

Center for Hazardous Materials Research

A Subsidiary of the University of Pittsburgh Trust.
Pittsburgh, Pennsylvania

July 19, 1991
Date of Award

Edgar Berkey, Ph.D.
President

TETRA TECH NUS

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

John S. Wright

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER
REFRESHER TRAINING

prepared and instructed by
Tetra Tech NUS, Inc.
Pittsburgh, Pennsylvania

February 25, 2005

Date of Award

Clyde Snyder
Senior Instructor
Training Services

James K. Laffey
Manager
Training Services

WORKCARE™
A Trademark of WorkCare, Inc.

RELEASE TO DUTY

CLINIC INSTRUCTIONS: Complete and give to employee before they leave the facility. This is a requirement of Tetra-Tech.

Employee Name: John Wright

Office Location: _____

Yes	No	
☑	☐	To work with hazardous materials in accordance with 29 CFR 1910.120.
☑	☐	To use respiratory protective equipment in accordance with 29 CFR 1910.134.

Based on the limited information available to me at this time, I find no necessity for immediate restrictions and I release this employee for duty. It is understood and agreed upon by the employer or potential employer of this examinee that subsequent comprehensive review of all laboratory and other test data by WorkCare may detect health conditions not apparent to me. It is further agreed and understood that such health conditions may necessitate the need for workplace restrictions. Examination has been performed in compliance with 1910.120 and 1910.134.

Signed: [illegible] M.D.

Date: 4/29/05

Employee

Bring this form back to the office and fax it to:
Matt Soltis, Corporate Health & Safety (412) 921-4040

333 S. Anita Drive, Suite 630, Orange, CA 92868 • (714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154
E-mail: info@workcare.com • Website: www.workcare.com

APPENDIX D

SWMU 16

ANALYTICAL DATA

APPENDIX D.1.1

SWMU 16

GROUNDWATER ANALYTICAL DATA

ROUND 5

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 UPGRADIENT GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location	16MW02
Sample Number	16GW0206
Sample Code	NORMAL
Sample Date	5/6/2005
Volatile Organics (ug/L)	
1,1,1,2-TETRACHLOROETHANE	0.3 U
1,1,1-TRICHLOROETHANE	0.3 U
1,1,2,2-TETRACHLOROETHANE	0.3 U
1,1,2-TRICHLOROETHANE	0.3 U
1,1-DICHLOROETHANE	0.3 U
1,1-DICHLOROETHENE	0.3 U
1,2,3-TRICHLOROPROPANE	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 UJ
1,2-DIBROMOETHANE	0.3 U
1,2-DICHLOROETHANE	0.3 U
1,2-DICHLOROPROPANE	0.3 U
2-BUTANONE	0.5 U
2-HEXANONE	0.5 U
3-CHLOROPROPENE	0.5 U
4-METHYL-2-PENTANONE	0.5 U
ACETONE	0.5 U
ACROLEIN	0.5 UR
ACRYLONITRILE	0.5 U
BENZENE	0.3 U
BROMODICHLOROMETHANE	0.3 U
BROMOFORM	0.3 U
BROMOMETHANE	0.3 U
CARBON DISULFIDE	0.3 U
CARBON TETRACHLORIDE	0.3 U
CHLOROBENZENE	0.3 U
CHLORODIBROMOMETHANE	0.3 U
CHLOROETHANE	0.5 U
CHLOROFORM	0.3 U
CHLOROMETHANE	0.3 U
CHLOROPRENE	0.5 U
CIS-1,2-DICHLOROETHENE	0.3 U
CIS-1,3-DICHLOROPROPENE	0.3 U
DIBROMOMETHANE	0.3 U
DICHLORODIFLUOROMETHANE	0.3 U
ETHYL METHACRYLATE	0.5 U
ETHYLBENZENE	0.3 U
METHACRYLONITRILE	0.3 U
METHYL IODIDE	0.5 U
METHYL METHACRYLATE	0.5 U
METHYLENE CHLORIDE	0.3 U
STYRENE	0.3 U
TETRACHLOROETHENE	0.3 U
TOLUENE	0.3 U
TOTAL XYLENES	0.3 U
TRANS-1,2-DICHLOROETHENE	0.3 U
TRANS-1,3-DICHLOROPROPENE	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U
TRICHLOROETHENE	0.3 U
TRICHLOROFLUOROMETHANE	0.3 U
VINYL ACETATE	0.5 U
VINYL CHLORIDE	0.3 U
Energetics (ug/L)	
1,3,5-TRINITROBENZENE	0.26 U
1,3-DINITROBENZENE	0.26 U
2,4,6-TRINITROTOLUENE	0.26 U
2,4-DINITROTOLUENE	0.26 U
2,6-DINITROTOLUENE	0.26 U

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 UPGRADIENT GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location	16MW02
Sample Number	16GW0206
Sample Code	NORMAL
Sample Date	5/6/2005
2-AMINO-4,6-DINITROTOLUENE	0.26 U
2-NITROTOLUENE	0.26 U
3-NITROTOLUENE	0.26 U
4-AMINO-2,6-DINITROTOLUENE	0.26 U
4-NITROTOLUENE	0.26 U
HMX	0.26 U
NITROBENZENE	0.26 U
RDX	0.26 U
TETRYL	0.26 U
Field Parameters	
DISSOLVED OXYGEN - METER (mg/L)	1.53
OXIDATION REDUCTION POTENTIAL (MV)	641
PH (S.U.)	5.2
SPECIFIC CONDUCTANCE (MS/CM)	0.446
TEMPERATURE (C)	15.84
TURBIDITY (NTU)	0.2

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SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MW03 16GW0305 NORMAL 5/6/2005	16MWT04 16GWT0405 NORMAL 5/7/2005	16MWT06 16GWT0606 NORMAL 5/7/2005	16MWT09 16GWT0904 ORIG 5/7/2005	16MWT09 16GWT0904-D DUP 5/7/2005	16MWT10 16GWT1004 NORMAL 5/7/2005	16MWT13 16GWT1304 NORMAL 5/8/2005	16MWT17 16GWT1704 NORMAL 5/7/2005
Volatile Organics (ug/L)								
1,1,1,2-TETRACHLOROETHANE	0.3 U	0.3 U	0.6 J	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,1,1-TRICHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,1,2,2-TETRACHLOROETHANE	0.3 U	0.3 U	5.5	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,1,2-TRICHLOROETHANE	0.3 U	0.3 U	250	0.3 U	0.3 U	0.3 U	3.2	42
1,1-DICHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,1-DICHLOROETHENE	0.3 U	0.3 U	160 J	0.3 U	0.3 U	0.3 U	0.5 J	6 U
1,2,3-TRICHLOROPROPANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,2-DIBROMOETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,2-DICHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
1,2-DICHLOROPROPANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
2-BUTANONE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
2-HEXANONE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
3-CHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
4-METHYL-2-PENTANONE	0.5 U	0.5 U	41	0.5 U	0.5 U	0.5 U	0.5 U	10 U
ACETONE	0.5 U	0.5 UJ	17 J	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	10 UJ
ACROLEIN	0.5 UR	0.5 UR	0.5 UR	0.5 UR	0.5 UR	0.5 UR	0.5 UR	10 UR
ACRYLONITRILE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
BENZENE	0.3 U	0.3 U	4.7	0.3 U	0.3 U	0.3 U	0.3 U	6 U
BROMODICHLOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
BROMOFORM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
BROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
CARBON DISULFIDE	0.3 U	0.3 U	2.6	0.3 U	0.3 U	0.3 U	0.3 U	6 U
CARBON TETRACHLORIDE	14	0.3 U	3.5	0.3 U	0.3 U	0.3 U	0.3 U	6 U
CHLOROBENZENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
CHLORODIBROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
CHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
CHLOROFORM	4.5	0.3 U	21	0.6 U	0.6 U	2.2 U	0.3 U	6 U
CHLOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
CHLOROPRENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
CIS-1,2-DICHLOROETHENE	0.3 U	0.3 U	5600	0.3 U	0.3 U	0.3 U	12	260
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
DIBROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
DICHLORODIFLUOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
ETHYL METHACRYLATE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
ETHYLBENZENE	0.3 U	0.3 U	6.2	0.3 U	0.3 U	0.3 U	0.3 U	6 U
METHACRYLONITRILE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
METHYL IODIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
METHYL METHACRYLATE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
METHYLENE CHLORIDE	0.3 U	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	6 UJ

