N00164.AR.000659
NSWC CRANE
5090.3a

Volume 1
Monitoring Event No. 2
1st Quarter 1999
Ammunition Burning Grounds

Attachments 1 through 17

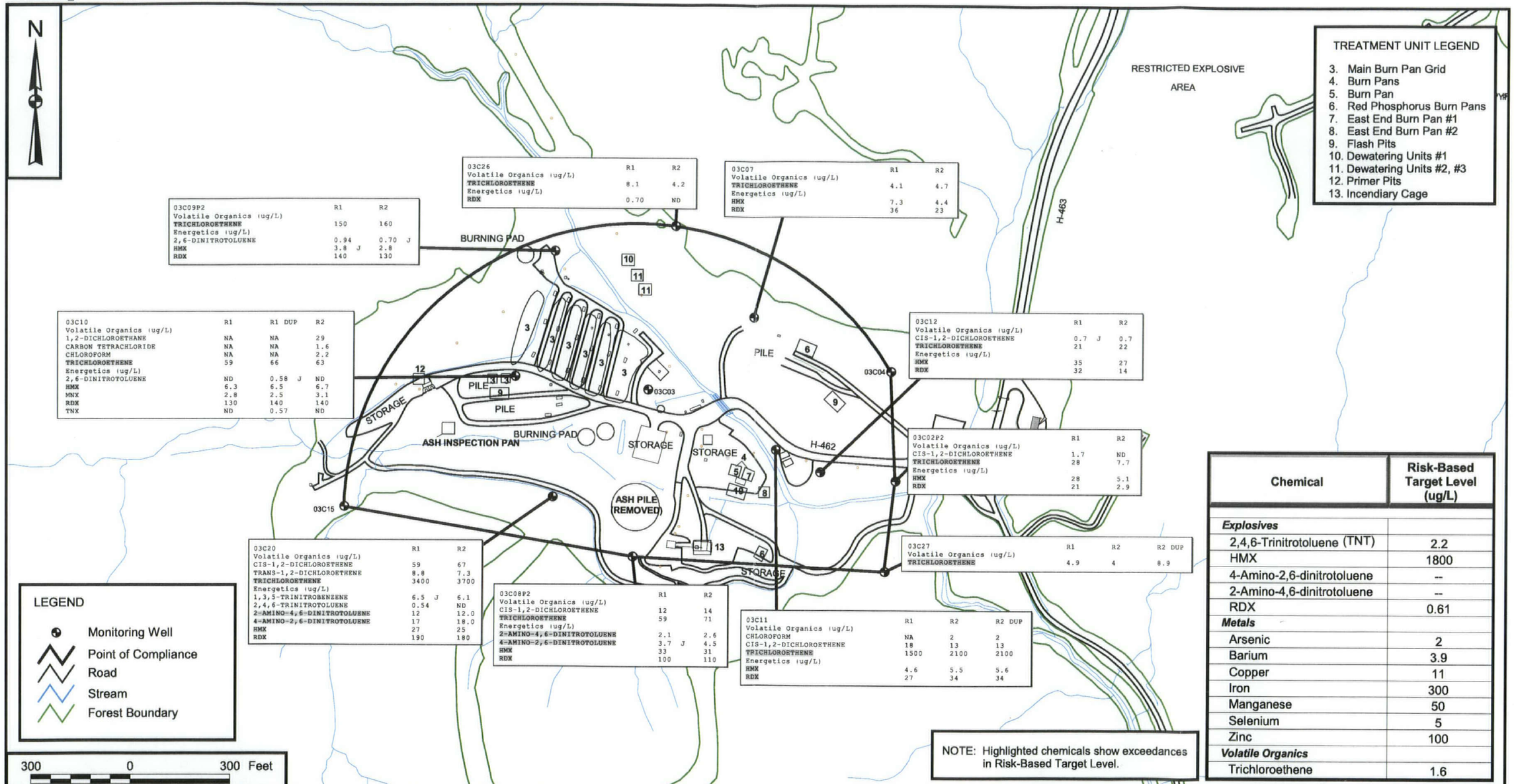
Naval Surface Warfare Center
Crane Division
Crane, Indiana

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888
Contract Task Order 0038

July 2001

P:\GIS\NSWC_CRANE\7651.APR ABG PROPER-POSITIVE DETECTIONS FOR ORGANICS AND EXPLOSIVES 7/23/99 JAL



TREATMENT UNIT LEGEND

3. Main Burn Pan Grid
4. Burn Pans
5. Burn Pan
6. Red Phosphorus Burn Pans
7. East End Burn Pan #1
8. East End Burn Pan #2
9. Flash Pits
10. Dewatering Units #1
11. Dewatering Units #2, #3
12. Primer Pits
13. Incendiary Cage

Chemical	Risk-Based Target Level (ug/L)
Explosives	
2,4,6-Trinitrotoluene (TNT)	2.2
HMX	1800
4-Amino-2,6-dinitrotoluene	--
2-Amino-4,6-dinitrotoluene	--
RDX	0.61
Metals	
Arsenic	2
Barium	3.9
Copper	11
Iron	300
Manganese	50
Selenium	5
Zinc	100
Volatile Organics	
Trichloroethene	1.6

NOTE: Highlighted chemicals show exceedances in Risk-Based Target Level.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY J. LAMEY DATE 7/22/99
CHECKED BY DATE
COST/SCHEDULE-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

AMMUNITION BURNING GROUND PROPER
POSITIVE DETECTIONS
ORGANICS AND ENERGETICS
MONITORING EVENTS 1 & 2
NSWC CRANE, INDIANA

CONTRACT NUMBER N7640
OWNER NUMBER
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO.
REV 0

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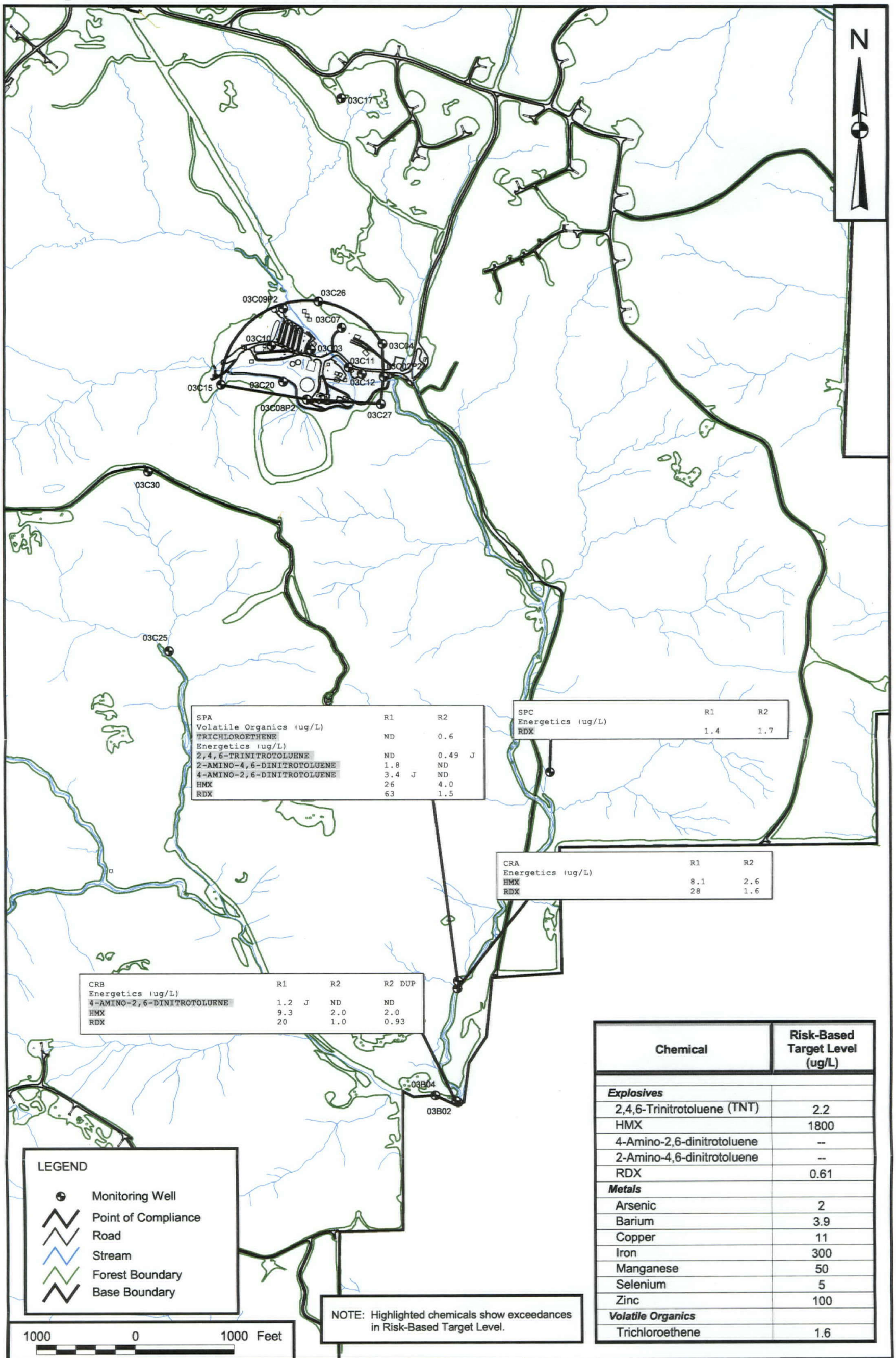

NOTE: Highlighted chemicals show exceedances in Risk-Based Target Level.

Chemical	Risk-Based Target Level (ug/L)
Explosives	
2,4,6-Trinitrotoluene (TNT)	2.2
HMX	1800
4-Amino-2,6-dinitrotoluene	--
2-Amino-4,6-dinitrotoluene	--
RDX	0.61
Metals	
Arsenic	2
Barium	3.9
Copper	11
Iron	300
Manganese	50
Selenium	5
Zinc	100
Volatile Organics	
Trichloroethene	1.6

DRAWN BY J. LAMEY	DATE 7/22/99	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7640 / OWNER NUMBER —
CHECKED BY	DATE	AMMUNITION BURNING GROUND POSITIVE DETECTIONS ORGANICS AND ENERGETICS MONITORING EVENTS 1 & 2 NSWC CRANE, INDIANA	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. — / REV 0

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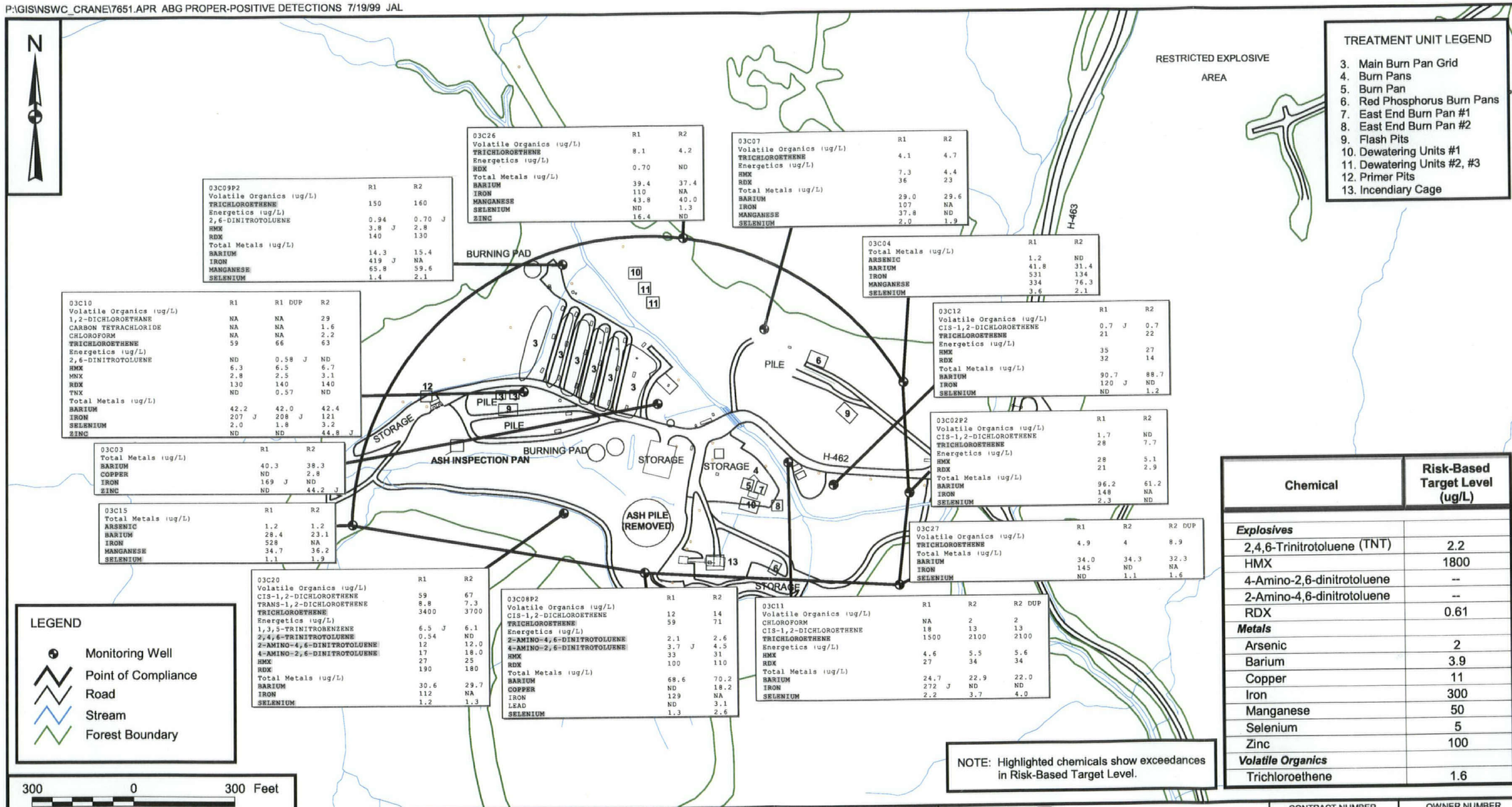

03C09P2	R1	R2
Volatile Organics (ug/L)		
TRICHLOROETHENE	150	160
Energetics (ug/L)		
2,6-DINITROTOLUENE	0.94	0.70 J
HMX	3.8 J	2.8
RDX	140	130
Total Metals (ug/L)		
BARIUM	14.3	15.4
IRON	419 J	NA
MANGANESE	65.8	59.6
SELENIUM	1.4	2.1

03C26	R1	R2
Volatile Organics (ug/L)		
TRICHLOROETHENE	8.1	4.2
Energetics (ug/L)		
RDX	0.70	ND
Total Metals (ug/L)		
BARIUM	39.4	37.4
IRON	110	NA
MANGANESE	43.8	40.0
SELENIUM	ND	1.3
ZINC	16.4	ND

03C07	R1	R2
Volatile Organics (ug/L)		
TRICHLOROETHENE	4.1	4.7
Energetics (ug/L)		
HMX	7.3	4.4
RDX	36	23
Total Metals (ug/L)		
BARIUM	29.0	29.6
IRON	107	NA
MANGANESE	37.8	ND
SELENIUM	2.0	1.9

03C04	R1	R2
Total Metals (ug/L)		
ARSENIC	1.2	ND
BARIUM	41.8	31.4
IRON	531	134
MANGANESE	334	76.3
SELENIUM	3.6	2.1