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location	16MW03	16MWT04	16MWT06	16MWT09	16MWT09	16MWT10	16MWT13	16MWT17
Sample Number	16GW0305	16GWT0405	16GWT0606	16GWT0904	16GWT0904-D	16GWT1004	16GWT1304	16GWT1704
Sample Code	NORMAL	NORMAL	NORMAL	ORIG	DUP	NORMAL	NORMAL	NORMAL
Sample Date	5/6/2005	5/7/2005	5/7/2005	5/7/2005	5/7/2005	5/7/2005	5/8/2005	5/7/2005
STYRENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
TETRACHLOROETHENE	0.3 U	0.3 U	180 J	0.3 U	0.3 U	0.3 U	0.6 J	6 U
TOLUENE	0.3 U	0.3 U	380	0.3 U	0.3 U	0.3 U	0.3 U	6 U
TOTAL XYLENES	0.3 U	0.3 U	9.1	0.3 U	0.3 U	0.3 U	0.3 U	6 U
TRANS-1,2-DICHLOROETHENE	0.3 U	0.3 U	25	0.3 U	0.3 U	0.3 U	0.3 U	6 U
TRANS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
TRICHLOROETHENE	4.5	2.4	510000	6.9	7.2	1.6	2200	19000
TRICHLOROFLUOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	6 U
VINYL ACETATE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U
VINYL CHLORIDE	0.3 U	0.3 U	610	0.3 U	0.3 U	0.3 U	0.3 U	6 U
Energetics (ug/L)								
1,3,5-TRINITROBENZENE	0.271 U	0.269 U	3.4	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
1,3-DINITROBENZENE	0.271 U	0.269 U	0.264 UJ	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
2,4,6-TRINITROTOLUENE	0.271 U	0.269 U	12	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
2,4-DINITROTOLUENE	0.271 U	0.269 U	1 J	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
2,6-DINITROTOLUENE	0.271 U	0.269 U	1.3 J	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
2-AMINO-4,6-DINITROTOLUENE	0.45 J	0.269 U	60 J	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
2-NITROTOLUENE	0.271 U	0.269 U	0.264 UJ	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
3-NITROTOLUENE	0.271 U	0.269 U	0.264 UJ	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
4-AMINO-2,6-DINITROTOLUENE	0.76	0.44 J	31	0.269 U	0.6 J	0.248 U	0.298 U	0.281 U
4-NITROTOLUENE	0.271 U	0.269 U	0.264 UJ	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
HMX	5	6.4	0.64 J	9.3	8.9	4.8	0.298 U	0.281 U
NITROBENZENE	0.271 U	0.269 U	0.264 UJ	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
RDX	51	59	11	98	95	51	0.298 U	4.9
TETRYL	0.271 U	0.269 U	0.264 UJ	0.269 U	0.258 U	0.248 U	0.298 U	0.281 U
Field Parameters								
DISSOLVED OXYGEN - METER (mg/L)	0.81	0.39	2.69	1.51		1.1	0	-17.04
OXIDATION REDUCTION POTENTIAL (MV)	335.8	286.3	497	525		337	100.1	173.2
PH (S.U.)	5.13	6.32	6	5		3.59	5.18	5.4
SPECIFIC CONDUCTANCE (MS/CM)	0.359	0.16	0.762	0.432		0.867	0.232	0.474
TEMPERATURE (C)	14.85	15.93	17.46	14.1		15.88	16.23	13.78
TURBIDITY (NTU)	8.7	7.8	15	1		7.4	30	4.6

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN MIDDLE ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MW04 16GW0405 NORMAL 5/6/2005	16MWT12 16GWT1204 NORMAL 5/7/2005
Volatile Organics (ug/L)		
1,1,1,2-TETRACHLOROETHANE	0.3 U	0.3 U
1,1,1-TRICHLOROETHANE	0.3 U	0.3 U
1,1,2,2-TETRACHLOROETHANE	0.3 U	0.3 U
1,1,2-TRICHLOROETHANE	0.3 U	0.3 U
1,1-DICHLOROETHANE	0.3 U	0.3 U
1,1-DICHLOROETHENE	0.3 U	0.3 U
1,2,3-TRICHLOROPROPANE	0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 UJ	0.3 U
1,2-DIBROMOETHANE	0.3 U	0.3 U
1,2-DICHLOROETHANE	0.3 U	0.3 U
1,2-DICHLOROPROPANE	0.3 U	0.3 U
2-BUTANONE	0.5 U	0.5 U
2-HEXANONE	0.5 U	0.5 U
3-CHLOROPROPENE	0.5 U	0.5 U
4-METHYL-2-PENTANONE	0.5 U	0.5 U
ACETONE	0.5 U	0.5 UJ
ACROLEIN	0.5 UR	0.5 UR
ACRYLONITRILE	0.5 U	0.5 U
BENZENE	0.3 U	0.3 U
BROMODICHLOROMETHANE	0.3 U	0.3 U
BROMOFORM	0.3 U	0.3 U
BROMOMETHANE	0.3 U	0.3 U
CARBON DISULFIDE	0.3 U	0.3 U
CARBON TETRACHLORIDE	0.3 U	0.3 U
CHLOROBENZENE	0.3 U	0.3 U
CHLORODIBROMOMETHANE	0.3 U	0.3 U
CHLOROETHANE	0.5 U	0.5 U
CHLOROFORM	0.3 U	0.3 U
CHLOROMETHANE	0.3 U	0.3 U
CHLOROPRENE	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.3 U	0.3 U
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U
DIBROMOMETHANE	0.3 U	0.3 U
DICHLORODIFLUOROMETHANE	0.3 U	0.3 U
ETHYL METHACRYLATE	0.5 U	0.5 U
ETHYLBENZENE	0.3 U	0.3 U
METHACRYLONITRILE	0.3 U	0.3 U
METHYL IODIDE	0.5 U	0.5 U
METHYL METHACRYLATE	0.5 U	0.5 U
METHYLENE CHLORIDE	0.3 U	0.3 UJ
STYRENE	0.3 U	0.3 U
TETRACHLOROETHENE	0.3 U	0.3 U
TOLUENE	0.3 U	0.3 U
TOTAL XYLENES	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	0.3 U	0.3 U
TRANS-1,3-DICHLOROPROPENE	0.3 U	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U	0.5 U
TRICHLOROETHENE	0.7 J	0.3 U
TRICHLOROFLUOROMETHANE	0.3 U	0.3 U
VINYL ACETATE	0.5 U	0.5 U
VINYL CHLORIDE	0.3 U	0.3 U
Energetics (ug/L)		
1,3,5-TRINITROBENZENE	0.269 U	0.266 U
1,3-DINITROBENZENE	0.269 U	0.266 U
2,4,6-TRINITROTOLUENE	0.269 U	0.266 U
2,4-DINITROTOLUENE	0.269 U	0.266 U
2,6-DINITROTOLUENE	0.269 U	0.266 U
2-AMINO-4,6-DINITROTOLUENE	0.269 U	0.266 U
2-NITROTOLUENE	0.269 U	0.266 U

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN MIDDLE ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MW04 16GW0405 NORMAL 5/6/2005	16MWT12 16GWT1204 NORMAL 5/7/2005
3-NITROTOLUENE	0.269 U	0.266 U
4-AMINO-2,6-DINITROTOLUENE	0.269 U	0.266 U
4-NITROTOLUENE	0.269 U	0.266 U
HMX	0.269 U	0.266 U
NITROBENZENE	0.269 U	0.266 U
RDX	0.59	0.266 U
TETRYL	0.269 U	0.266 U
Field Parameters		
DISSOLVED OXYGEN - METER (mg/L)	1.57	-1.57
OXIDATION REDUCTION POTENTIAL (MV)	274.3	230.2
PH (S.U.)	4.06	4.65
SPECIFIC CONDUCTANCE (MS/CM)	0.738	2.014
TEMPERATURE (C)	14.13	16.46
TURBIDITY (NTU)	0.49	1.7

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location	16MWT11	16MWT15
Sample Number	16GWT1104	16GWT1504
Sample Code	NORMAL	NORMAL
Sample Date	5/6/2005	5/7/2005
Volatile Organics (ug/L)		
1,1,1,2-TETRACHLOROETHANE	30 U	0.3 U
1,1,1-TRICHLOROETHANE	30 U	0.3 U
1,1,2,2-TETRACHLOROETHANE	30 U	0.3 U
1,1,2-TRICHLOROETHANE	30 U	0.3 U
1,1-DICHLOROETHANE	30 U	0.3 U
1,1-DICHLOROETHENE	30 U	0.3 U
1,2,3-TRICHLOROPROPANE	30 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	30 U	0.3 U
1,2-DIBROMOETHANE	30 U	0.3 U
1,2-DICHLOROETHANE	30 U	0.3 U
1,2-DICHLOROPROPANE	30 U	0.3 U
2-BUTANONE	50 U	0.5 U
2-HEXANONE	50 U	0.5 U
3-CHLOROPROPENE	50 U	0.5 U
4-METHYL-2-PENTANONE	50 U	0.5 U
ACETONE	50 UJ	0.5 UJ
ACROLEIN	50 UR	0.5 UR
ACRYLONITRILE	50 U	0.5 U
BENZENE	30 U	0.3 U
BROMODICHLOROMETHANE	30 U	0.3 U
BROMOFORM	30 U	0.3 U
BROMOMETHANE	30 U	0.3 U
CARBON DISULFIDE	30 U	0.3 U
CARBON TETRACHLORIDE	30 U	0.3 U
CHLOROBENZENE	30 U	0.3 U
CHLORODIBROMOMETHANE	30 U	0.3 U
CHLOROETHANE	50 U	0.5 U
CHLOROFORM	30 U	0.3 U
CHLOROMETHANE	30 U	0.3 U
CHLOROPRENE	50 U	0.5 U
CIS-1,2-DICHLOROETHENE	30 U	0.3 U
CIS-1,3-DICHLOROPROPENE	30 U	0.3 U
DIBROMOMETHANE	30 U	0.3 U
DICHLORODIFLUOROMETHANE	30 U	0.3 U
ETHYL METHACRYLATE	50 U	0.5 U
ETHYLBENZENE	30 U	0.3 U
METHACRYLONITRILE	30 U	0.3 U
METHYL IODIDE	50 U	0.5 U
METHYL METHACRYLATE	50 U	0.5 U
METHYLENE CHLORIDE	30 UJ	0.3 UJ
STYRENE	30 U	0.3 U
TETRACHLOROETHENE	30 U	0.3 U
TOLUENE	30 U	0.3 U
TOTAL XYLENES	30 U	0.3 U
TRANS-1,2-DICHLOROETHENE	30 U	0.3 U
TRANS-1,3-DICHLOROPROPENE	30 U	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE	50 U	0.5 U
TRICHLOROETHENE	52 U	0.3 U
TRICHLOROFLUOROMETHANE	30 U	0.3 U
VINYL ACETATE	50 U	0.5 U
VINYL CHLORIDE	30 U	0.3 U
Energetics (ug/L)		
1,3,5-TRINITROBENZENE	0.266 U	0.271 U
1,3-DINITROBENZENE	0.266 U	0.271 U
2,4,6-TRINITROTOLUENE	0.266 U	0.271 U
2,4-DINITROTOLUENE	0.266 U	0.271 U
2,6-DINITROTOLUENE	0.266 U	0.271 U

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MWT11 16GWT1104 NORMAL 5/6/2005	16MWT15 16GWT1504 NORMAL 5/7/2005
2-AMINO-4,6-DINITROTOLUENE	0.266 U	0.271 U
2-NITROTOLUENE	0.266 U	0.271 U
3-NITROTOLUENE	0.266 U	0.271 U
4-AMINO-2,6-DINITROTOLUENE	0.266 U	0.271 U
4-NITROTOLUENE	0.266 U	0.271 U
HMX	0.266 U	0.271 U
NITROBENZENE	0.266 U	0.271 U
RDX	0.266 U	0.271 U
TETRYL	0.266 U	0.271 U
Field Parameters		
DISSOLVED OXYGEN - METER (mg/L)		-0.04
OXIDATION REDUCTION POTENTIAL (MV)		238.4
PH (S.U.)		7.06
SPECIFIC CONDUCTANCE (MS/CM)		0.301
TEMPERATURE (C)		16.87
TURBIDITY (NTU)		0