03C10	R1	R1 DUP	R2
Volatile Organics (ug/L)			
1,2-DICHLOROETHANE	NA	NA	29
CARBON TETRACHLORIDE	NA	NA	1.6
CHLOROFORM	NA	NA	2.2
TRICHLOROETHENE	59	66	63
Energetics (ug/L)			
2,6-DINITROTOLUENE	ND	0.58 J	ND
HMX	6.3	6.5	6.7
MNX	2.8	2.5	3.1
RDX	130	140	140
TNX	ND	0.57	ND
Total Metals (ug/L)			
BARIUM	42.2	42.0	42.4
IRON	207 J	208 J	121
SELENIUM	2.0	1.8	3.2
ZINC	ND	ND	44.8 J

03C12	R1	R2
Volatile Organics (ug/L)		
CIS-1,2-DICHLOROETHENE	0.7 J	0.7
TRICHLOROETHENE	21	22
Energetics (ug/L)		
HMX	35	27
RDX	32	14
Total Metals (ug/L)		
BARIUM	90.7	88.7
IRON	120 J	ND
SELENIUM	ND	1.2

03C02P2	R1	R2
Volatile Organics (ug/L)		
CIS-1,2-DICHLOROETHENE	1.7	ND
TRICHLOROETHENE	28	7.7
Energetics (ug/L)		
HMX	28	5.1
RDX	21	2.9
Total Metals (ug/L)		
BARIUM	96.2	61.2
IRON	148	NA
SELENIUM	2.3	ND

03C03	R1	R2
Total Metals (ug/L)		
BARIUM	40.3	38.3
COPPER	ND	2.8
IRON	169 J	ND
ZINC	ND	44.2 J

03C15	R1	R2
Total Metals (ug/L)		
ARSENIC	1.2	1.2
BARIUM	28.4	23.1
IRON	528	NA
MANGANESE	34.7	36.2
SELENIUM	1.1	1.9

03C27	R1	R2	R2 DUP
Volatile Organics (ug/L)			
TRICHLOROETHENE	4.9	4	8.9
Total Metals (ug/L)			
BARIUM	34.0	34.3	32.3
IRON	145	ND	NA
SELENIUM	ND	1.1	1.6

03C20	R1	R2
Volatile Organics (ug/L)		
CIS-1,2-DICHLOROETHENE	59	67
TRANS-1,2-DICHLOROETHENE	8.8	7.3
TRICHLOROETHENE	3400	3700
Energetics (ug/L)		
1,3,5-TRINITROBENZENE	6.5 J	6.1
2,4,6-TRINITROTOLUENE	0.54	ND
2-AMINO-4,6-DINITROTOLUENE	12	12.0
4-AMINO-2,6-DINITROTOLUENE	17	18.0
HMX	27	25
RDX	190	180
Total Metals (ug/L)		
BARIUM	30.6	29.7
IRON	112	NA
SELENIUM	1.2	1.3

03C08P2	R1	R2
Volatile Organics (ug/L)		
CIS-1,2-DICHLOROETHENE	12	14
TRICHLOROETHENE	59	71
Energetics (ug/L)		
2-AMINO-4,6-DINITROTOLUENE	2.1	2.6
4-AMINO-2,6-DINITROTOLUENE	3.7 J	4.5
HMX	33	31
RDX	100	110
Total Metals (ug/L)		
BARIUM	68.6	70.2
COPPER	ND	18.2
IRON	129	NA
LEAD	ND	3.1
SELENIUM	1.3	2.6

03C11	R1	R2	R2 DUP
Volatile Organics (ug/L)			
CHLOROFORM	NA	2	2
CIS-1,2-DICHLOROETHENE	18	13	13
TRICHLOROETHENE	1500	2100	2100
Energetics (ug/L)			
HMX	4.6	5.5	5.6
RDX	27	34	34
Total Metals (ug/L)			
BARIUM	24.7	22.9	22.0
IRON	272 J	ND	ND
SELENIUM	2.2	3.7	4.0

TREATMENT UNIT LEGEND

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LEGEND

- Monitoring Well
- Point of Compliance
- Road
- Stream
- Forest Boundary

300 0 300 Feet

Chemical	Risk-Based Target Level (ug/L)
Explosives	
2,4,6-Trinitrotoluene (TNT)	2.2
HMX	1800
4-Amino-2,6-dinitrotoluene	--
2-Amino-4,6-dinitrotoluene	--
RDX	0.61
Metals	
Arsenic	2
Barium	3.9
Copper	11
Iron	300
Manganese	50
Selenium	5
Zinc	100
Volatile Organics	
Trichloroethene	1.6

NOTE: Highlighted chemicals show exceedances in Risk-Based Target Level.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY J. LAMEY DATE 7/19/99
CHECKED BY DATE
COST/SCHEDULE-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

AMMUNITION BURNING GROUND PROPER
POSITIVE DETECTIONS
MONITORING EVENTS 1 & 2
NSWC CRANE, INDIANA

CONTRACT NUMBER N7640
OWNER NUMBER
APPROVED BY DATE
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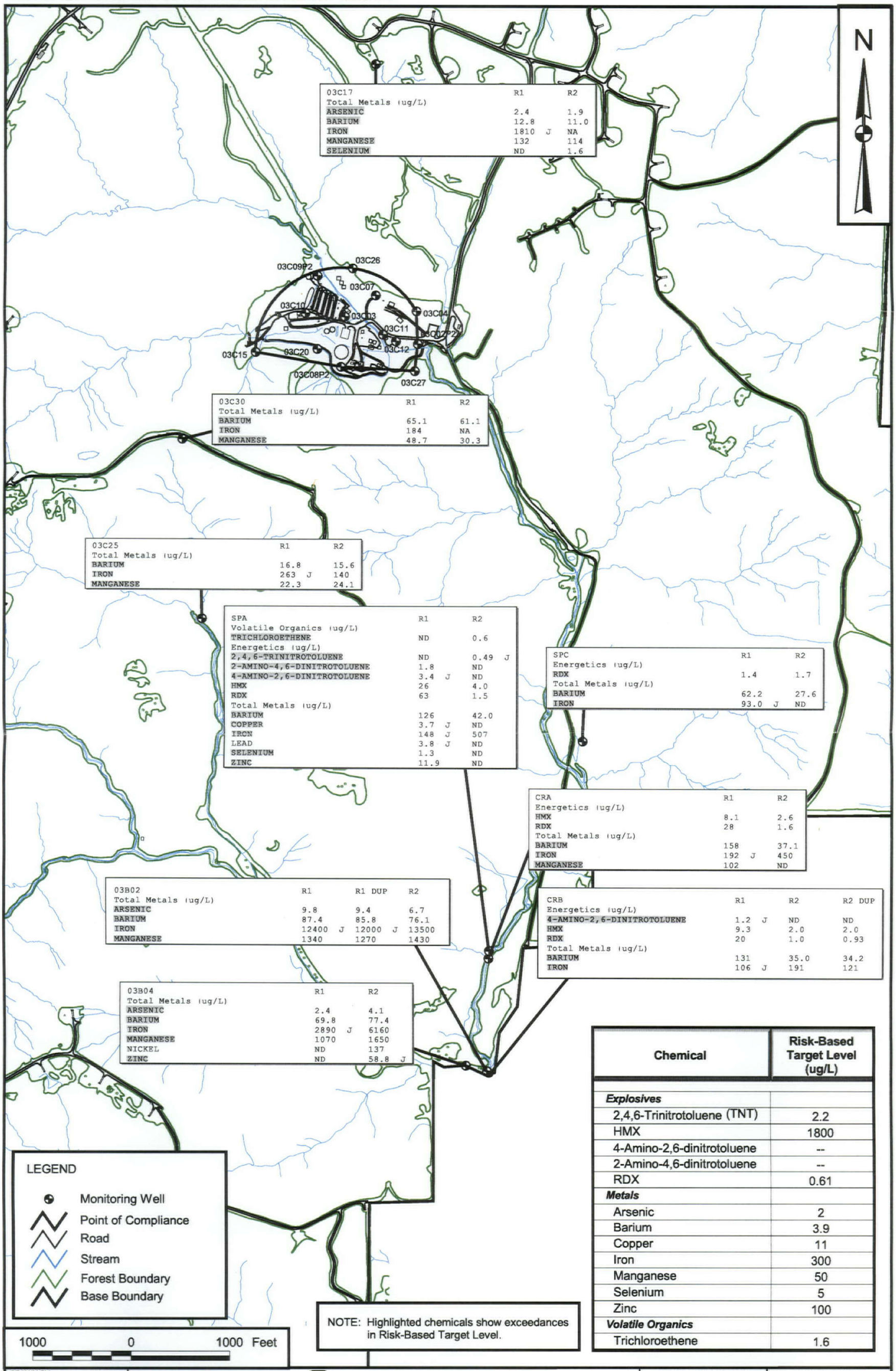
REV 0

P:\GIS\NSWC_CRANE\7651.APR ABG-POSITIVE DETECTIONS LAYOUT 7/20/99 JAL



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Manganese	50
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Volatile Organics	
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DRAWN BY J. LAMEY	DATE 7/19/99	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7640 / OWNER NUMBER —
CHECKED BY —	DATE —	AMMUNITION BURNING GROUND POSITIVE DETECTIONS MONITORING EVENTS 1 & 2 NSWC CRANE, INDIANA	APPROVED BY — / DATE —
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SCALE AS NOTED			DRAWING NO. — / REV 0

010019/P

MONITORING EVENT NO. 2
1st QUARTER 1999
AMMUNTION BURNING GROUNDS

NAVAL SURFACE WARFARE CENTER, CRANE DIVISION
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:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0038

JULY 2001

PREPARED UNDER THE SUPERVISION OF:

Ralph Basinski Date 7/10/01
RALPH BASINSKI
TASK ORDER MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMITTAL BY:

Debbie Wroblewski Date 7/10/01
DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

TETRA TECH NUS, INC.
661 Andersen Drive ▪ Pittsburgh, Pennsylvania 15220-2745
(412) 921-7090 ▪ FAX (412) 921-4040 ▪ www.tetratech.com

PITT 07-9-071

July 12, 1999

Project Number 7651

Commanding Officer
Department of the Navy
SOUTHNAVFACENGCOM
Attn: E.P. Johns (Code 1829)
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract No. N62472-90-D-1298
Contract Task Order 0038

Subject: Report for Ground Water Monitoring
Event Number 2 for
Naval Surface Warfare Center
Crane, Indiana

Dear Mr. Johns:

Monitoring Event No. 2 has been completed. During this monitoring event samples from ground water, surface waters, and springs were collected at the Ammunition Burning Grounds (ABG) and analyzed. Enclosed is the Report for Monitoring Event No. 2. All field sampling was conducted in accordance with the draft field sampling procedures distributed, which were under review at that time by U.S. EPA Region V. (These procedures were subsequently approved with minor editorial modifications by U.S. EPA). Following is a listing of the documentation provided in this report.

PUMP INSTALLATION
Dedicated pumps were installed in 2 at the ORR. QED Environmental Systems was the pump vendor.

Attachment 1 contains the Manufacturer's Pump Certifications for each individual pump.

ABG FIELD SAMPLING ACTIVITIES
Samples were collected from 18 monitoring wells, 2 surface waters, and 2 springs at the ABG in accordance with the draft field sampling procedures. Field chemical analysis for natural attenuation parameters was initiated for the first time. Training of field personnel in field analysis techniques also took place.

Attachment 2 contains a summary of the field activities.

Attachment 3 contains the Monitoring Well Inspection Forms.

Attachment 4 contains the Water Level Measurement Forms. Water level measure data was used to prepare flow contours for the Beech Creek Aquifer. Figure 1 shows the ground water flow contours obtained using only wells located at the Point of Compliance or within the Point of Compliance. Figure 2 shows the ground water flow contours when wells located beyond the Point of Compliance are included.

Attachment 5 contains the Low Flow Purge Data Sheet and the Groundwater Sample Log Sheet for each monitoring well that was sampled.

Attachment 6 contains the Surface Water Sample Log Sheets for each surface water and spring location that was sampled.

Table 1 summarizes the ground water monitoring wells, surface waters, and springs sampled at the ABG.

Attachment 7 contains the Field Chemical Analysis Log Forms for each monitoring point at which field chemical analysis was conducted.

Attachment 8 contains a copy of the Chain of Custody (COC) records as completed by the TtNUS field staff.

Attachment 9 contains the Equipment Calibration Logs.

Attachment 10 contains a copy of the Field Notebook.

Attachment 11 contains copies of the FedEx airbills as completed by TtNUS.

LABORATORY ANALYSIS

Eighteen ground water, 2 surface water, and 2 spring water samples were analyzed for the parameters described in Table 4-2 of the revised Field Sampling Plan. All analyses were conducted in accordance with the procedures described in the May 1998 Quality Assurance Project Plan (QAPP).

Attachment 12 contains the analytical results for all parameters, which were analyzed. Also included for the NSWC information repository in Attachment 15 is one copy of the original disk as received from each laboratory and the TtNUS database file after data validation was completed.

Attachment 13 contains in a tabular form a summary of positive detections, as printed from the TtNUS database, for all parameters that were detected in concentrations above detection limits in one or more samples. Table 2 also highlights the positive detections.

Attachment 14 contains the rinsate, trip, and ambient blank data.

Attachments 1 through 14 constitute Volume I of this report.

Attachment 15 contains the data packages received from Laucks Testing. Please note that this attachment is voluminous and is provided separately for inclusion in the Crane Ground Water Monitoring Information Repository. This attachment is not included in all copies of this report.

Attachment 16 contains the data validation letters for the Laucks Testing data. TtNUS conducted the data validation. This attachment is also included separately for inclusion in the Crane Ground Water Monitoring Information Repository. This attachment is not included in all copies of this report.

Attachment 17 contains the Microseeps data packages and data validation letters including supporting documentation. TtNUS conducted data validation. This attachment is also included separately for inclusion in the Crane Ground Water Monitoring Information Repository. This attachment is not included in all copies of this report.

Attachments 15, 16, and 17 together constitute Volume II of this report. One copy each of these attachments is provided separately in a banker's box for inclusion in the NSWC Crane Ground Water Information Repository.

Please contact Ralph Basinski at 412/921-8308 (e-mail basinskir@ttnus.com) regarding questions and or comments.