APPENDIX D.1.2

SWMU 16

GROUNDWATER ANALYTICAL DATA

ROUND 6

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 6 UPGRADIENT GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location	16MW02
Sample Number	16GW0207
Sample Code	NORMAL
Sample Date	8/14/2005
Volatile Organics (ug/L)	
ETHANE	0.093
ETHENE	0.007 J
METHANE	75
Energetics (ug/L)	
1,3,5-TRINITROBENZENE	0.26 U
1,3-DINITROBENZENE	0.26 U
2,4,6-TRINITROTOLUENE	0.26 U
2,4-DIAMINO-6-NITROTOLUENE	0.26 U
2,4-DINITROTOLUENE	0.26 U
2,6-DIAMINO-4-NITROTOLUENE	0.26 U
2,6-DINITROTOLUENE	0.26 U
2-AMINO-4,6-DINITROTOLUENE	0.26 U
2-NITROTOLUENE	0.26 U
3,5-DINITROANILINE	0.26 U
3-NITROTOLUENE	0.26 U
4,4'-TN-AZOXY	0.52 U
4-AMINO-2,6-DINITROTOLUENE	0.26 U
4-NITROTOLUENE	0.26 U
DNX	0.26 U
HMX	0.26 U
MNX	0.26 U
NITROBENZENE	0.26 U
RDX	0.26 U
TETRYL	0.26 U
TNX	0.26 U
Field Parameters	
DISSOLVED OXYGEN - METER (mg/L)	0.95
PH (S.U.)	5.91
SPECIFIC CONDUCTANCE (MS/CM)	402
TEMPERATURE (C)	16.63
TURBIDITY (NTU)	0
Miscellaneous Parameters (ug/L)	
CHLORIDE	22
NITRITE/NITRATE-N	0.025 U
SULFATE	59
TOTAL ORGANIC CARBON	1.1

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MW03 16GW0306 NORMAL 8/13/2005	16MWT04 16GWT0406 NORMAL 8/13/2005	16MWT06 16GWT0607 NORMAL 8/12/2005	16MWT09 16GWT0905 NORMAL 8/14/2005	16MWT10 16GWT1005 NORMAL 8/13/2005	16MWT13 16GWT1305 NORMAL 8/14/2005	16MWT17 16GWT1705 ORIG 8/14/2005	16MWT17 16GWT1705-D DUP 8/14/2005
Volatile Organics (ug/L)								
1,1,1,2-TETRACHLOROETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,1,1-TRICHLOROETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,1,2,2-TETRACHLOROETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,1,2-TRICHLOROETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	43	49
1,1-DICHLOROETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,1-DICHLOROETHENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	6.3 J	6 U
1,2,3-TRICHLOROPROPANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,2-DIBROMOETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,2-DICHLOROETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
1,2-DICHLOROPROPANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
2-BUTANONE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
2-HEXANONE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
3-CHLOROPROPENE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
4-METHYL-2-PENTANONE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
ACETONE	0.5 U	0.5 UJ	200 UJ	0.5 UJ	0.5 U	0.5 UJ	5 UJ	10 UJ
ACROLEIN	0.5 UR	0.5 UR	200 UR	0.5 UR	0.5 UR	0.5 UR	5 UR	10 UR
ACRYLONITRILE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
BENZENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
BROMODICHLOROMETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
BROMOFORM	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
BROMOMETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
CARBON DISULFIDE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
CARBON TETRACHLORIDE	14	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
CHLOROBENZENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
CHLORODIBROMOMETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
CHLOROETHANE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
CHLOROFORM	4.7	0.3 U	120 U	0.8 J	2.3	0.3 U	3 U	6 U
CHLOROMETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
CHLOROPRENE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
CIS-1,2-DICHLOROETHENE	0.3 U	0.3 U	4600	0.3 U	0.3 U	1.5	290	320
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
DIBROMOMETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
DICHLORODIFLUOROMETHANE	0.3 UJ	0.3 UJ	120 UJ	0.3 UJ	0.3 UJ	0.3 UJ	3 UJ	6 UJ
ETHANE	0.016 J	0.004 J	1.5	0.044	0.054	0.03	0.74	0.66
ETHENE	0.052	0.016 J	22	0.079	0.036	0.1	0.2	0.19
ETHYL METHACRYLATE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
ETHYLBENZENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
METHACRYLONITRILE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
METHANE	0.42	0.25	260	0.64	0.62	170	95	88
METHYL IODIDE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
METHYL METHACRYLATE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
METHYL TERT-BUTYL ETHER	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
METHYLENE CHLORIDE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U

SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN UPPER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MW03 16GW0306 NORMAL 8/13/2005	16MWT04 16GWT0406 NORMAL 8/13/2005	16MWT06 16GWT0607 NORMAL 8/12/2005	16MWT09 16GWT0905 NORMAL 8/14/2005	16MWT10 16GWT1005 NORMAL 8/13/2005	16MWT13 16GWT1305 NORMAL 8/14/2005	16MWT17 16GWT1705 ORIG 8/14/2005	16MWT17 16GWT1705-D DUP 8/14/2005
STYRENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
TETRACHLOROETHENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
TOLUENE	0.3 U	0.3 U	290 J	0.3 U	0.3 U	0.3 U	3 U	6 U
TOTAL XYLENES	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
TRANS-1,2-DICHLOROETHENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
TRANS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
TRICHLOROETHENE	4.8	3.7	480000	9.1	1.4	130	19000	20000
TRICHLOROFLUOROMETHANE	0.3 U	0.3 U	120 U	0.3 U	0.3 U	0.3 U	3 U	6 U
VINYL ACETATE	0.5 U	0.5 U	200 U	0.5 U	0.5 U	0.5 U	5 U	10 U
VINYL CHLORIDE	0.3 U	0.3 U	350 J	0.3 U	0.3 U	0.3 U	3 U	6 U
Energetics (ug/L)								
1,3,5-TRINITROBENZENE	0.25 U	0.28 U	1.9	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
1,3-DINITROBENZENE	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
2,4,6-TRINITROTOLUENE	0.25 U	0.28 U	4.1	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
2,4-DIAMINO-6-NITROTOLUENE	0.25 U	0.28 U	1.3	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
2,4-DINITROTOLUENE	0.25 U	0.28 U	0.68	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
2,6-DIAMINO-4-NITROTOLUENE	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
2,6-DINITROTOLUENE	0.25 U	0.28 U	0.52 J	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
2-AMINO-4,6-DINITROTOLUENE	0.41 J	0.34 J	28 J	0.27 J	0.27 U	0.29 U	0.27 U	0.27 U
2-NITROTOLUENE	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
3,5-DINITROANILINE	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.56
3-NITROTOLUENE	0.25 U	0.28 U	0.28 U	1.1 J	0.34 J	0.29 U	0.27 U	0.27 U
4,4'-TN-AZOXY	0.5 U	0.55 U	0.56 U	0.52 U	0.54 U	0.59 U	0.53 U	0.54 U
4-AMINO-2,6-DINITROTOLUENE	0.72	0.75	13	0.68	0.47 J	0.29 U	0.27 U	0.27 U
4-NITROTOLUENE	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
DNX	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
HMX	5.4	8.8	1.6	11	5.8	0.29 U	0.27 U	0.29 J
MNX	0.32 J	2.5	0.33 J	0.46 J	0.27 U	0.29 U	0.27 U	0.27 U
NITROBENZENE	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
RDX	51	130	13	100	58	0.29 U	4.5	5.7
TETRYL	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
TNX	0.25 U	0.28 U	0.28 U	0.26 U	0.27 U	0.29 U	0.27 U	0.27 U
Field Parameters								
DISSOLVED OXYGEN - METER (mg/L)	1.5	2.02	3.06	1.09	220	0.41	20.43	20.43
PH (S.U.)	5	6.1	6	4.11	3	6.82	6.31	6.31
SPECIFIC CONDUCTANCE (MS/CM)	339	0.168	862	522	854	0.234	0.658	0.658
TEMPERATURE (C)	17.14	19.6	20.27	17.77	17.85	21.63	18.29	18.29
TURBIDITY (NTU)	8.4	0.7	5.2	0	6.9	5.8	2.5	2.5
Miscellaneous Parameters (mg/L)								
CHLORIDE	4	7	58	12	7	23	120	130
NITRITE/NITRATE-N	0.36	0.025 U	0.025 U	0.025 U	0.27	0.025 U	0.025 U	0.025 U
SULFATE	200	24	490	240	880	37	260	270
TOTAL ORGANIC CARBON	1.2	2.6	4.1	1	1.7	1.3	1.7	1.6

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN MIDDLE ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MW04 16GW0406 NORMAL 8/13/2005	16MWT12 16GWT1205 NORMAL 8/13/2005
Volatile Organics (ug/L)		
1,1,1,2-TETRACHLOROETHANE	0.3 U	0.3 U
1,1,1-TRICHLOROETHANE	0.3 U	0.3 U
1,1,2,2-TETRACHLOROETHANE	0.3 U	0.3 U
1,1,2-TRICHLOROETHANE	0.3 U	0.3 U
1,1-DICHLOROETHANE	0.3 U	0.3 U
1,1-DICHLOROETHENE	0.3 U	0.3 U
1,2,3-TRICHLOROPROPANE	0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U	0.3 U
1,2-DIBROMOETHANE	0.3 U	0.3 U
1,2-DICHLOROETHANE	0.3 U	0.3 U
1,2-DICHLOROPROPANE	0.3 U	0.3 U
2-BUTANONE	0.5 U	0.5 U
2-HEXANONE	0.5 U	0.5 U
3-CHLOROPROPENE	0.5 U	0.5 U
4-METHYL-2-PENTANONE	0.5 U	0.5 U
ACETONE	0.5 U	0.5 U
ACROLEIN	0.5 UR	0.5 UR
ACRYLONITRILE	0.5 U	0.5 U
BENZENE	0.3 U	0.3 U
BROMODICHLOROMETHANE	0.3 U	0.3 U
BROMOFORM	0.3 U	0.3 U
BROMOMETHANE	0.3 U	0.3 U
CARBON DISULFIDE	0.3 U	0.3 U
CARBON TETRACHLORIDE	0.3 U	0.3 U
CHLOROBENZENE	0.3 U	0.3 U
CHLORODIBROMOMETHANE	0.3 U	0.3 U
CHLOROETHANE	0.5 U	0.5 U
CHLOROFORM	0.3 U	0.3 U
CHLOROMETHANE	0.3 U	0.3 U
CHLOROPRENE	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.3 U	0.3 U
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U
DIBROMOMETHANE	0.3 U	0.3 U
DICHLORODIFLUOROMETHANE	0.3 UJ	0.3 UJ
ETHANE	0.01 J	0.13
ETHENE	0.018 J	0.028
ETHYL METHACRYLATE	0.5 U	0.5 U
ETHYLBENZENE	0.3 U	0.3 U
METHACRYLONITRILE	0.3 U	0.3 U
METHANE	0.34	0.88
METHYL IODIDE	0.5 U	0.5 U
METHYL METHACRYLATE	0.5 U	0.5 U
METHYL TERT-BUTYL ETHER	0.5 U	0.5 U
METHYLENE CHLORIDE	0.3 U	0.3 U
STYRENE	0.3 U	0.3 U
TETRACHLOROETHENE	0.3 U	0.3 U
TOLUENE	0.3 U	0.3 U
TOTAL XYLENES	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	0.3 U	0.3 U
TRANS-1,3-DICHLOROPROPENE	0.3 U	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U	0.5 U
TRICHLOROETHENE	0.9 J	0.3 U
TRICHLOROFLUOROMETHANE	0.3 U	0.3 U
VINYL ACETATE	0.5 U	0.5 U
VINYL CHLORIDE	0.3 U	0.3 U
Energetics (ug/L)		
1,3,5-TRINITROBENZENE	0.25 U	0.26 U
1,3-DINITROBENZENE	0.25 U	0.26 U

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN MIDDLE ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MW04 16GW0406 NORMAL 8/13/2005	16MWT12 16GWT1205 NORMAL 8/13/2005
2,4,6-TRINITROTOLUENE	0.25 U	0.26 U
2,4-DIAMINO-6-NITROTOLUENE	0.25 U	0.26 U
2,4-DINITROTOLUENE	0.25 U	0.26 U
2,6-DIAMINO-4-NITROTOLUENE	0.25 U	0.26 U
2,6-DINITROTOLUENE	0.25 U	0.26 U
2-AMINO-4,6-DINITROTOLUENE	0.25 U	0.26 U
2-NITROTOLUENE	0.25 U	0.26 U
3,5-DINITROANILINE	0.25 U	0.26 U
3-NITROTOLUENE	0.25 U	0.26 U
4,4'-TN-AZOXY	0.5 U	0.51 U
4-AMINO-2,6-DINITROTOLUENE	0.25 U	0.26 U
4-NITROTOLUENE	0.25 U	0.26 U
DNX	0.25 U	0.26 U
HMX	0.25 U	0.26 U
MNX	0.25 U	0.26 U
NITROBENZENE	0.25 U	0.26 U
RDX	0.64	0.26 U
TETRYL	0.25 U	0.26 U
TNX	0.25 U	0.26 U
Field Parameters		
DISSOLVED OXYGEN - METER (mg/L)	2.01	0.36
PH (S.U.)	3.33	6.68
SPECIFIC CONDUCTANCE (MS/CM)	0.703	1.165
TEMPERATURE (C)	15.79	16.75
TURBIDITY (NTU)	0.5	0
Miscellaneous Parameters (ug/L)		
CHLORIDE	14	13
NITRITE/NITRATE-N	0.025 U	0.025 U
SULFATE	650	980
TOTAL ORGANIC CARBON	1	1