Sincerely,

Ralph R. Basinski
Task Order Manager

RRB/vvp

Enclosures

c: Mr. Tom Brent, NSWC Crane, (w/enclosures - 3 copies of Volume 1, 1 copy of Volume 2)
Ms. D. Wroblewski, (w/o enclosures)
Ms. R.A. Baur (w/o enclosures)
Mr. M. Perry, Project File CTO 0038 (unbound - w/enclosures - 1 copy of Volume 1) (Volume 2 maintained at TtNUS Warehouse)

TABLE 1

AMMUNITION BURNING GROUNDS
GROUND WATER/SURFACE WATER/SPRING WATER MONITORING POINTS
MONITORING EVENT NO. 2
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Monitoring Points	Screened Formation
03B02	Al
03B04	Al
03C02P2	BC
03C03	BB
03C04	BC
03C07	BC
03C08P2	BC
03C09P2	BC
03C10	BC
03C11	BC
03C12	BC
03C15	BC
03C17	BC
03C20	BC
03C25	BC
03C26	BC
03C27	BC
03C30	BC
Little Sulphur Creek Below Spring A	NA
Little Sulphur Creek at Boundary	NA
Spring A	NA
Spring C	NA

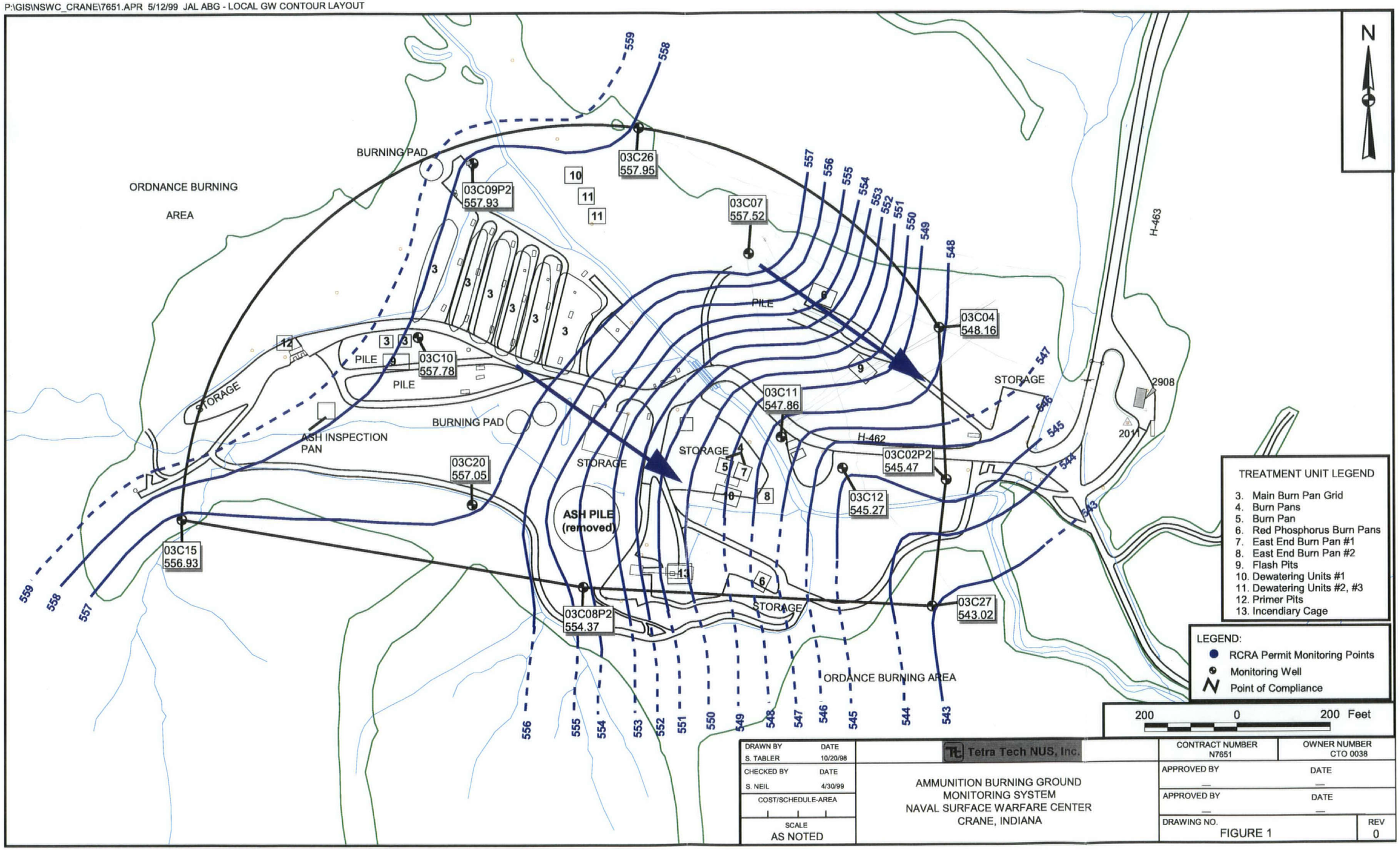
Legend:

Al - Alluvium
BB - Beaver Bend
BC - Beech Creek
NA – Not applicable

TABLE 2
SUMMARY OF PARAMETERS DETECTED AT LEAST ONCE
MONITORING EVENT NO. 2
AMMUNITION BURNING GROUNDS

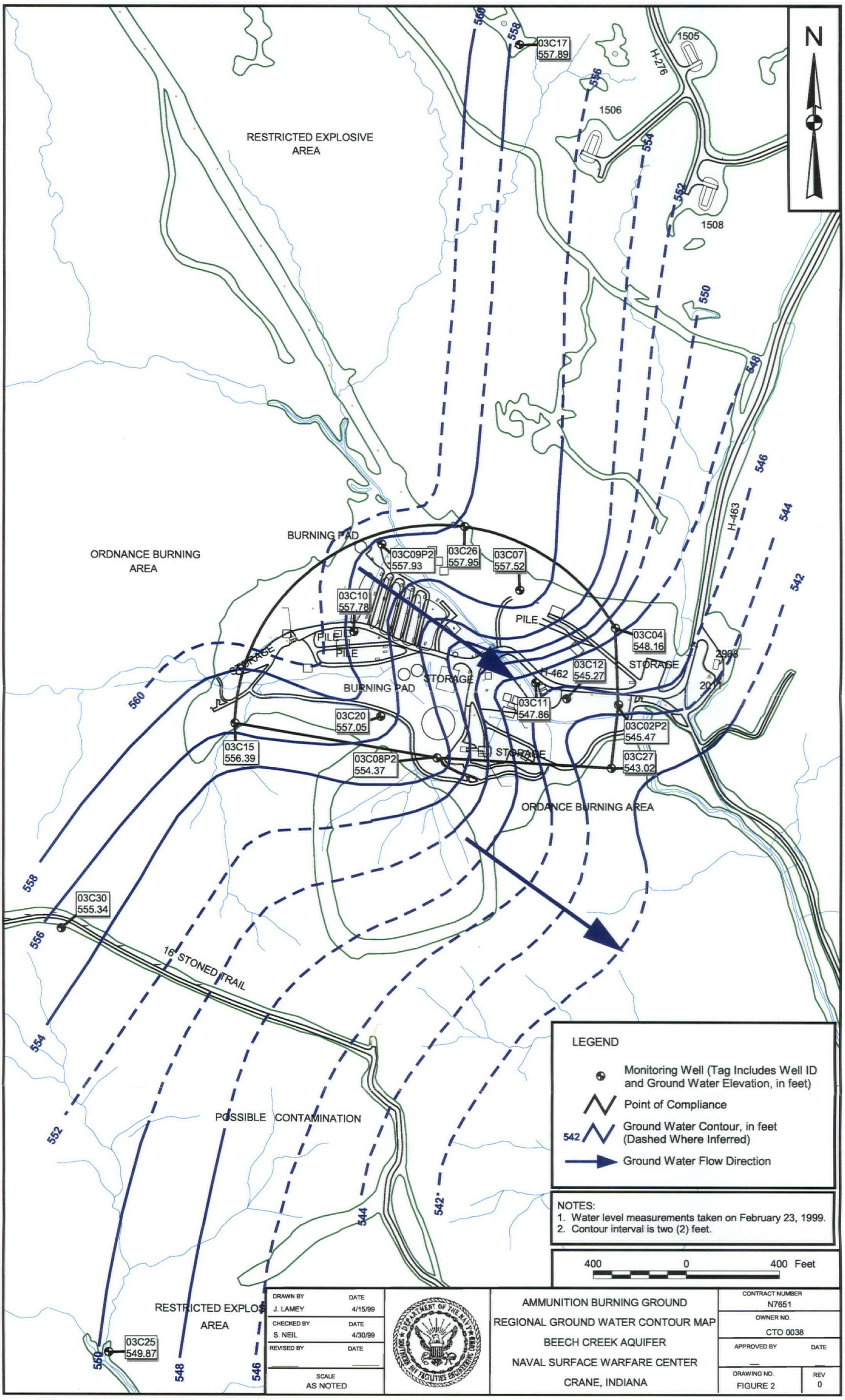
location	03B02	03B04	03C02P2	03C03	03C04	03C07	03C08P2	03C09P2	03C10	03C11	03C11	03C12	03C15	03C17	03C20	03C25	03C26	03C27	03C27	03C30	CREEK	CREEK	CREEK	SPRING A	SPRING C
aquifer	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEAVER BEND	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK					
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	SW	SW	SW	SW	SW
nsample	AB021A99	AB041A99	AC02P21A99	AC031A99	AC041A99	AC071A99	AC08P21A99	AC09P21A99	AC101A99	AC111A99	AC111A99-D	AC121A99	AC151A99	AC171A99	AC201A99	AC251A99	AC261A99	AC271A99	AC271A99-D	AC301A99	ACRA1A99	ACRB1A99	ACRB1A99-D	ASPA1A99	ASPC1A99
sample	AB021A99	AB041A99	AC02P21A99	AC031A99	AC041A99	AC071A99	AC08P21A99	AC09P21A99	AC101A99	AC111A99	FD02259901	AC121A99	AC151A99	AC171A99	AC201A99	AC251A99	AC261A99	AC271A99	FD03029901	AC301A99	ACRA1A99	ACRB1A99	FD02289901	ASPA1A99	ASPC1A99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL
sample_dat	03/10/99	02/23/99	02/26/99	02/27/99	02/27/99	02/26/99	03/12/99	03/01/99	02/25/99	02/25/99	02/25/99	02/25/99	03/01/99	03/08/99	03/11/99	02/24/99	03/02/99	03/02/99	03/02/99	03/08/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99
duplicate											AC111A99								AC271A99				ACRB1A99		
Volatile Organics (ug/L)																									
1,2-DICHLOROETHANE	0.5 U	0.5 U		0.5 U	0.5 U				29	0.5 U	0.5 U	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	0.5 U	0.5 U		0.5 U	0.5 U				1.6	0.5 U	0.5 U	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROFORM	0.5 U	0.5 U		0.5 U	0.5 U				2.2	2	2	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	14	0.5 U	0.5 U	13	13	0.7	0.5 U	0.5 U	67	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	0.5 U	0.5 U		0.5 U	0.5 U				0.5 U	0.5 U	0.5 U	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	7.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U	7.7	0.5 U	0.5 U	4.7	71	160	63	2100	2100	22	0.5 U	0.5 U	3700	0.5 U	4.2	4	8.9	0.5 U	0.5 U	0.5 U	0.5 U	0.6	0.5 U
Dissolved Gases (ug/L)																									
ETHANE	0.081	1.494		0.195	0.069				0.274	0.372	0.273	0.163				0.583					0.147	0.147	0.192	0.112	0.119
ETHENE	0.045	0.232		0.042	0.027				0.054	0.057	0.039	0.03				0.099					0.033	0.034	0.038	0.027	0.026
METHANE	8.426	13.569		13.376	8.794				1.798	800	660	0.912				55.04					0.764	0.901	1.557	0.501	0.536
Energetics (ug/L)																									
1,3,5-TRINITROBENZENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	1.2 U	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	6.1	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
2,4,6-TRINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	1.2 U	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	0.56 U	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.49 J	1.6 U
2,6-DINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	1.2 U	0.70 J	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	0.56 U	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
2-AMINO-4,6-DINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	2.6	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	12.0	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
4-AMINO-2,6-DINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	4.5	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	18.0	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
HMX	0.58 U	0.94 U	5.1	1.0 U	0.46 U	4.4	31	2.8	6.7	5.5	5.6	27	0.49 U	1.2 U	25	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	2.6	2.0	2.0	4.0	1.6 U
MNX	0.58 U	0.94 U		1.0 U	0.46 U				3.1	1.0 U	1.1 U	0.74 U				1.2 U					0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
RDX	0.58 U	0.94 U	2.9	1.0 U	0.46 U	23	110	130	140	34	34	14	0.49 U	1.2 U	180	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	1.6	1.0	0.93	1.5	1.7
Total Metals (ug/L)																									
ARSENIC	6.7	4.1	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2	1.9	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
BARIUM	76.1	77.4	61.2	38.3	31.4	29.6	70.2	15.4	42.4	22.9	22.0	88.7	23.1	11.0	29.7	15.6	37.4	34.3	32.3	61.1	37.1	35.0	34.2	42.0	27.6
COPPER	2.2 U	2.2 U	2.2 U	2.8	2.2 U	2.2 U	18.2	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
IRON	13500	6160		111 U	134				121	111 U	111 U	111 U				140		111 U			450	191	121	507	111 U
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	3.1	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
MANGANESE	1430	1650	16.7 U	16.7 U	76.3	16.7 U	16.7 U	59.6	16.7 U	16.7 U	16.7 U	16.7 U	36.2	114	16.7 U	24.1	40.0	16.7 U	16.7 U	30.3	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U
NICKEL	11.1 U	137	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U
SELENIUM	1.1 U	1.1 U	1.1 U	1.1 U	2.1	1.9	2.6	2.1	3.2	3.7	4.0	1.2	1.9	1.6	1.3	1.1 U	1.3	1.1	1.6	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
ZINC	11.1 U	58.8 J	11.1 U	44.2 J	11.1 U	11.1 U	11.1 U	11.1 U	44.8 J	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U
Dissolved Metals (ug/L)																									
ARSENIC, FILTERED	6.0	3.6	1.1 U	1.1 U	1.6	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
BARIUM, FILTERED	75.2	95.9	71.6	47.8	49	41	63.1	13.4	47.7	26.2	26.8	105	22.9	11.0	29.9	20.8	36.9	32.7	31.9	57.7	48.3	39.7	44.3	46.8	30.2
CALCIUM, FILTERED	44100	25100	36600	1140	149000	100000	112000	81300	91300	233000	234000	99600	104000	201000	86000	106000	98700	59800	57000	71000	11500	11600	11700	13500	10900
COBALT, FILTERED	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	4.0	3.3 U	3.3 U	3.3 U	3.4
COPPER, FILTERED	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	11.2	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
MAGNESIUM, FILTERED	6210	3790	8340	1110 U	199000	48500	39700	15700	11800	130000	129000	8130	45100	199000	29900	60700	53100	3280	3150	36700	2710	2730	2740	3220	2470
MANGANESE, FILTERED	1420	1660	16.7 U	16.7 U	665	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	35.1	110	16.7 U	24.7	39.9	16.7 U	16.7 U	39.4	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U
POTASSIUM, FILTERED	1130	1230	2150	1110 U	3690	5160	30800	1290	1110 U	3180	3190	2060	1960	3220	1990	2650	2110	1220	1220	2790	1220	1130	1220	1400	1110
SELENIUM, FILTERED	1.1 U	1.1	1.6	1.1 U	2.2	2.3	2.2	2.2	3.2	3.9	4.2	1.4	1.9	1.9	1.4	1.1	1.6	1.3	2	1.1 U	1.1 U	1.2	1.1 U	1.1 U	1.1 U
SODIUM, FILTERED	9020	5470	21300	218000	63900	23800	19700	4790	7190	94500	92300	13400	26900	115000	12000	63600	16800	5980	5800	68000	1780	1730	1750	2240	1530
ZINC, FILTERED	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	14.0	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	17.4	11.1 U	11.1 U
Miscellaneous (mg/L)																									
ALKALINITY (MG/L)	148.8	78.4	80	356	366	346	323	196	200	290	0 NS	216	286	389	246	180	322	156	143	408	24.1	32.8	27.2	26.3	20.4
BICARBONATE ALKALINITY (MG/L)	148.8	74.4	80	356	NA	346	323	196	200	290	0 NS	216	286	389	246	180	322	156	143	408	24.1	32.8	27.2	26.3	20.4
CARBON DIOXIDE (MG/L)	86	93.6	NA	64	250	NA	NA	NA	183	165	0 NS	136	NA	NA	NA	191	NA	NA	NA	NA	17.4	64	47	17.8	20.1
CHLORIDE	3	2	37	2	7	9	12	5	9	40	40	32	4	4	6	2	4	3	3	2	2	2	2	2	1
DISSOLVED OXYGEN-HACH (MG/L)	0.41	0	NA	0.31	2.51	NA	NA	NA	2.53	5.32	0 NS	7.02	NA	NA	NA	0	NA	NA	NA	NA	7.56	9.44	9.6	9.32	10.68
DISSOLVED OXYGEN-METER (MG/L)	2.27	1.12	12.84	0.65	13.38	6.97	10.94	8.01	3.58	7.69	NA	8.46	1.89	1.26	4.21	3.14	4.04	7.87	NA	0.77	12.67	12.36	NA	12.65	13.15
FERROUS IRON (MG/L)	3.30	3.30	NA	0.05	1.09	NA	NA	NA	0	0.02	0 NS	0.01	NA	NA	NA	0.12	NA	NA	NA	NA	0.01	0	0	0.01	0
NITRATE (MG/L)	0	0	NA	0.207	0	NA	NA	NA	0.39	0.726	0 NS	0.550	NA	NA	NA	0	NA	NA	NA	NA	0.22	0.23	0.22	0.20	0.2
NITRITE (MG/L)	0	0	NA	0.003	0	NA	NA	NA	0.002	0.01	0 NS	0	NA	NA	NA	0	NA	NA	NA	NA	0	0	0	0	0
OXIDATION REDUCTION POTENTIAL (MV)	-116.9	-30.4	162.1	-5.8	-18.2	117.9	165.3	165.6	158.6	-54.5	NA	139.4	3.5	-22.9	169.2	-74.1	106.1	164.9	NA	-112.9	157.0	186.4	NA	157.0	165.8
PH ()	7.16	6.99	7.04	9.22	7.28	7.16	7.22	6.87	6.53	7.15	NA	7.25	7.15	7.01	7.13	7.11	7.11	7.59	NA	8.32	7.35	7.35	NA	7.30	7.14
SPECIFIC CONDUCTIVITY (MS/CM)	0.334	0.206	0.349	0.887	1.92	0.789	0.937	0.492	0.521	1.9	NA	0.643	0.826	2.209	0.656	1.063	0.780	0.304	NA	0.778	0.104	0.095	NA	0.106	0.085
SULFATE	26 J	16	35	76	950	86	120 J	43 J	58	710	920	58	170 J	1100 J	100 J	270	92 J	17 J	12 J	130 J	17	16	16	19	16
SULFIDE (MG/L)	0.06	0	NA	0.04	0	NA	NA	NA	0	0.47	0 NS	0	NA	NA	NA	0.04	NA	NA	NA	NA	0.06	0.07	0.05	0.030	0.06
TEMPERATURE (C)	8.9	9.0	12.0	13.7	8.2	12.4	10.0	13.0	13.1	10.7	NA	13.3	12.9	11.3	11.1	10.8	11.2	8.2	NA	10.9	7.9	7.9	NA	8.1	8.8
TOTAL ORGANIC CARBON	1.4	1 U	1.6	1.6	1.6	1.9	2	2.6	1.6	3.3	1.9	1.7	1.3	1.4	1.2	1 U	1 U	1.4	1.1	1.8	2.5	3	3.5	3	2.4
TOTAL ORGANIC HALOGENS	0.02 U	0.03	0.02 U	0.02 U	0.02 U	0.02 U	0.06	0.13	0.06	0.86	1	0.02	0.02 U	0.02 U	3	0.03	0.02 U	0.02 U	0.02 U	0.05	0.02 U	0.02 U	0.03	0.02 U	0.02 U
TURBIDITY (NTU)	8	2	8	1	3	8	0	8	6	1	NA	0	1	0	0	0	0	8	NA	0	15.1	14.2	NA	15.9	10.2
WATER LEVEL (FT)	6.00	6.58	37.43	87.77	76.10	78.80	74.78	45.45	50.14	44.40	NA	41.86	64.71	138.12	89.50	46.81	82.67	60.73	NA	223.38	NA	NA	NA	NA	NA

P:\GIS\NSWC_CRANE\7651.APR 5/12/99 JAL ABG - LOCAL GW CONTOUR LAYOUT



DRAWN BY S. TABLER	DATE 10/20/98	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7651 / OWNER NUMBER CTO 0038
CHECKED BY S. NEIL	DATE 4/30/99	AMMUNITION BURNING GROUND MONITORING SYSTEM NAVAL SURFACE WARFARE CENTER CRANE, INDIANA	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV 0

P:\GIS\CRANE\7651.APR 5/12/99 JAL REGIONAL GW CONTOUR LAYOUT



ATTACHMENT 1

PUMP CERTIFICATIONS
MONITORING EVENT NO. 2

ORA
06C19
3.27.99

QED
Ground Water
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

The enclosed pump has been tested for the EPA priority pollutant parameters under conditions more critical than those required in current accepted ground water monitoring practices. We certify that this pump will not adversely affect the results of your ground water sample analysis.

TWC

Quality Certification Manager

MAR 1 0 1999
Date

P1150
Pump Model

0 3 9 9 0 1
Batch Serial Number

If you need further information on QED's Pump Certification Program, please contact QED Environmental Systems, Inc. at 1-800-624-2026.

ORR
06C19P2
3.27-99

QED
Ground Water
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

The enclosed pump has been tested for the EPA priority pollutant parameters under conditions more critical than those required in current accepted ground water monitoring practices. We certify that this pump will not adversely affect the results of your ground water sample analysis.

TNJ

Quality Certification Manager

MAR 1 0 1999
Date

P1150
Pump Model

0 9 9 0 1
Batch Serial Number

If you need further information on QED's Pump Certification Program, please contact QED Environmental Systems, Inc. at 1-800-624-2026.

ATTACHMENT 2

SUMMARY OF FIELD ACTIVITIES
MONITORING EVENT NO. 2

NSWC Crane, IN
CTO 38
Summary of Field Activities
February 21, 1999 through March 30, 1999

The following is a summary of field activities conducted from February 21 through March 30, 1999, during three 10-day work shifts, at the NSWC Crane facility, Crane, IN. Round two sampling was completed for all monitoring points at the Ammunition Burning Grounds (ABG). Field analysis training was conducted and field chemical analysis was implemented at all monitoring points. Land surveying was conducted on all monitoring points and various surface features at five sites: ABG, DR, ORR, SWL & LF. Aquifer testing was conducted at 39 wells at the ORR and DR.

Round two sampling was conducted following the revised, December 1998 FSP. The revised FSP includes additional field tasks and requirements, mainly field chemical analysis and additional documentation. These requirements significantly increased the labor hours required to complete the sampling event. The time and effort for completing the additional tasks has been documented in the field log books and on the field notes. An increase from two to three field personnel for round three sampling scheduled for mid-May, is planned. The increase in personnel will reduce the time spent in the field and complete the sampling effort in one ten day shift.

Monitoring Point Sampling:
Round two sampling was completed for all monitoring wells and surface water points (18 wells, 2 surface waters and 2 spring waters) at the Ammunition Burning Grounds (ABG). All samples to be analyzed at fixed base laboratory were shipped, via over-night courier, to Laucks Testing Laboratory, Inc., and Microseeps Testing Laboratory. Field chemical analysis for various natural attenuation parameters (see FSP for parameter list) was conducted on site for all monitoring points sampled. A HACH brand portable Colorimeter and/or Digital Titrator was used for the field chemical analysis of all samples. Purge water generated during the sampling effort was transported (via 8 gal. containers) and discharged into NSWC-permitted sanitary sewer system on site via manhole #327. See attached table for a list of monitoring points and dates sampled. Two dedicated bladder pumps were installed in monitoring wells 06C19 and 06C19P2 at the ORR. This completed the pump installation for CTO 38.

Aquifer Testing:
A total of 15 wells at the DR and 26 wells at the ORR were selected for aquifer testing. All wells were tested, except 06-01B and 0601P2, with a total of 74 tests completed. In all 35 falling head tests and 39 rising head test were completed. Wells 06-01B and 0601P2 were not tested due to insufficient water levels in the wells.

Surveying:
Bledsoe Tapp & Riggert, Inc. were sub-contracted to survey all monitoring points and various surface features on base. Monitoring points were surveyed at five sites on base: ABG, DR, ORR SWL and LF. Some of the monitoring well riser pipe elevations were adjusted (cut) when the dedicated bladder pumps were installed. Also, former surveying data was either incomplete or surveyed at different dates by different surveying contractors. This necessitated the need for all monitoring points associated with CTO 38 and 48 to be resurveyed. Eric Denlinger and Dave Meier from Bledsoe Tapp & Riggert started the field surveying on March 8, 1999 and completed the field effort on April 2, 1999. The data is being processed and checked and the survey report will be completed in mid-April.

Shift 1: February 21 through March 3, 1999
Tt NUS personnel on site:

Keith Simpson and Scott Neil
Andy Kendrick, February 23 through February 25, 1999 (Field chemical analysis training)

WES personnel on site:

James May and Danny Harrelson February 25, 1999 (Observing Low Flow Purging and Sampling)

Shift 2: March 7 through 17, 1997
Tt NUS personnel on site:
Keith Simpson and Scott Neil
Tim Evans (Aquifer testing)

Navy SDIV personnel on site:
E. P. Johns, March 9 and 10, 1999 (Observing Low Flow Sampling and Field Chemical analysis)

Shift 3: March 21 through 30 1999
Tt NUS personnel on site:
Keith Simpson and Scott Neil (The majority of this shift was spent working on CTO 48, SWL)

For more details on any of the above activities, see the following: log books, sample log forms and COC's.
Log book numbers: 2426, 1309, 2456 and 2397

The following table lists monitoring point sample dates.

SITE	MONITORING POINT	SAMPLE DATE
ABG	3B02	3/10/99
ABG	3B04	2/23/99
ABG	3C02P2	2/26/99
ABG	3C03	2/27/99
ABG	3C04	2/26-27-28/99
ABG	3C07	2/26/99
ABG	3C09P2	3/1/99
ABG	3C10	2/25/99
ABG	3C11	2/25/99
ABG	3C12	2/29/99
ABG	3C15	3/1/99
ABG	3C17	3/8/99
ABG	3C20	3/11/99
ABG	3C25	2/24/99
ABG	3C26	3/2/99
ABG	3C27	3/2/99
ABG	3C30	3/9/99
ABG	3C8P2	3/12/99
ABG	CRA	2/28/99
ABG	CRB	2/28/99
ABG	SPA	2/28/99
ABG	SPC	2/28/99

Tetra Tech NUS, Inc.

INTEROFFICE MEMORANDUM - TRIP REPORT

TO: Ralph Basinski

DATE: March 30, 1999

FROM: Andy Kendrick AWK

CC: M. Perry
K. Simpson
S. Neil
Project File

SUBJECT: Geochemical Sampling and Training
SOUTHDIV CLEAN – NSWC Crane, IN
CTO – 38 (N7651)
February 23, 1999 – February 25, 1999

Introduction

During the period of February 23, 1999 through February 25, 1999, Andy Kendrick (AK) joined Keith Simpson (KS) and Scott Neil (SN) at the NSWC Crane project site to provide training and support for geochemical sampling and field analysis.

February 23, 1999

AK joined KS and SN at the site trailer to begin geochemical sampling, geochemical field analysis, and on-site training.

KS is the acting FOL, supported by SN. All notes with respect to geochemical sampling, analysis, and training that were maintained by AK were recorded in Field Logbook No. 1309. Copies of those pages (pages 1-3, and odd pages 5-15) recorded by AK are attached to this memo. General site activities were recorded by KS in Site Logbook 2397.

The morning was spent unpacking, inventorying, and cleaning all geochemical equipment, supplies, and reagents that had been shipped to the site. Additionally, the portable colorimeter (HACH® DR/890) was initiated for the first time, checked, and programmed for the current time and date stamp.

During the afternoon, AK set up the mobile lab in the site trailer and ran several geochemical QC samples in accordance with Crane sampling SOP 7. QC samples included lab blanks and standard additions. All QC sample results were in compliance with expected results.

At approximately 16:30, AK, SN, and KS collect groundwater samples from ABG well 03B04 (AB041A99). AK trains KS and SN in the use of the digital titrator methods including alkalinity, dissolved oxygen, and carbon dioxide. Collect an additional 2 liters of sample volume for colorimeter analysis back at the field trailer. Run the remaining parameters back at the field trailer, including sulfide, ferrous iron, nitrate, and nitrite. In addition, run reagent blank corrections for ferrous iron and nitrate. All QC sample results were in compliance with expected results and therefore, no corrections were necessary.

February 24, 1999

AK runs standard additions on nitrate. QC sample results are in compliance with expected results.

Tom Brent and Chris Freeman visit the trailer and discuss briefly the field geochemical analyses.

At approximately 12:00, AK, SN, and KS collect groundwater sample from ABG well 03C25 (AC251A99). AK provides additional training to KS and SN in the use of the digital titrator methods including alkalinity, dissolved oxygen, and carbon dioxide. Duplicate the dissolved oxygen analysis using CHEMetrics® CHEMets® (0-1.0 mg/L and 1-12 mg/L ranges). CHEMetrics method for dissolved oxygen appears to provide better accuracy than the HACH titration method for dissolved oxygen at low (0-2 mg/L) ranges. Collect an additional 2 liters of sample volume for colorimeter analysis back at the field trailer. Run the remaining parameters back at the field trailer, including sulfide, ferrous iron, nitrate, and nitrite. In addition, run reagent blank corrections for ferrous iron and nitrate. Provide additional training to KS and SN in colorimeter analytical methods. In addition, run standard solution for nitrate. QC sample results are in compliance with expected results.

February 25, 1999

AK and KS collect groundwater sample from ABG well 03C11 (AC111A99). AK provides additional training to KS in the use of the colorimeter method for ferrous iron. Preserve the dissolved oxygen sample for analysis back at the field trailer. Collect a dissolved oxygen analysis using CHEMetrics® CHEMets® (1-12 mg/L range). Later comparison yields 5.5 mg/L for CHEMetrics method and 5.32 mg/L for HACH method. CHEMetrics method for dissolved oxygen appears to provide comparable accuracy compared to the HACH titration method for dissolved oxygen at moderate ranges.

James May and Danny Harrelson of COE/WES visit the site and stay from 09:30 until 13:00. Discuss the field geochemical analyses and overall Crane program in significant detail.

Collect an additional 2 liters of sample volume for colorimeter and titration analysis back at the field trailer. Run the remaining parameters back at the field trailer, including alkalinity, dissolved oxygen (previously preserved), carbon dioxide, sulfide, ferrous iron, nitrate, and nitrite. Provide additional training to KS and SN in colorimeter and titration analytical methods.

Run the parameters for sample AC101A99 (collected previously by SN) back at the field trailer, including alkalinity, dissolved oxygen (previously preserved), carbon dioxide, sulfide, ferrous iron, nitrate, and nitrite. Provide additional training to KS and SN in colorimeter and titration analytical methods.

General Comments

Sulfide analyses should be performed at the well head since one of the forms of sulfide analyzed during the total sulfide method is hydrogen sulfide gas. Preliminary results indicate measurable losses in total sulfide when the sample is transported back to the field trailer for later analysis (even when stored at 4°C with zero headspace in amber glass).

All parameters, particularly ferrous iron, are somewhat sensitive to transportation and thus must be stored at 4°C with zero headspace in amber glass if analysis at the well head is not performed.

James May and Danny Harrelson of COE/WES seemed very pleased with our geochemical sampling and analyses.

The sampling and chain-of-custody procedures performed by KS and SN (in accordance with Region V specifications) require a significant greater level of effort in comparison to standard operating procedures performed by TtNUS. It is likely that additional field sampling support will required to compensate for the time-intensive procedures required for this project.

KS and SN both seem to understand the geochemical sampling and analysis procedures as well as the general approach and objectives of the geochemical study.