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MWT11 16GWT1105 NORMAL 8/12/2005	16MWT15 16GWT1505 NORMAL 8/14/2005
Volatile Organics (ug/L)		
1,1,1,2-TETRACHLOROETHANE	0.3 U	0.3 U
1,1,1-TRICHLOROETHANE	0.3 U	0.3 U
1,1,2,2-TETRACHLOROETHANE	0.3 U	0.3 U
1,1,2-TRICHLOROETHANE	0.3 U	0.3 U
1,1-DICHLOROETHANE	0.3 U	0.3 U
1,1-DICHLOROETHENE	0.3 U	0.3 U
1,2,3-TRICHLOROPROPANE	0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U	0.3 U
1,2-DIBROMOETHANE	0.3 U	0.3 U
1,2-DICHLOROETHANE	0.3 U	0.3 U
1,2-DICHLOROPROPANE	0.3 U	0.3 U
2-BUTANONE	0.5 U	0.5 U
2-HEXANONE	0.5 U	0.5 U
3-CHLOROPROPENE	0.5 U	0.5 U
4-METHYL-2-PENTANONE	0.5 U	0.5 U
ACETONE	0.5 U	0.5 UJ
ACROLEIN	0.5 UR	0.5 UR
ACRYLONITRILE	0.5 U	0.5 U
BENZENE	0.3 U	0.3 U
BROMODICHLOROMETHANE	0.3 U	0.3 U
BROMOFORM	0.3 U	0.3 U
BROMOMETHANE	0.3 U	0.3 U
CARBON DISULFIDE	0.3 U	0.3 U
CARBON TETRACHLORIDE	0.3 U	0.3 U
CHLOROBENZENE	0.3 U	0.3 U
CHLORODIBROMOMETHANE	0.3 U	0.3 U
CHLOROETHANE	0.5 U	0.5 U
CHLOROFORM	0.3 U	0.3 U
CHLOROMETHANE	0.3 U	0.3 U
CHLOROPRENE	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.3 U	0.3 U
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U
DIBROMOMETHANE	0.3 U	0.3 U
DICHLORODIFLUOROMETHANE	0.3 UJ	0.3 UJ
ETHANE	0.44	0.99
ETHENE	0.074	0.41
ETHYL METHACRYLATE	0.5 U	0.5 U
ETHYLBENZENE	0.3 U	0.3 U
METHACRYLONITRILE	0.3 U	0.3 U
METHANE	1700	5400
METHYL IODIDE	0.5 U	0.5 U
METHYL METHACRYLATE	0.5 U	0.5 U
METHYL TERT-BUTYL ETHER	0.5 U	0.5 U
METHYLENE CHLORIDE	0.3 U	0.3 U
STYRENE	0.3 U	0.3 U
TETRACHLOROETHENE	0.3 U	0.3 U
TOLUENE	0.3 U	0.3 U
TOTAL XYLENES	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	0.3 U	0.3 U
TRANS-1,3-DICHLOROPROPENE	0.3 U	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U	0.5 U
TRICHLOROETHENE	0.3 U	0.3 U
TRICHLOROFLUOROMETHANE	0.3 U	0.3 U
VINYL ACETATE	0.5 U	0.5 U
VINYL CHLORIDE	0.3 U	0.3 U
Energetics (ug/L)		
1,3,5-TRINITROBENZENE	0.29 U	0.26 U

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 6 GROUNDWATER SAMPLES - PENNSYLVANIAN LOWER ZONE
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16MWT11 16GWT1105 NORMAL 8/12/2005	16MWT15 16GWT1505 NORMAL 8/14/2005
1,3-DINITROBENZENE	0.29 U	0.26 U
2,4,6-TRINITROTOLUENE	0.29 U	0.26 U
2,4-DIAMINO-6-NITROTOLUENE	0.29 U	0.26 U
2,4-DINITROTOLUENE	0.29 U	0.26 U
2,6-DIAMINO-4-NITROTOLUENE	0.29 U	0.26 U
2,6-DINITROTOLUENE	0.29 U	0.26 U
2-AMINO-4,6-DINITROTOLUENE	0.29 U	0.26 U
2-NITROTOLUENE	0.29 U	0.26 U
3,5-DINITROANILINE	0.29 U	0.26 U
3-NITROTOLUENE	0.29 U	0.26 U
4,4'-TN-AZOXY	0.59 U	0.52 U
4-AMINO-2,6-DINITROTOLUENE	0.29 U	0.26 U
4-NITROTOLUENE	0.29 U	0.26 U
DNX	0.29 U	0.26 U
HMX	0.29 U	0.26 U
MNX	0.29 U	0.26 U
NITROBENZENE	0.29 U	0.26 U
RDX	0.29 U	0.26 U
TETRYL	0.29 U	0.26 U
TNX	0.29 U	0.26 U
Field Parameters		
DISSOLVED OXYGEN - METER (mg/L)		1.09
PH (S.U.)		6.95
SPECIFIC CONDUCTANCE (MS/CM)		0.326
TEMPERATURE (C)		19.23
TURBIDITY (NTU)		0.65
Miscellaneous Parameters (ug/L)		
CHLORIDE	5	2
NITRITE/NITRATE-N	0.025 U	0.025 U
SULFATE	4	0.5 U
TOTAL ORGANIC CARBON	1 U	1 U

APPENDIX D.2.1

SMWU 16

SURFACE WATER ANALYTICAL DATA

ROUND 5

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 SURFACE WATER SAMPLES
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

Location Sample Number Sample Code Sample Date	16SW/SD10 16SW1003 NORMAL 5/8/2005	16SW/SD12 16SW1204 NORMAL 5/8/2005	16SW/SD13 16SW1304 NORMAL 5/8/2005	16SW/SD30 16SW3003 ORIG 5/8/2005	16SW/SD30 16SW3003-D DUP 5/8/2005
Volatile Organics (ug/L)					
1,1,1,2-TETRACHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1,1-TRICHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1,2,2-TETRACHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1,2-TRICHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,1-DICHLOROETHENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2,3-TRICHLOROPROPANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-DIBROMO-3-CHLOROPROPANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-DIBROMOETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-DICHLOROETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
1,2-DICHLOROPROPANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
2-BUTANONE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-HEXANONE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
3-CHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-METHYL-2-PENTANONE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ACETONE	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
ACROLEIN	0.5 UR	0.5 UR	0.5 UR	0.5 UR	0.5 UR
ACRYLONITRILE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BENZENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
BROMODICHLOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
BROMOFORM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
BROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CARBON DISULFIDE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CARBON TETRACHLORIDE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROBENZENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLORODIBROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROFORM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROPRENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
DIBROMOMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
DICHLORODIFLUOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
ETHYL METHACRYLATE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
METHACRYLONITRILE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
METHYL IODIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYL METHACRYLATE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	0.3 UJ	0.3 U	0.3 UJ	0.3 UJ	0.3 UJ
STYRENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TETRACHLOROETHENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOLUENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TOTAL XYLENES	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,2-DICHLOROETHENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
TRANS-1,4-DICHLORO-2-BUTENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.3 U	6.7	0.3 U	0.3 U	0.3 U
TRICHLOROFLUOROMETHANE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
VINYL ACETATE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Energetics (ug/L)					
1,3,5-TRINITROBENZENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
1,3-DINITROBENZENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
2,4,6-TRINITROTOLUENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
2,4-DINITROTOLUENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
2,6-DINITROTOLUENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
2-AMINO-4,6-DINITROTOLUENE	0.25 U	0.25 U	0.245 U	0.39 J	0.38 J
2-NITROTOLUENE	0.6	0.25 U	0.245 U	0.25 U	0.24 U

TABLE
SUMMARY OF ANALYTIC RESULTS
ROUND 5 SURFACE WATER SAMPLES
SITE 16 (CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR)
NWSC CRANE
CRANE, INDIANA