ATTACHMENT 3

MONITORING WELL INSPECTION FORMS
MONITORING EVENT NO. 2

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3B2

Time: 1427 **Date:** 2-23-99 **Inspector's Name:** SIMPSON

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: ~~ACB~~ KS A3B4

Time: 1338 **Date:** 2-23-99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A C2P2

Time: 2.23.99 @ 1055 **Date:** 2.23.99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		NEW LOCKING WELL CAP
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		NEW BUILDING (TIN SHED) CLOSE TO WELL
Dedicated sampling equipment	Condition of...	✓		YES + TRANSDUCER
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C3

Time: 1108 **Date:** 2-23-99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [signature]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3 C4

Time: 1146 **Date:** 2-23-99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C7

Time: 1151 **Date:** 2-23-99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C8P2

Time: 1123 **Date:** 2-23-99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C9P2

Time: 1112 **Date:** 2·23·99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		NEW LOCKING CAP
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		TRANSDUCER & PUMP IN WELL
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C10

Time: 1117 **Date:** 2-23-99 **Inspector's Name:** NEIL & SIMPSON

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) N. E. Simp

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C11

Time: 1102 **Date:** 2-23-99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. E. Simp

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3 C12

Time: 1058 **Date:** 2-23-99 **Inspector's Name:** NEIL & SIMPSON

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		NEW LOCKING WELL CAP
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		YES + TRANSDUCER
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3 C15

Time: 1134 **Date:** 2-23-99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3 C17

Time: 1045 **Date:** 2-23-99 **Inspector's Name:** SIMPSON, NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		OK, IN PLACE
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) N. S. Simpson

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C20

Time: 1130 **Date:** 2·23·99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C25

Time: 1456 **Date:** 2-23-99 **Inspector's Name:** SIMPSON

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. S. Simpson

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3 C26

Time: 1153 **Date:** 2·23·99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) [illegible]

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3 C 27

Time: 1140 **Date:** 2·23·99 **Inspector's Name:** SIMPSON & NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		IN-PLACE, OK
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. S. Simpson

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: A3C30

Time: 1030 **Date:** 2-23-99 **Inspector's Name:** K. SIMPSON
S. NEIL

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		
Well pad	Concrete or gravel & condition	✓		
Well seal	Condition of...	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of...	✓		OK, IN-PLACE
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. E. Simpson

Note: S= Satisfactory, U= Unsatisfactory
Check one, if unsatisfactory explain

ATTACHMENT 4

WATER LEVEL MEASUREMENT FORMS
MONITORING EVENT NO. 2

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: LT SNOW 28°F

Project No.: CTO 38 . 7651
Personnel: SIMPSON, NEIL
Measuring Device: HERON INST. DIPPER-T
Remarks: ① USED MSCOPE NY 10215

Well ID	Date	Time	Water Level *	Thickness of Free Product *	PID Reading ppm RP	PID Reading ppm BZ	Comments
A3C30	2-23-99	1030	223.38 ①	0	1.1	0	
A3C17		1045	138.12	0	0	0	
A3C2P2		1055	37.43	0	0	0	TRANSDUCER & PUMP IN WELL
A3C12		1058	41.86	0	0	0	" "
A3C11		1102	44.40	0	0.8	0	
A3C3		1108	87.77	0	13.5	0	
A3C9P2		1112	45.45	0	0	0	TRANSDUCER & PUMP IN WELL
A3C10		1117	50.14	0	9.5	0	
A3C8P2		1123	74.78	0	0	0	
A3C20		1130	89.50	0	7.4	0	
A3C15		1134	64.71	0	5.2	0	
A3C27		1140	60.73	0	0	0	

(12)

* All measurements to the nearest 0.01 foot

Signature(s): N. S. Simpson

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: LT SNOW 28°F

Project No.: CTO 38 7651
Personnel: K. SIMPSON, SCOTT NEIL
Measuring Device: HERON INST. DIPPER-T
Remarks:

Well ID	Date	Time	Water Level *	Thickness of Free Product *	PID Reading ppm RP	PID Reading ppm BZ	Comments
A3C4	2.23.99	1146	76.10	0	0	0	
A3C7	↓	1151	78.80	0	1.4	0	
A3C26	↓	1153	82.67	0	0	0	
KS A3B~~2~~4	↓	1338	6.58	0	13.9	0	
A3B2	↓	1427	6.00	0	0	0	
A3C25	↓	1456	46.81	0	0	0	

* All measurements to the nearest 0.01 foot

Signature(s): K. S. Simpson

ATTACHMENT 5

LOW FLOW PURGE DATA FORMS/GROUND WATER SAMPLE LOG FORMS
MONITORING EVENT NO. 2

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651/CTO 38
WELL ID.: 03B02 (ABG)
DATE: 3/10/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1114	5.32							→	Cleaned turbidity probe;
1116	5.31	122	7.07	0.334	12	4.32	7.5	-64.7	control box problem
1121	5.32	122	7.15	0.333	11	0.75	8.0	-97.9	↓
1126	5.33	122	7.15	0.332	11	1.24	7.9	-104.6	Stop purging - need nitrogen and another control box.
1335	5.22							→	restart purging.
1340	5.27	120	7.12	0.403	168	9.01	8.2	-81.8	
1345	5.29	120	7.15	0.637	149	6.59	8.3	-87.5	
1350	5.28	120	7.14	0.629	152	6.72	8.4	-88.2	
1355	5.30	120	7.14	0.431	62	7.27	8.2	-82.3	
1400	5.33	120	7.12	0.346	41	6.76	8.5	-97.8	
1410	5.35	120	7.14	0.340	29	7.56	8.9	-107.0	
1420	5.36	120	7.14	0.340	23	7.06	8.8	-109.8	
1430	5.36	120	7.14	0.338	14	6.83	8.9	-112.2	
1440	5.35	120	7.14	0.337	17	5.57	9.1	-113.4	
1450	5.35	120	7.14	0.336	12	4.65	9.0	-114.6	
1500	5.34	120	7.16	0.335	10	3.04	9.0	-116.9	
1510	5.36	120	7.16	0.334	8	2.27	8.9	-116.9	End of purging.
1515	Begin sampling - sample # ABO21A99.								
1700	End sampling ~~@ 1700~~ SN								

SIGNATURE(S): Scott W. Neil

PAGE 3 **OF** 3

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CTO 38

Sample ID No.: AB021A99
Sample Location: ABG-03B02
Sampled By: Scott Neil
C.O.C. No.:

SAMPLING DATA:

Date: 3/10/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1515 End: 1700	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Cloudy	7.16	0.334	8.9	8	2.27	-116.9	None

PURGE DATA:

Date: 3/10/99	Total Well Depth (TD): 18.60 FT.	End Purge (hrs): 1510
Method: Dedicated Bladder Pump	Static Water Level (WL): 5.12 FT.	Total Purge Time (min): 247
Well Casing: 2" PVC	Start Purge (hrs): 0839	Total Vol. Purged (gal): *
One Casing Volume(gal):		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1515
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1518
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) ~~500 mL~~ Polyethylene (1000 mL)	1520
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1526
Explosives (Subsets A/B)	4°C/Dark	(2) 1000 mL Amber Glass (SN)	1534, 1544
Explosives ~~(Subsets B)~~ Nitrocellulose Picric Acid	4°C/Dark	(W) 2 (2x 500 mL Amber Glass) (SN) Nitro [illegible]	1550; 1557 + 1606
Total Metals (Subsets A & B)			1614
Cyanide		[illegible] mL)	1623
TOC			1630
Chloride & Sulfate			1632
Total Phosphorus			1636
Dissolved Phosphorus			1641
Dissolved Metals (Subsets A, C & D)			1645
Natural Attenuation (field test)			1653

CTO 38
FILE

ROUND 2 SAMPLING

MARCH 99

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe =

PID reading in Breathing Zone =

Reaction of sample to preservative: P

[illegible] as greenish tint.

* Purged for four [illegible] g – Dissolved oxygen and Turbidity did not stabalize for three consecutive readings.

Field Chemistry @ well head: CH4 mets D.O. = 0.5 mg/L ; Sulfide = 0.06 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:	Signature(s):
None	None	Scott W. Neil

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03B02 (ABG)
DATE: 3/10/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0839	5.12								Begin purging.
0844	5.22	144	7.15	0.557	836	2.04	8.1	-67.8	Water is orange color
0849	5.23	120	7.12	0.412	1133	1.53	7.7	-80.5	
0854	5.24	120	7.11	0.377	994	0.70	7.7	-86.1	
0859	5.26	120	7.11	0.367	858	1.48	7.7	-91.0	
0904	5.25	120	7.11	0.350	940	1.58	7.6	-93.5	
0909	5.25	120	7.10	0.359	907	0.91	7.6	-92.3	
0914	5.26	120	7.09	0.347	167	1.23	7.8	-89.2	Light orange
0919	5.26	120	7.08	0.353	57	1.65	8.0	-88.8	
0924	5.27	120	7.08	0.352	44	1.42	8.0	-88.9	
0929	5.27	120	7.09	0.348	45	2.21	7.7	-73.5	
0934	5.28	120	7.10	0.347	38	1.31	7.9	-88.3	
0939	5.29	120	7.10	0.345	37	1.01	8.1	-93.8	
0944	5.28	120	7.11	0.342	33	2.23	8.3	-96.9	
0949	5.26	120	7.10	0.339	31	1.98	8.3	-98.1	
0954	5.25	120							Control box problem.
1019	5.27	120	7.09	0.336	20	4.54	8.2	-86.6	
1024	5.28	130	7.10	0.338	16	3.78	7.9	-90.1	
1029	5.29	130	7.11	0.338	15	3.21	7.9	-92.6	
1034	5.30	130	7.12	0.337	16	2.84	7.9	-95.6	
1039	5.29	122	7.09	0.339	16	5.49	7.8	-63.2	
1044	5.30	122	7.12	0.337	17	1.41	7.9	-98.5	
1049	5.32	122	7.15	0.336	16	1.44	7.9	-106.0	
1054	5.32	122	7.15	0.335	16	1.41	7.8	-107.5	
1059	5.33	122	7.15	0.334	13	1.42	7.9	-109.9	
1104	5.33	122	7.15	0.334	11	1.54	7.8	-110.4	
1109	5.32	122	7.16	0.334	12	1.35	7.9	-110.4	

SIGNATURE(S): Scott W. Neil

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CT038

Sample ID No.: ABG4/A99
Sample Location: ABG4 03BOA
Sampled By: SCOTT NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 2/23/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1508 End: 1650	Visual	w/ Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.38	0.206	9.0	2	1.12	-30.4	NONE

PURGE DATA:

Date: 2/23/99	Total Well Depth (TD): 16.80 FT	End Purge (hrs): 1504
Method: Dedicated Bladder Pump	Static Water Level (WL): 6.58 FT	Total Purge Time (min): 60
Well Casing: 2" PVC	Start Purge (hrs): 1404	Total Vol. Purged (gal): 2.77
One Casing Volume(gal): 1.67		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1508
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1510
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1514
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1521, ~~1520~~ 1526
Explosives (Subsets A)	4°C/Dark	(2) 1000 mL Amber Glass	1527, 1530, 1534, 1542
Explosives (Subsets B)	4°C/Dark	(2) 500 mL Amber Glass	1550, 1556
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1558
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1604
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1623
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1628
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1633
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1640
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1645
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1508

KS 4

N 2/23/99

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 13.9 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None except for Sulfide which a precipitate formed; and Cyanide which turned light tan.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): [signature]

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CT038
WELL ID.: 03B04
DATE: 2/23/99

	Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
	1404	6.58							→	BEGIN PURGING
575	1409	6.61	115	7.38	1.086	1264	4.82	8.2	2.1	RUST COLOR
1800	1419	6.72	180	7.05	0.213	91	1.39	8.6	-8.1	CLEAR
900	1424	6.72	180	7.03	0.204	70	1.11	8.6	-9.2	↓
	1429	6.74	180	6.96	0.198	23	1.26	9.0	-15.3	↓
1800	1439	6.73	180	6.96	0.202	32	1.13	8.9	-19.6	Cleaned probe after reading - turbidity.
1800	1449	6.73	180	6.99	0.208	3	1.03	9.0	-22.9	CLEAR
1800	1459	6.72	180	6.98	0.206	2	1.00	8.8	-28.8	↓
	~~1404~~ 1504	6.73	180	6.99	0.206	2	1.12	9.0	-30.4	↓
	1508	BEGIN SAMPLING - SAMPLE # A B04/1A99, END SAMPLING AT 1650								

SIGNATURE(S): Scott Reid

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

Sample ID No.: AC02P21A99
Sample Location: 3C02P2 ABG
Sampled By: KEITH SIMPSON
C.O.C. No.:

SAMPLING DATA:

Date: 2-26-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1545 End: 1643	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.04	0.349	12.0	8	12.54	162.1	NONE

PURGE DATA:

Date: 2-26-99	Total Well Depth (TD): 50.9	End Purge (hrs): 1540
Method: Dedicated Bladder Pump	Static Water Level (WL): 37.38	Total Purge Time (min): 55
Well Casing: 2" PVC	Start Purge (hrs): 1445	Total Vol. Purged (gal): 2.6
One Casing Volume(gal): 2.2		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1540
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1546
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1550, 1556, 1604
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	~~1556~~ 1610
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1614
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1619
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1620
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1623
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1626
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1630
Field test	Alkalinity, see SOP 7		1637

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 2.0 (ppm)
PID reading in Breathing Zone = 0.1 (ppm)

Reaction of sample to preservative: NONE

NEW BUILDING (LG. SHED) 25' WEST OF WELL
IN TRANDUCER IN WELL

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): K. S. Simpson

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 38 7651

WELL ID.: 03C02P2
DATE: 2-26-99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1450	37.38	180	7.42	1.033	216	13.26	12.1	89.3	
1455	37.40	180	7.25	0.501	15	13.27	12.4	103.6	
1500	37.40	180	7.11	0.363	13	13.40	12.3	123.5	
1505	37.40		7.07	0.358	13	14.03	12.1	140.2	
1510			7.06	0.356	11	12.09	12.0	146.3	
1520			7.06	0.353	10	13.51	12.0	150.0	
1525			7.03	0.351	9	13.31	12.0	157.5	
1530			7.04	0.352	9	12.24	12.0	161.7	
1535			7.03	0.350	8	13.25	12.0	165.6	
1540			7.04	0.349	8	12.84	12.0	162.1	END PURGE

SIGNATURE(S): [illegible]

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46 MIN FOR 1 VOL

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651 / CTO 38

Sample ID No.: AC031A99
Sample Location: ABG-03C03
Sampled By: Scott Neil
C.O.C. No.:

SAMPLING DATA:

Date: 2/27/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1130 End: 1250	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	9.22	0.887	13.7	1	0.65	-5.8	None

PURGE DATA:

Date: 2/27/99	Total Well Depth (TD): 152.70 FT.	End Purge (hrs): 1125
Method: Dedicated Bladder Pump	Static Water Level (WL): 87.62 FT.	Total Purge Time (min): 190
Well Casing: 2" PVC	Start Purge (hrs): 0815	Total Vol. Purged (gal): 10.8
One Casing Volume(gal): 10.6		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1130
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1140
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1145
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1147
Explosives (Subsets A)	4°C/Dark	(2) 1000 mL Amber Glass	1200, 1205, 1155, 1210
Explosives (Subsets B)	4°C/Dark (1) 1000	(2) 500 mL Amber Glass	1215
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1220
Cyanide	NaOH/4°C 1000 mL	(1) 500 mL Polyethylene	1225
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1230
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1231
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1233
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1237
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1240
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1245

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 29.1 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: Sulfide formed precipitate.