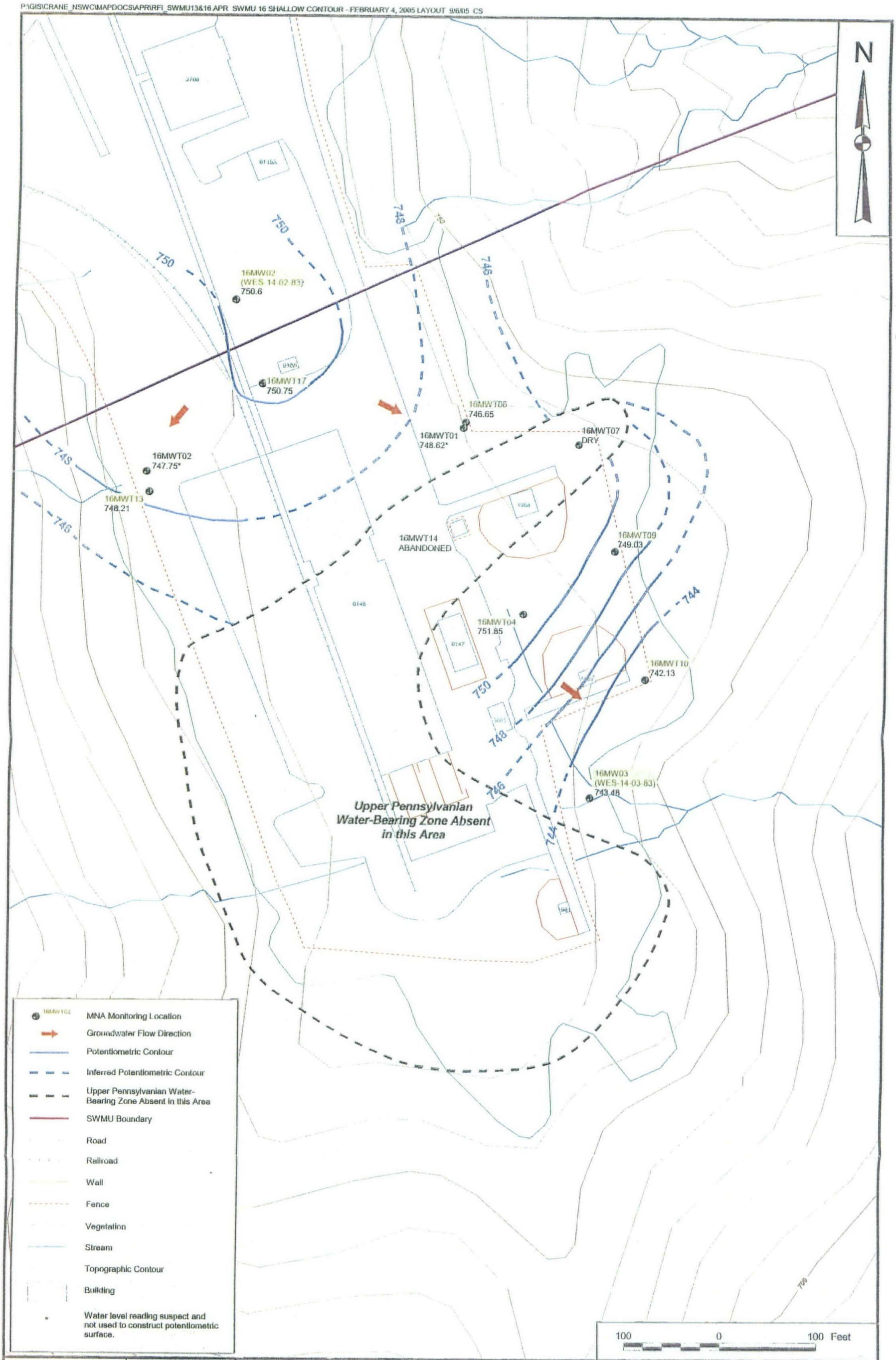
Location Sample Number Sample Code Sample Date	16SW/SD10 16SW1003 NORMAL 5/8/2005	16SW/SD12 16SW1204 NORMAL 5/8/2005	16SW/SD13 16SW1304 NORMAL 5/8/2005	16SW/SD30 16SW3003 ORIG 5/8/2005	16SW/SD30 16SW3003-D DUP 5/8/2005
3-NITROTOLUENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
4-AMINO-2,6-DINITROTOLUENE	0.25 U	0.25 U	0.245 U	0.76	0.75
4-NITROTOLUENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
HMX	0.25 U	0.25 U	0.245 U	4.4	4.2
NITROBENZENE	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
RDX	0.25 U	0.25 U	0.245 U	13	13
TETRYL	0.25 U	0.25 U	0.245 U	0.25 U	0.24 U
Field Parameters					
DISSOLVED OXYGEN - METER (mg/L)	10.04	10.49	8.45	10.44	
OXIDATION REDUCTION POTENTIAL (MV)	213	211	203	207	
PH (S.U.)	6.96	6.76	6.48	7.07	
SPECIFIC CONDUCTANCE (MS/CM)	0.135	0.164	0.166	0.133	
TEMPERATURE (C)	13.71	13.92	12.66	14.56	
TURBIDITY (NTU)	1.5	3.5	3.3	9	

APPENDIX E

POTENTIOMETRIC SURFACE MAPS

ROUND 4

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16.APR SWMU 16 SHALLOW CONTOUR - FEBRUARY 4, 2005 LAYOUT 9/6/05 CS



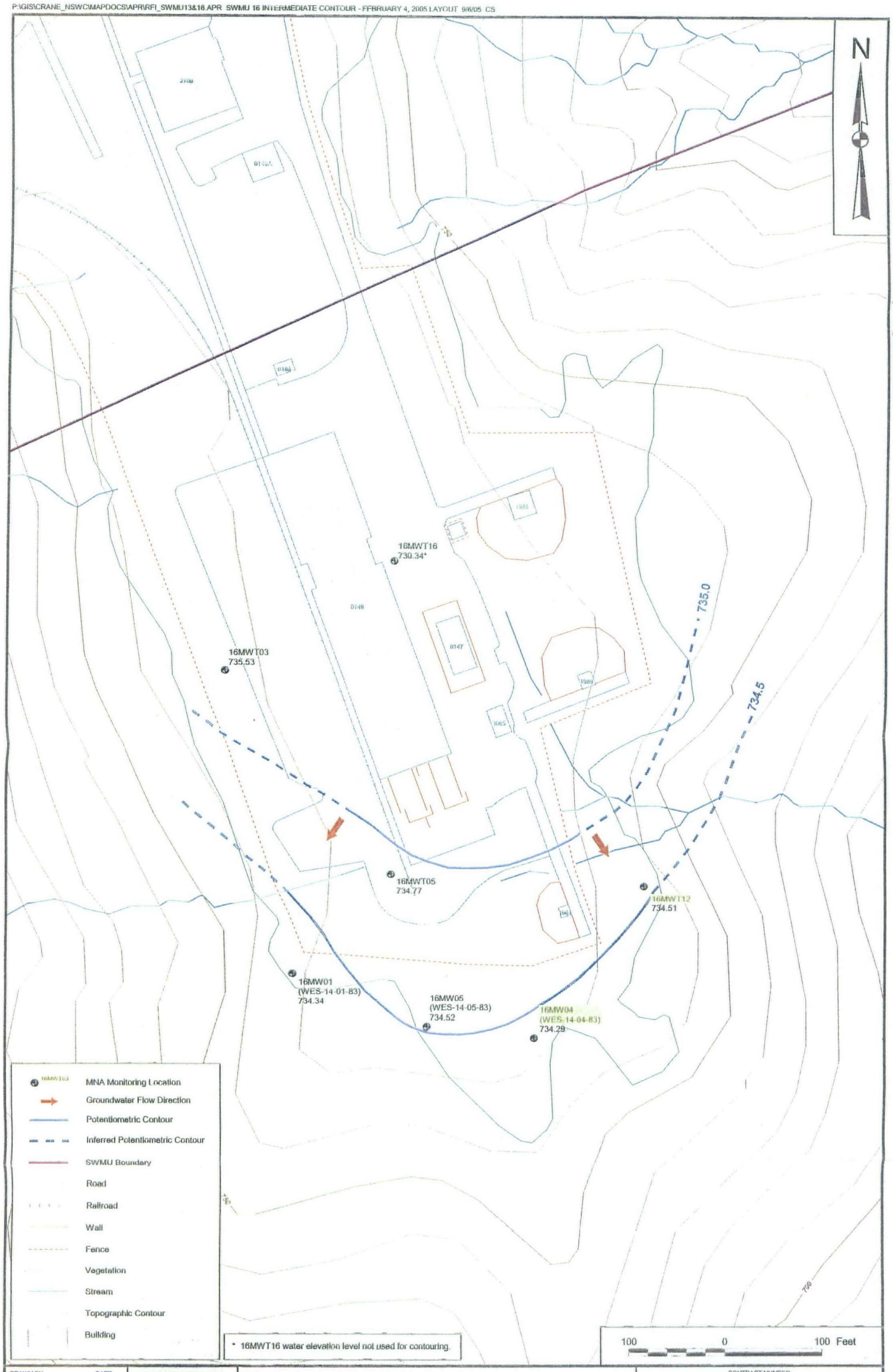
DRAWN BY	DATE
A. JANOCHA	8/21/05
CHECKED BY	DATE
J. LUCAS	8/31/05
COST/SCHEDULE AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
UPPER PENNSYLVANIAN WATER-BEARING ZONE - FEBRUARY 4, 2005 (ROUND 4)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
7448	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV
FIGURE 4 - 1	0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16.APR SWMU 16 INTERMEDIATE CONTOUR - FEBRUARY 4, 2005 LAYOUT 9/6/05 CS



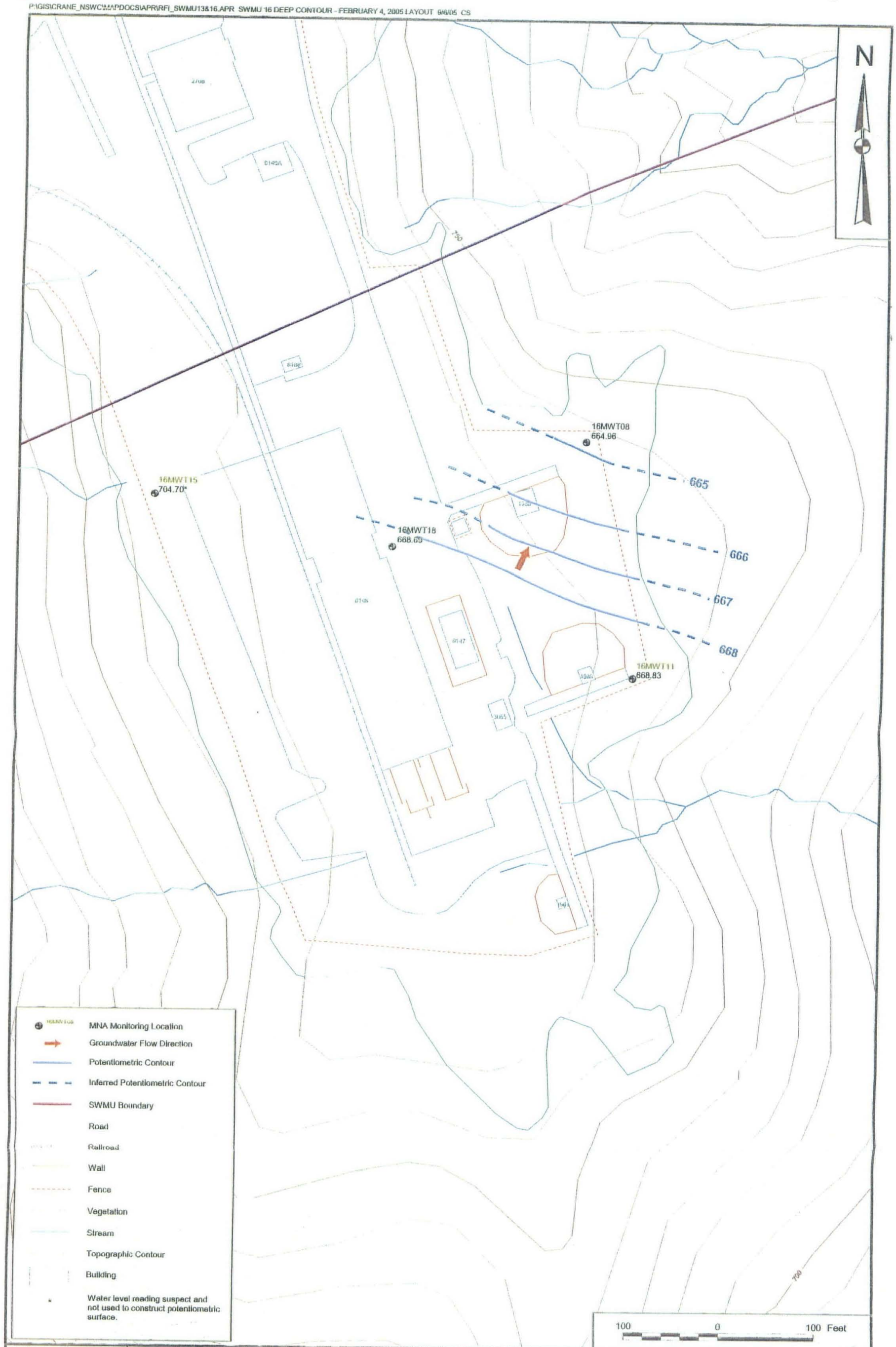
DRAWN BY	DATE
A. JANOCHA	8/21/05
CHECKED BY	DATE
J. LUCAS	8/31/05
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

NAVFAC

POTENTIOMETRIC SURFACE MAP FOR
MIDDLE PENNSYLVANIAN WATER-BEARING ZONE - FEBRUARY 4, 2005 (ROUND 4)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR
NSWC CRANE
CRANE, INDIANA

CONTRACT NUMBER	
7448	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV
FIGURE 4 - 2	0

P:\GIS\CRANE_NSWC\MAPDOCS\APR\RFI_SWMU13&16.APR SWMU 16 DEEP CONTOUR - FEBRUARY 4, 2005 LAYOUT 9/6/05 CS



DRAWN BY A. JANOCHA	DATE 8/21/05	POTENTIOMETRIC SURFACE MAP FOR LOWER PENNSYLVANIAN WATER-BEARING UNIT - FEBRUARY 4, 2005 (ROUND 4) SWMU 16 - CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSWC CRANE CRANE, INDIANA	CONTRACT NUMBER 7448
CHECKED BY J. LUCAS	DATE 8/31/05		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 4 - 3 REV 0