Sulfide field test:
Blank = 0.00 mg/L
Sample = 0.04 mg/L

Chemets DO field test:
DO = 0.25 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott W. Neil

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C03
DATE: 2/27/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0815	87.62	—						→	Begin purging
0820	87.64	180	9.23	0.936	5	2.71	12.8	52.9	water is clear. Heavy rain begins
0825	87.65	180	9.22	0.902	3	1.37	12.7	-14.6	↓ ↓
0835	87.65	180	9.20	0.902	2	3.37	12.7	-3.2	
0845	87.64	180	9.19	0.899	1	3.59	12.7	-47.8	
0855	87.64	180	9.19	0.898	1	4.32	12.8	-31.7	↓ ↓
0905	87.64	180	9.19	0.892	2	1.09	13.0	-18.8	Rain ends, water is clear. Adjust
0915	87.64	200	9.19	0.884	1	0.86	13.0	-16.1	flow rate/GPD. Water is clear.
0925	87.64	200	9.19	0.886	1	0.93	13.1	-15.0	↓
0935	87.64	200	9.19	0.884	1	0.70	13.2	-14.3	↓
0945	87.64	200	9.20	0.885	1	0.59	13.2	-13.7	Adjusted flow rate —
0955	87.64	240	9.19	0.884	1	0.60	13.4	-14.7	water is clear.
1005	87.64	240	9.19	0.883	0	0.63	13.5	-15.3	
1015	87.64	240	9.19	0.882	0	0.62	13.6	-18.1	
1025	87.64	240	9.21	0.892	0	0.57	13.7	-19.0	
1035	87.64	240	9.21	0.889	2	0.93	13.7	-18.2	
1045	87.64	240	9.20	0.887	2	0.80	13.7	-20.1	
1055	87.64	240	9.21	0.877	1	0.91	13.7	-11.2	
1105	87.64	240	9.20	0.884	0	0.63	13.7	-0.9	
1115	87.64	240	9.21	0.886	1	0.60	13.8	-6.5	
1125	87.64	240	9.22	0.887	1	0.65	13.7	-5.8	
1130	Start sampling - sample # AC031A99 - end sampling @ 1250								

2150/5.8

SIGNATURE(S): [signature]

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

Sample ID No.: AC04-1A 99
Sample Location: 03 C04
Sampled By: KEITH SIMPSON
C.O.C. No.:

SEE BELOW

SAMPLING DATA:

Date: 2-26-99 → 2-28-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1030 End:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.28	1.92	8.2	3	13.38	-18.2	NONE

PURGE DATA:

Date: 2-26-99	Total Well Depth (TD): 86.6	End Purge (hrs): 0925
Method: Dedicated Bladder Pump	Static Water Level (WL): 76.12	Total Purge Time (min): 65
Well Casing: 2" PVC	Start Purge (hrs): 0820	Total Vol. Purged (gal): 1.4 ±
One Casing Volume(gal): 1.7		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	0800 - 2-27-99
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1452 - 2-28-99
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	0815 - 2-27-99
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	0808 - 2-27-99
Explosives (Subsets A)	4°C/Dark	(2) 1000 mL Amber Glass	0820, 0850, 0940 - 2-27-99
Explosives (Subsets B)	4°C/Dark (1) 1000	(2) ~~500~~ mL Amber Glass KS	1455 - 2-28-99
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1500 - 2-28-99
Cyanide	NaOH/4°C 1000	(1) ~~500~~ mL Polyethylene	1525 - 2-28-99
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1530 - 2-28-99
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1030 - 2-26-99
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1532 - 2-28-99
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1542 - 2-28-99
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1557 - 2-28-99
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		0930 - 2-26-99

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0 (ppm)
PID reading in Breathing Zone = 0 (ppm)

LOW SAMPLE LAB NOTIFIED

Reaction of sample to preservative: NONE

POOR PRODUCER, SLOW RECHARGE, PURGED DRY (TO PUMP INLET) 2-26-99
PURGING COMPLETE WILL SAMPLE 2-26-99 & CONTINUE SAMPLING SAT, SUN. UNTIL ALL REQUIRED BOTTLES ARE FILLED.
2-27-99 @ 0740 WL = 77.20
2-28-99 @ 1445 WL = 77.59

O_2 CHEMETS KIT = 3 PPM, 1020 2-26-99

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): K. S. Simpson

WELL WILL TAKE 3 or 4 DAYS TO SAMPLE, SAMPLED OUT OF BOTTLE FILLING ORDER TO MAINTAIN HOLD TIME FOR SHORT HOLD PARAMETERS

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM ABG

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: GO 38 7651

WELL ID.: 03C04
DATE: 2-26-99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0830	76.12	70	7.40	3.41	3	14.02	8.4	-18.1	
0840	77.10	65	7.29	2.50	3	10.17	8.6	-39.7	
0850	77.64	65	7.26	2.06	2	17.10	8.4	-42.3	
0900	78.05	65	7.24	1.95	3	17.38	8.2	-34.8	
0910	78.51	65	7.27	1.91	3	15.44	8.2	-20.2	
0920	79.03	60	7.28	1.92	3	13.38	8.2	-18.2	WATER LEVEL AT PUMP INLET END PURGE

SIGNATURE(S): K. S. Simpson

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CT038

Sample ID No.: AC071A99
Sample Location: ARG-03C07
Sampled By: SCOTT NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 2/26/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1302 End: 1458	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.16	0.789	12.4	8	6.97	117.9	NONE

PURGE DATA:

Date: 2/26/99	Total Well Depth (TD): 102.10 FT.	End Purge (hrs): 1259
Method: Dedicated Bladder Pump	Static Water Level (WL): 79.02 FT.	Total Purge Time (min): 240 *
Well Casing: 2" PVC	Start Purge (hrs): (SN) ~~0810~~ 0810	Total Vol. Purged (gal): 4.0
One Casing Volume(gal): 3.8		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1302
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1305
Explosives (Subset A)	4°C/Dark (SN)	(~~3~~) 1000 mL Amber Glass (2) 500 mL AG	1339 1346, 1316, 1324
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1354 ~~1324~~ (SN)
Cyanide	NaOH/4°C (SN)	(1) ~~500~~ 1000 mL Polyethylene	1405
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1418
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1420
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1425
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1433
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1440
Field test	Alkalinity, see SOP 7		1450

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 3.7 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

*Total purge time does not reflect equipment breakdown referenced in comments section of Low-Flow Purge Data Sheet and Field Log Book #2426.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott W. Neil

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651/C0038
WELL ID.: 03C07
DATE: 2/26/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0810	79.02	—						→	Begin Purging
0815	—							→	Pump not working - changed hose
0827	79.02	—						→	Begin purging.
0832	79.22	80	7.47	1.221	614	5.56	9.4	140.0	
0837	79.41	80	7.40	1.069	69	4.83	9.1	122.7	Decrease flow.
0842	79.59	72	7.44	0.974	104	5.12	8.8	131.2	Stop purging due to drawdown
0855	—							→	Water level indicator not functioning
—									properly - got another meter.
0914	79.18	—						→	Restart purging.
0919	79.29	72	7.44	0.869	74	6.06	8.5	122.7	Decrease flow.
0924	79.43	60	7.41	0.891	18	6.07	8.1	122.8	
0929	79.41	60	7.37	0.831	18	6.54	8.6	128.9	Cleaned turb. probe
0939	79.43	60	7.35	0.853	24	3.86	8.9	130.4	
0949	79.41	60	7.35	0.869	25	4.93	8.5	120.6	
0959	79.47	60	7.31	0.855	10	4.99	9.2	124.1	
1009	79.45	60	7.32	0.848	14	4.93	9.1	119.5	
1019	79.44	60	7.29	0.840	11	4.55	9.3	124.6	
1029	79.44	60	7.28	0.836	15	5.38	9.5	109.0	
1039	79.45	60	7.22	0.837	12	4.21	9.8	123.8	
1049	79.46	60	7.22	0.824	18	4.63	10.0	111.5	
1059	79.45	60	7.21	0.814	19	4.99	10.2	117.1	
1109	79.45	60	7.22	0.813	23	5.20	10.4	122.3	
1119	79.45	60	7.21	0.798	12	5.14	10.8	110.0	
1129	79.42	60	7.22	0.804	9	5.65	10.7	121.8	
1139	79.43	60	7.20	0.794	6	5.94	11.0	130.4	
1149	79.45	60	7.18	0.808	8	4.26	11.4	130.6	
1159	79.46	60	7.19	0.811	6	5.51	11.7	124.1	

SIGNATURE(S): Scott Neil

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LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C07
DATE: 2/26/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1209	79.45	65	7.17	0.795	7	4.69	12.0	126.9	Increased flow rate
1219	79.47	65	7.17	0.789	8	6.96	12.3	129.7	
1229	79.44	65	7.16	0.791	5	5.85	12.4	131.1	
1239	79.46	65	7.16	0.798	8	7.21	12.4	126.5	
1249	79.44	65	7.15	0.794	7	6.91	12.5	127.9	
1259	79.47	65	7.16	0.789	8	6.97	12.4	117.9	End purging.
1302	Begin sampling - sample # AC071A99; end sampling @ 1458.								

SIGNATURE(S): Scott W. Shed

PAGE 3 **OF** 3

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CTO 38

Sample ID No.: AC08P21A99
Sample Location: AB6-03C08P2
Sampled By: Scott Neil
C.O.C. No.:

SAMPLING DATA:

Date: 3/12/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1605 End: 1802	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.22	0.937	16.0	0	10.94	165.3	None

PURGE DATA:

Date: 3/12/99	Total Well Depth (TD): 103.50 FT.	End Purge (hrs): 1600 *
Method: Dedicated Bladder Pump	Static Water Level (WL): 75.04 FT.	Total Purge Time (min): 255
Well Casing: 2" PVC	Start Purge (hrs): 0830	Total Vol. Purged (gal): 4.8
One Casing Volume(gal): 4.6		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1605
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1610
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1633, 1622, 1645
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1658
Cyanide	NaOH/4°C (SN)	(1) ~~500 mL~~ Polyethylene (1000 mL)	1711
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1724
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1727
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1733
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1743
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1749
Field test	Alkalinity, see SOP 7		1802

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 2.1 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative:

*Stopped purging at 1118 due to malfunctioning bladder pump. Restarted purging @ 1430.

* Parameters not stable (DO). Started sampling after purging for four hours per FSP.

*End purge time includes time spent rectifying malfunctioning pump.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott W. Neil

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651
WELL ID.: 03C08P2 (ABG)
DATE: 3/12/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0830	75.04							→	Begin purging.
0835	75.48	87	7.65	1.314	292	5.24	8.7	118.4	water is clear.
0845	75.80	78	7.76	1.239	186	8.38	8.3	122.0	Adjusted flow rate.
0855	75.95	78	7.74	1.084	151	6.80	8.4	124.6	Adjusted flow rate.
0905	76.01	71	7.66	1.081	80	11.84	8.4	132.4	water is clear
0915	76.09	71	7.60	1.039	74	5.63	8.6	132.3	
0925	76.12	71	7.53	1.039	153	10.29	8.9	137.7	
0935	76.18	71	7.49	1.038	131	7.64	9.1	140.5	
0945	76.17	71	7.48	1.031	591	11.76	9.4	122.3	cleaned turbidity probe.
0955	76.19	71	7.46	1.014	231	4.55	9.2	146.4	water is clear.
1005	76.19	71	7.39	1.005	12	10.09	9.2	149.6	
1015	76.22	71	7.36	0.994	15	10.76	9.1	154.3	
1025	76.23	71	7.19	0.983	31	8.88	9.1	157.3	
1035	76.22	71	7.33	0.975	25	9.43	9.2	160.5	
1045	76.24	71	7.31	0.968	25	8.97	9.5	164.1	
1055	76.22	71	7.31	0.967	11	7.78	9.6	163.7	
1105	76.22	71	7.27	0.970	0	8.45	9.6	164.3	
1115	76.23	71	7.30	0.967	0	7.54	9.7	163.0	Stopped purging.
1118	Problem with bladder pump - please refer to Field Logbook #2426, page 37.								
1430	75.01							→	Restart purging w/ new bladder pump
1440	75.35	71	7.44	1.592	472	11.93	9.9	152.8	
1450	75.34	71	7.36	1.119	246	9.84	10.1	153.6	
1500	75.60	71	7.35	1.035	21	8.91	10.1	151.7	
1510	75.80	71	7.32	0.983	4	11.05	10.0	158.9	
1520	75.90	71	7.30	0.966	0	10.64	10.2	161.0	
1530	75.94	71	7.29	0.954	0	10.31	10.1	163.5	
1540	75.97	71	7.28	0.941	1	10.45	10.1	153.6	

SIGNATURE(S): Scott W. Reid

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NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38

WELL ID.: 03C08P2 (ABG)
DATE: 3/12/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1550	76.01	71	7.25	0.940	0	11.56	10.0	158.0	
1600	76.02	71	7.22	0.937	0	10.94	10.0	165.3	End purging.
1605	Begin sampling sample # AC08P21A99.								
1802	End sampling								

SIGNATURE(S): [illegible]

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CTO 38

Sample ID No.: ACOGP21A99
Sample Location: OSCOGPZ - ABG
Sampled By: Scott Neil
C.O.C. No.:

SAMPLING DATA:

Date: 3/1/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1321 End: 1302	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	6.87	0.492	13.0	8	8.01	165.6	None

PURGE DATA:

Date: 2/27/99	Total Well Depth (TD): 74.40 FT.	End Purge (hrs): 1218
Method: Dedicated Bladder Pump	Static Water Level (WL): 45.19 FT.	Total Purge Time (min): 240
Well Casing: 2" PVC	Start Purge (hrs): 0818	Total Vol. Purged (gal): 12.4
One Casing Volume(gal): 4.8		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1221
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1225
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1228 1233 1235
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1239
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	1243
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1246
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1247
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1250
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1252
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1254
Field test	Alkalinity, see SOP 7		1258

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0.0 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative:

① Indiana University transducer in this well.

② Purged for 4 hours (per FSP) due to unstable field parameters. (especially Turbidity & DO).

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott Neil

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C09P2
DATE: 3/1/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0818	45.19							→	Begin purging.
0823	45.19	195	6.94	0.599	643	11.05	12.2	120.7	Slight brownish color-sediment.
0833	45.20	195	6.98	0.506	541	8.71	12.2	151.8	
0843	45.20	195	6.89	0.501	476	8.86	12.5	150.3	
0853	45.20	195	6.86	0.496	408	9.46	12.4	153.4	
0903	45.20	195	6.84	0.489	362	9.76	12.3	156.7	
0913	45.21	195	6.84	0.490	326	7.47	12.3	155.4	
0923	45.21	195	6.83	0.485	39	9.54	12.5	165.3	Cleaned flow-thru cell cup. Sed. build-up.
0933	45.20	195	6.82	0.483	33	7.86	12.5	170.0	Brown / Sediment.
0943	45.22	195	6.81	0.482	33	7.51	12.3	173.0	
0953	45.21	195	6.81	0.483	26	8.92	12.5	177.7	
1003	45.22	195	6.81	0.481	21	9.51	12.6	182.6	
1013	45.23	195	6.81	0.483	24	9.75	12.6	177.9	
1023	45.23	195	6.82	0.482	16	8.51	12.7	186.2	Cleaned flow-thru cell of sed. build-up.
1033	45.23	195	6.82	0.482	14	9.54	12.7	186.2	Light Brown / Light sediment.
1043	45.24	195	6.83	0.484	21	7.27	12.5	189.6	
30,225mL 1053	45.24	195	6.83	0.485	18	9.12	12.7	184.2	
1103	45.25	195	6.84	0.486	13	8.87	12.6	176.1	Sediment (Light)
1113	45.25	195	6.84	0.486	12	8.99	12.6	184.4	
1123	45.25	195	6.83	0.488	13	8.11	12.7	184.8	
1133	45.25	195	6.84	0.490	11	7.81	12.8	183.7	
1143	45.24	195	6.84	0.490	11	7.62	13.0	183.3	
1153	45.24	195	6.85	0.491	8	6.70	13.0	160.6	
1203	45.24	195	6.87	0.485	14	8.51	13.0	165.1	
1213	45.24	195	6.86	0.492	8	7.49	13.1	160.2	
1218	45.25	195	6.87	0.492	8	8.01	13.0	165.6	
	Purged for 4 Hours due to high turbidity - begin sampling per FSP.								

SIGNATURE(S): Scott W. Reid

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CT038

Sample ID No.: AC101A99
Sample Location: 03C10 (AB6)
Sampled By: SCOTT NGIL
C.O.C. No.:

SAMPLING DATA:

Date: 2/25/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1044 End: 1202	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	6.53	0.521	13.1	6	3.58	155.6	None

PURGE DATA:

Date: 2/25/99	Total Well Depth (TD): 79.10 FT.	End Purge (hrs): 1038
Method: Dedicated Bladder Pump	Static Water Level (WL): 50.12 FT	Total Purge Time (min): 140
Well Casing: 2" PVC	Start Purge (hrs): 0818	Total Vol. Purged (gal): 7.8
One Casing Volume(gal): 4.7		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1044
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1054
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1059
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1102
Explosives (Subsets A)	4°C/Dark 4	(~~2~~) 1000 mL Amber Glass	1107, 1113, 1117, 1121
Explosives (Subsets B)	4°C/Dark 1	(~~2~~) ~~500~~ 1000 mL Amber Glass	1126
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1131
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	1135
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1140
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1141
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1144
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1148
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1150
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1202

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 11.7 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: Sulfide formed a precipitate.

Extra volume purged due to turbidity readings above 10 NTU's.
Natural Attenuation DO using Chemets Kit = 2.5 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott Ngil

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

ABG

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C10
DATE: 2/25/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0818	50.12								Begin purging.
0823	50.15	180	6.70	0.610	654	4.33	12.5	166.2	water is clear.
0828	50.15	180	6.60	0.523	612	3.72	12.9	168.6	↓
0833	50.16	240	6.58	0.528	44	3.17	13.4	171.9	Increased flow.
0838	50.20	240	6.57	0.527	32	3.13	13.4	172.4	water is clear.
0843	50.20	210	6.56	0.524	30	3.10	13.1	172.7	Decreased flow.
0853	50.15	210	6.55	0.529	27	3.23	13.0	175.3	Water is clear.
0903	50.16	210	6.54	0.527	12	3.10	12.4	168.0	
0913	50.16	210	6.54	0.524	11	3.44	13.2	170.6	
0923	50.16	210	6.54	0.522	32	3.82	13.0	172.1	
0933	50.16	210	6.53	0.524	12	3.81	12.7	174.2	Cleaned turb. probe.
0943	50.17	210	6.53	0.521	9	3.90	12.8	175.3	water is clear.
0953	50.17	210	6.53	0.521	9	3.89	13.0	171.2	
0958	50.17	210	6.60	0.519	12	4.72	12.8	163.0	
1003	50.17	210	6.53	0.523	11	4.38	13.1	170.4	
1008	50.17	210	6.52	0.521	12	3.73	13.0	169.0	
1013	50.18	210	6.53	0.522	12	4.01	13.1	163.9	
1018	50.18	210	6.52	0.521	11	3.46	13.0	159.7	
1023	50.17	210	6.52	0.517	12	3.62	13.0	160.2	
1028	50.18	210	6.52	0.520	9	3.35	13.0	156.0	
1033	50.18	210	6.52	0.516	7	3.58	13.1	156.1	
1038	50.18	210	6.53	0.521	6	3.58	13.1	158.6	
1044	Begin sampling - sample # AC10A99 - end sampling @ 1202								

SIGNATURE(S): Beth Ne

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

Sample ID No.: ACIIIA99
Sample Location: ABG 03C11
Sampled By: KEITH SIMPSON
C.O.C. No.:

SAMPLING DATA:

Date: 2.25.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1008 End: 1210	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	NONE	7.15	1.90	10.7	1	7.69	-59.5	CLEAR

PURGE DATA:

Date: 2.25.95	Total Well Depth (TD): 60.9	End Purge (hrs): 1000
Method: Dedicated Bladder Pump	Static Water Level (WL): 44.40	Total Purge Time (min): 113
Well Casing: 2" PVC	Start Purge (hrs): 0807	Total Vol. Purged (gal): 3.2
One Casing Volume(gal): 2.7		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1008
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1015
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1018
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1026
Explosives (Subsets A)	4°C/Dark KS 4	(2) 1000 mL Amber Glass	1038, 1050, 1111, 1133
Explosives (Subsets B)	4°C/Dark (1) 1000	(2) ~~500~~ mL Amber Glass	1220
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1240
Cyanide	NaOH/4°C 1000	(1) ~~500~~ mL Polyethylene	1300
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1316
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1318
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1328
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1335
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1347
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		KS ~~1140~~ 1140

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 4.1 (ppm)
PID reading in Breathing Zone = 0 (ppm)

Reaction of sample to preservative: NONE

ALSO AT WELL DURING SAMPLING ANDY KENDRECK TINUS, JAMES MAY & DANNY HARRELSON SEE ALSO LOG BOOK # 1309

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	FD 02259901

Signature(s): K. S. Simpson

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 38 7651
WELL ID.: ABG 03C11
DATE: 2.25.99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0814	44.40	130	7.12	2.53	35.5	12.0	11.0	133.3	
0820	44.85	110	7.03	2.09	44.6	20.71	11.2	143.7	
0830	44.93	100	7.10	1.94	1	10.87	10.7	-1.3	CLEANED PROBE
0840	44.89	100	7.09	1.94	1	10.21	11.1	-27.5	
0845	44.94	100	7.11	1.94	1	8.37	10.7	-34.3	
0855	44.89	100	7.12	1.92	1	16.72	10.6	-41.5	
0905	44.95	100	7.14	1.91	1	6.71	10.7	-49.8	
0915	44.95	100	7.16	1.88	1	11.05	10.9	-53.7	
0925	44.97	100	7.16	1.89	2	11.10	11.1	-55.5	
0930	45.02	100	7.15	1.89	1	12.21	11.2	-54.9	
0940	45.00	100	7.15	1.90	1	8.26	10.64	-54.5	
0950	45.01	100	7.16	1.90	1	7.69	10.7	-54.5	
0955	45.01	100	7.15	1.90	1	7.69	10.7	-54.5	

SIGNATURE(S): K. S. Simpson

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

Sample ID No.: AC121A99
Sample Location: 3C12
Sampled By: KEITH SIMPSON
C.O.C. No.:

SAMPLING DATA:

Date: 2-27-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1410 End: 1657	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	NONE
Method: Dedicated Bladder Pump	CLEAR	7.25	0.643	13.3	0	8.46	139.4	~~CLEAR~~ KS

PURGE DATA:

Date: 2-27-99	Total Well Depth (TD): 53.2	End Purge (hrs): 1408
Method: Dedicated Bladder Pump	Static Water Level (WL): 41.83	Total Purge Time (min): 94
Well Casing: 2" PVC	Start Purge (hrs): 1234	Total Vol. Purged (gal): 2.1
One Casing Volume(gal): 1.9		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1410
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1416
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1418
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1420
Explosives (Subsets A)	4°C/Dark 4	(1) 1000 mL Amber Glass	1434, 1510, 1520, 1535
Explosives (Subsets B)	4°C/Dark (1) 1000	~~(2) 500~~ mL Amber Glass KS	1548
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1600
Cyanide	NaOH/4°C 1000	(1) ~~500~~ mL Polyethylene KS	1615
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1629
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1631
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1634
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1640
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1647
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1450

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0.2 (ppm)
PID reading in Breathing Zone = 0 (ppm)

Reaction of sample to preservative: PRECIPITATE IN SULFIDE

SULFIDE IN THE FIELD @ 1455 = 0 mg/L

DO CHEMETRICS 6.5+ PPM @ 1440

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): K. S. Simpson

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 38 7651

WELL ID.: 3C12 ABG
DATE: 2·27·99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1238	41.83	100	7.33	1.327	13	8.57	13.4	126.5	
1245	42.02	85	7.32	1.003	7	8.92	13.4	127.2	
1250	42.03	85	7.32	0.818	5	8.58	13.4	130.4	
1255	42.05	↓	7.30	0.732	3	8.26	13.3	132.7	
1305	42.13	↓	7.29	0.697	0	7.90	13.3	143.8	
1315	42.19	80	7.28	0.688	0	8.45	13.3	141.1	
1325	42.25	↓	7.28	0.676	0	7.80	13.3	140.0	
1335	42.30	↓	7.26	0.667	0	8.61	13.3	141.3	
1345	42.30	↓	7.24	0.663	0	7.97	13.4	140.1	
1355	↓	↓	7.24	0.653	0	8.39	13.3	132.2	
1400	↓	↓	7.24	0.647	0	8.83	13.3	134.5	
1405	↓	↓	7.25	0.643	0	8.46	13.3	139.4	

SIGNATURE(S): [illegible]

PAGE 2 **OF** 2

90 MIN. = 1 VOL

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651 / CTO 38

Sample ID No.: AC15IA99
Sample Location: 03C15 - ABG
Sampled By: SCOTT NEIL
C.O.C. No.: 0021 + 0022

SAMPLING DATA:

Date: 3/1/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1605 End: 1704	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.15	0.826	12.9	1	1.89	3.5	None

PURGE DATA:

Date: 3/1/99	Total Well Depth (TD): 102.57 FT.	End Purge (hrs): 1602
Method: Dedicated Bladder Pump	Static Water Level (WL): 64.38 FT.	Total Purge Time (min): 115
Well Casing: 2" PVC	Start Purge (hrs): 1407	Total Vol. Purged (gal): 6.4
One Casing Volume(gal): 6.2		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1605
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1615
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1624, 1628, 1633
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1637
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1642
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1644
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1645
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1648
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1651
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1655
Field test	Alkalinity, see SOP 7		1700

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 4.3 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

Nitrogen cylinder tapped out at beginning of sampling - changed cylinder.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott Neil

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C15
DATE: 3/1/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1407	64.38							→	Begin purging
1412	64.40	212	7.20	0.730	1257	1.16	12.5	10.1	Rust colored water.
1422	64.40	212	7.21	0.800	22	3.66	12.2	7.7	water has cleared.
1432	64.40	212	7.15	0.818	16	2.56	12.6	-1.3	
1442	64.40	212	7.15	0.819	12	2.44	12.2	-7.4	
1452	64.40	212	7.16	0.802	15	2.48	12.5	-1.0	
1502	64.40	212	7.15	0.809	7	3.13	12.6	-1.2	
1512	64.40	212	7.15	0.806	13	3.10	12.6	3.6	
1522	64.40	212	7.14	0.826	2	2.04	13.3	2.6	
1532	64.40	212	7.15	0.831	1	2.06	13.4	2.2	
1542	64.40	212	7.15	0.832	2	2.07	13.2	1.5	
1552	64.40	212	7.15	0.828	1	1.97	13.0	1.6	
1602	64.38	212	7.15	0.826	1	1.89	12.9	3.5	
	Begin sampling @ 1605, sample # AC15IA99.								
	End sampling @ 1704.								

SIGNATURE(S): Scott W. Reid

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651 / CTO 38

Sample ID No.: AC171AGG
Sample Location: ABG-03C17
Sampled By: Scott Neil
C.O.C. No.:

SAMPLING DATA:

Date: 3/8/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1615 End: 1714	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.01	2.204	11.3	0	1.26	-22.9	None

PURGE DATA:

Date: 3/8/99	Total Well Depth (TD): 151.70 ft.	End Purge (hrs): 1610
Method: Dedicated Bladder Pump	Static Water Level (WL): 138.38 ft.	Total Purge Time (min): 140
Well Casing: 2" PVC	Start Purge (hrs): 1350	Total Vol. Purged (gal): 7.0 *
One Casing Volume(gal): 2.2		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1615
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1618
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1625, 1631, 1637
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1643
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000 mL	1648
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1653
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1654
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1657
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1700
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1704
Field test	Alkalinity, see SOP 7		1708

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0.4 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

* Extra volume purged due to unstable parameters.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott Neil

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C17
DATE: 3/8/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1350	138.38							→	Begin purging
1400	138.38	188	7.00	2.418	229	13.94	11.0	-49.1	
1410	138.39	188	6.98	2.226	15	11.10	11.1	-40.0	
1420	138.38	188	6.98	2.190	0	9.11	11.1	-30.2	Cleaned turbidity probe.
1430	138.38	188	6.98	2.191	0	6.05	11.3	-27.5	
1440	138.38	188	6.98	2.192	2	5.00	11.2	-30.1	
1450	138.38	188	6.98	2.189	0	4.93	11.1	-27.4	
1500	138.38	188	7.00	2.193	0	2.89	11.2	-22.2	
1510	138.38	188	6.99	2.182	0	2.72	11.1	-12.2	
1520	138.38	188	7.00	2.193	0	2.65	11.2	-19.5	
1530	138.38	188	6.99	2.198	0	2.02	11.3	-19.3	
1540	138.38	188	6.99	2.204	0	0.77	11.3	-24.1	
1550	138.38	188	7.00	2.204	0	1.23	11.3	-21.5	
1600	138.38	188	7.00	2.207	0	1.17	11.2	-21.6	
1610	138.38	188	7.01	2.209	0	1.26	11.3	-22.9	
	Begin sampling @ 1615 - Sample # AC171A99.								
	End sampling @ ~~1~~ 1714								
		(SW)							

SIGNATURE(S): Scott A. Neil

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CTO 38

Sample ID No.: AC201A99
Sample Location: ABG-03C20
Sampled By: Scott Neil
C.O.C. No.:

SAMPLING DATA:

Date: 3/11/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1045 End: 1150	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.13	0.656	11.1	0	4.21	169.2	None

PURGE DATA:

Date: 3/11/99	Total Well Depth (TD): 121.70 FT.	End Purge (hrs): 1040
Method: Dedicated Bladder Pump	Static Water Level (WL): 89.70 FT.	Total Purge Time (min): 130
Well Casing: 2" PVC	Start Purge (hrs): 0815	Total Vol. Purged (gal): 5.6
One Casing Volume(gal): 5.2		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1045
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1049
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1102, 1055, 1107
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1112
Cyanide	NaOH/4°C (Si)	(1) ~~500 mL~~ Polyethylene (1000 mL)	1118
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1124
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1126
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1129
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1134
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1137
Field test	Alkalinity, see SOP 7		1145

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 9.5 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

Purging interrupted @0912 due to burning at the ABG - resume purging at 0925.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott A. Neil

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38

WELL ID.: 03C20 (ABG)
DATE: 3/11/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0815	89.70	→						→	Begin purging.
0820	89.78	120	7.26	1.043	153	5.46	9.7	96.9	
0830	89.79	120	7.16	0.682	65	4.77	10.1	121.6	
0840	89.78	120	7.15	0.659	53	5.99	10.0	139.6	
0850	89.78	120	7.15	0.667	48	5.38	10.1	148.4	
0900	89.78	120	7.14	0.657	66	4.85	10.0	156.2	
0910	89.84	188	7.13	0.658	107	7.30	10.7	146.7	Increased flow rate.
0912	→						→		Stopped purging due to
									burning activities.
0925	89.72	→						→	Resume purging.
0935	89.81	188	7.14	0.657	53	6.01	10.5	158.8	
0945	89.83	188	7.14	0.653	0	7.46	10.8	165.8	Cleaned turbidity probe.
0955	89.85	188	7.14	0.657	2	3.94	10.7	172.0	
1005	89.84	188	7.14	0.658	0	4.33	10.7	170.1	
1015	89.84	188	7.13	0.656	0	3.79	10.8	173.2	
1025	89.85	188	7.13	0.657	0	4.20	11.0	173.4	
1035	89.84	188	7.13	0.658	0	4.15	11.1	171.2	
1040	89.84	188	7.13	0.656	0	4.21	11.1	169.2	End purging.
1045	Begin sampling - sample # AC20iA99.								
1150	End sampling								

SIGNATURE(S): Scott W. Reid

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO38 7651

Sample ID No.: A C25 1A 99
Sample Location: ABG 03C25
Sampled By: SIMPSON & NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 2.24.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: ~~1010~~ 1110 KS End: 1240	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.11	1.063	10.8	0	3.14	-74.1	LT. SULFUR

PURGE DATA:

Date: 2.24.99	Total Well Depth (TD): 74.0	End Purge (hrs): KS ~~1008~~ 1108
Method: Dedicated Bladder Pump	Static Water Level (WL): 46.96	Total Purge Time (min): ~~48~~ 108
Well Casing: 2" PVC	Start Purge (hrs): 0920	Total Vol. Purged (gal): 4.9
One Casing Volume(gal): 4.4		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1110
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1116
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1118
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1121
Explosives (Subsets A)	4°C/Dark KS 4	(2) 1000 mL Amber Glass	1128, 1130, 1137, 1142
Explosives (Subsets B)	4°C/Dark 10	~~(2) 500~~ mL Amber Glass	1155
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1202
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	1207
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1213
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1218
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1220
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1222
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1225
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1230

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 3.5 (ppm)
PID reading in Breathing Zone = 0 (ppm)

Reaction of sample to preservative: SULFIDE ~~PRECIPITATION~~ KS Precipitation

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott Neil

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 38 7651

WELL ID.: 03C25
DATE: 2.24.99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0920	46.96							→	BEGIN PURGING
0925	47.00	150	7.23	1.314	177	5.90	9.8	-43.8	Clear/light sulfur odor
0930	47.04	175	7.19	1.052	7	9.76	10.3	-67.0	Cleaned turb. probe
0940	47.08	175	7.16	1.051	2	12.16	10.5	-72.2	Clear/lgt. sulfur odor
0950	47.09	175	7.14	1.039	4	15.71	10.6	-69.5	Cleaned turb. probe
1000	47.12	175	7.12	1.045	1	20.03	10.6	-59.3	Clear/lgt. sulfur odor
1010	47.11	175	7.11	1.053	0	17.04	10.7	-63.4	Cleaned turb. probe
1020	47.13	175	7.12	1.054	2	23.31	10.7	-60.5	Clear/lgt. sulfur odor.
1030	47.15	175	7.12	1.053	1	3.75	10.6	-40.5	
1040	47.15	175	7.11	1.060	2	3.31	10.6	-65.6	
1050	47.14	175	7.11	1.060	1	3.19	10.7	-71.8	
1100	47.14	175	7.11	1.060	0	3.75	10.8	-74.3	
1105	47.15	175	7.11	1.063	0	3.14	10.8	-74.1	

750
575
175

SIGNATURE(S): [illegible]

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GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651/CC038

Sample ID No.: AC261A99
Sample Location: ABG-03C26
Sampled By: Scott Neil
C.O.C. No.: 0022

SAMPLING DATA:

Date: 3/2/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1205 End: 1359	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.11	0.780	11.2	0	4.04	106.1	None

PURGE DATA:

Date: 3/2/99	Total Well Depth (TD): 107.84 FT.	End Purge (hrs): 1201
Method: Dedicated Bladder Pump	Static Water Level (WL): 82.45 FT.	Total Purge Time (min): 231
Well Casing: 2" PVC	Start Purge (hrs): 0810	Total Vol. Purged (gal): 4.1
One Casing Volume(gal): 4.1		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1205
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1207
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1219, 1232, 1247
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1259
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene (1000 mL)	1308
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1316
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1317
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1322
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1327
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1334
Field test	Alkalinity, see SOP 7		1350

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0.0 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

QA Samples Collected:

MS/MSD	Duplicate ID No.:	Signature(s):
None	None	Scott W. Neil

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C26
DATE: 3/2/99

	Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
	0810	82.45								Begin purging.
600	0815	82.68	~~103~~/120	7.15	0.963	40	4.00	10.6	8.0	water is clear.
515	0820	82.79	103	7.13	0.873	8	4.86	10.5	13.9	Adjusted flow rate.
420	0825	82.95	84	7.11	0.814	22	5.62	10.7	25.8	Adjusted flow rate.
	0830	83.19	72	7.10	0.806	19	4.26	10.5	31.8	Adjusted flow rate.
	0835	83.30	72	7.19	0.824	21	5.91	10.2	40.9	
1080	0840	83.46	72	7.09	0.795	14	4.41	10.2	47.1	
	0850	83.50	65	7.10	0.784	8	4.82	9.9	66.9	Adjusted flow rate.
1300	0900	83.52	65	7.08	0.762	0	6.43	9.9	92.6	
	0910	83.57	65	7.10	0.785	0	5.16	10.0	93.2	
	0920	83.60	65	7.11	0.782	1	6.16	10.1	97.6	
	0930	83.64	65	7.11	0.781	0	5.00	10.0	104.3	
	0940	83.66	65	7.12	0.778	2	4.36	10.0	106.2	
	0950	83.67	65	7.11	0.782	1	4.87	10.0	107.1	
	1000	83.69	65	7.11	0.779	0	5.17	10.0	107.7	YSI keypad not operating - went to
										KS's sample location and took his keypad.
5265	1021	83.72	65	7.10	0.777	0	4.14	10.6	114.3	
	1031	83.73	65	7.11	0.780	3	4.38	10.8	116.0	
	1041	83.72	65	7.11	0.777	1	3.89	11.1	113.3	
	1051	83.72	65	7.12	0.777	1	5.64	11.0	117.3	
	1101	83.73	65	7.12	0.776	0	6.55	10.9	112.2	
	1111	83.71	65	7.12	0.776	2	5.29	10.6	113.4	
	1121	83.71	65	7.12	0.769	2	4.52	11.0	108.9	
	1131	83.70	65	7.12	0.780	0	4.65	11.2	104.1	
	1141	83.70	65	7.12	0.777	0	4.00	11.3	103.5	
	1151	83.70	65	7.11	0.778	0	4.21	11.3	108.5	
	1201	83.70	65	7.11	0.780	0	4.04	11.2	106.1	End of purging.

SIGNATURE(S): [illegible]

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

Sample ID No.: AC271A99
Sample Location: 03C27 ABG
Sampled By: K. SIMPSON
C.O.C. No.:

SAMPLING DATA:

Date: 3.2.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 0952 End: 1622	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.59	0.304	9.2	8	7.57	164.9	NONE

PURGE DATA:

Date: 3.2.99	Total Well Depth (TD): ≈ 75.0	End Purge (hrs): 0950
Method: Dedicated Bladder Pump	Static Water Level (WL): 60.66	Total Purge Time (min): 125
Well Casing: 2" PVC	Start Purge (hrs): 0745	Total Vol. Purged (gal): 2.6
One Casing Volume(gal): 2.3		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	0955
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1010
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1130, 1210, 1240
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1400
Cyanide	NaOH/4°C ↔ 1000	(1) ~~500~~ mL Polyethylene	1430
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1515
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1520
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1531
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1540
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1555
Field test	Alkalinity, see SOP 7		1610

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 1.4 (ppm)
PID reading in Breathing Zone = 0 (ppm)

↑ CONTAINERS NUMBERS INCREASED DUP. & MS/MSD SEE COC

Reaction of sample to preservative: NONE

QA Samples Collected:

MS/MSD	Duplicate ID No.:
YES	FD03029901

Signature(s): K. S. Simpson

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CT038 7651

WELL ID.: 03C27 ABG
DATE: 3.2.99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0748	60.66	90	7.35	1.461	3	12.10	8.9	164.0	
0758	60.75	80	7.61	0.324	1.5	12.02	8.3	145.5	
0810	60.92		7.55	0.340	8	13.77	8.0	157.5	
0820	60.95		7.56	0.340	6	12.01	8.2	156.1	
0830	60.95		7.57	0.335	7	12.26	8.2	161.4	
0840	60.89		7.56	0.331	9	11.49	8.1	165.4	
0850	60.93		7.58	0.326	8	12.27	8.1	153.3	
0900	60.95		7.58	0.319	7	10.58	8.4	156.5	
0910	61.00		7.55	0.310	7	10.39	8.4	156.7	
0920	61.03		7.54	0.309	8	9.71	8.5	159.3	
0930	61.04		7.56	0.303	8	9.14	8.4	163.3	
0940	61.05		7.57	0.305	7	8.27	8.3	160.4	
0950	61.05		7.59	0.304	8	7.97	8.2	164.9	

SIGNATURE(S): [illegible] S. Simpson

PAGE 2 **OF** 2

110 MIN = 1 vol. 0950

GROUND WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: 7651 / CTO 38

Sample ID No.: AC301A99
Sample Location: ABG-03C30
Sampled By: Scott Neil
C.O.C. No.:

SAMPLING DATA:

Date: 3/9/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1305 End: 1519	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	Light sulphur ~~[illegible]~~ SN
Method: Dedicated Bladder Pump	Clear	8.32	0.778	10.9	0	0.77	-112.9	

PURGE DATA:

Date: 3/9/99	Total Well Depth (TD): 263.90 FT.	End Purge (hrs): 1300
Method: Dedicated Bladder Pump	Static Water Level (WL): 223.04 FT.	Total Purge Time (min): 240
Well Casing: 2" PVC	Start Purge (hrs): 0835	Total Vol. Purged (gal): 3.7
One Casing Volume(gal): 6.6		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1305
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1308
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1324, 1339, 1352
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1406
Cyanide	NaOH/4°C SN	(1) ~~500 mL~~ Polyethylene (100 mL)	1419
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1431
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1433
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1440
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1448
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1455
Field test	Alkalinity, see SOP 7		SN ~~1608~~ 1508

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 1.4 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative:

well was purged for four hours before sampling.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott W. Neil

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38

WELL ID.: 03C30 (ABG)
DATE: 3/9/99

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0835	223.04							→	Begin purging.
0840	223.82	63	8.37	1.312	0	9.36	8.2	102.3	
0845	224.35	63	8.39	1.353	5	9.11	8.2	105.5	
0855	224.92	63	10.81	0.741	4	6.43	8.2	71.2	
0905	225.34	63	11.92	1.419	81	4.34	8.5	20	
0915	225.92	63	11.90	1.394	65	6.29	10.1	-21.6	Flow-thru cell inside vehicle.
0925	226.28	63	11.86	1.281	1	4.87	9.8	-43.0	Cleaned turbidity probe.
0935	226.61	63	11.72	1.149	1	4.89	10.8	-66.9	
0945	226.87	63	11.76	1.145	1	4.22	10.8	-67.2	
0955	226.97	63	11.04	0.778	1	3.63	10.5	-76.1	
1005	227.15	63	10.81	0.739	0	2.12	10.6	-73.5	Stop purging for recharge.
5670 1030	~~225.05~~							→	Start purging. Rate of recharge = ~~[illegible]~~ 0.08 FT/min
1040	225.49	55	10.37	0.716	0	3.46	10.4	-64.2	Decrease flow rate.
1050	225.88	55	10.21	0.713	0	2.79	10.6	-61.0	
1100	226.12	55	9.85	0.708	0	3.06	10.8	-55.9	
1110	226.25	55	9.70	0.702	0	1.32	11.0	-58.0	
1120	226.47	55	9.33	0.701	0	2.82	10.8	-61.0	
1130	226.59	55	9.23	0.703	0	2.30	10.6	-63.8	
1140	226.69	55	9.08	0.702	0	2.03	10.8	-69.7	
1150	226.83	55	8.96	0.717	0	2.75	10.8	-71.1	
1200	226.92	55	8.88	0.725	0	2.11	11.0	-79.5	
1210	227.01	55	8.77	0.735	0	2.36	10.9	-85.4	
1220	226.98	55	8.70	0.744	0	1.88	10.9	-89.4	
1230	226.99	55	8.58	0.755	0	1.52	10.8	-94.4	
1240	227.01	55	8.45	0.769	1	1.01	10.9	-95.1	
1250	227.03	55	8.38	0.773	0	1.10	10.8	-102.3	
8250 1300	227.01	55	8.32	0.778	0	0.77	10.9	-112.9	End purging. Begin Sampling @ 1305.

SIGNATURE(S): Scott W. Reid

PAGE 2 **OF** 2

ATTACHMENT 6

SURFACE WATER SAMPLE LOG FORMS
MONITORING EVENT NO. 2

SURFACE WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

☑ Stream
☐ Spring

Sample ID No.: A CRA IA 99
Sample Location: CREEK BELOW SPRING A
Sampled By: SIMPSON & NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 2-28-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1115 End: 1153	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Depth: 4 inches	Cloudy	7.35	0.104	7.9	15.1	12.67	157.0	None
Method: Direct Fill								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1115
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1119
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1122
TOX	H_2SO_4/4°C (KS)	(1) 1000 mL Amber Glass	1124
Explosives (Subsets A)	4°C/Dark (4)	(2) 1000 mL Amber Glass	1126
Explosives (Subsets B)	4°C/Dark	(2) 500 mL Amber Glass	1131
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1133
Cyanide	NaOH/4°C 1000	(1) ~~500 mL~~ Polyethylene (KS)	1139
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1143
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1145
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1147
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1149
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1150
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1152

OBSERVATIONS / NOTES:

Reaction of sample to preservative: Sulfide formed precipitate

Estimated Flow Rate: 800 gpm

T-storm on 2/27/99

Comments:

8 inches total depth of creek.
Sulfide result from creek:
sample = 0.00 mg/L

Chemets DO = 9.5 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:

Signature(s): [illegible] / S. Simpson

SURFACE WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

[X] Stream
[ ] Spring

Sample ID No.: A SPC 1A 99
Sample Location: SPRING C
Sampled By: SIMPSON & NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 2.28.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1430 End: 1451	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Depth: 3" BELOW SWR.								
Method: Direct Fill	CLOUDY	7.14	0.095	8.8	10.2	13.15	165.8	NONE

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1430
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1431
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1432
TOX	H_2SO_4/4°C KS	(1) 1000 mL Amber Glass	1433
Explosives (Subsets A)	4°C/Dark (4)	(~~8~~) 1000 mL Amber Glass	1434, 1435, 1437, 1438
Explosives (Subsets B)	4°C/Dark	(2) 500 mL Amber Glass	1439, 1440
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1441
Cyanide	NaOH/4°C 1000	(1) ~~500~~ mL Polyethylene KS	1442
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1443
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1444
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1446
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1447
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1448
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1450

OBSERVATIONS / NOTES:

Reaction of sample to preservative:
SULFIDE FORMED A PRECIPITATE

Estimated Flow Rate: ~~300 GPM~~ KS > ~~150 GPM~~ KS
300 GPM

T-Storm on 2/27/99

Comments:

SULFIDE @ SPRING = ~~0 mg/L~~ KS
0.06 mg/L

CHEMETS DO = 10.5 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

SURFACE WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 38 7651

Sample ID No.: A CRB 1A 99
Sample Location: CREEK AT BOUNDARY
Sampled By: SIMPSON & NEIL
C.O.C. No.:

[x] Stream
[ ] Spring

SAMPLES TAKEN @ 4" BELOW SURFACE

SAMPLING DATA:

Date: 2-28-99 / Time-Start 0815 End: 1004 / Depth: 16 inches (max) / Method: Direct Fill	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
	Cloudy	7.35	0.095	7.9	14.2	12.36	186.4	None

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	0815
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	0830
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	0838
TOX	H_2SO_4/4°C (KS)	(1) 1000 mL Amber Glass	0843
Explosives (Subsets A)	4°C/Dark (4)	(~~2~~) 1000 mL Amber Glass	0855
Explosives (Subsets B)	4°C/Dark	(2) 500 mL Amber Glass	0905
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	0916
Cyanide	NaOH/4°C 1000	(1) ~~500~~ mL Polyethylene (KS)	0922
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	0930
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	0934
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	0939
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	0943
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	0950
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1000

OBSERVATIONS / NOTES:

Reaction of sample to preservative: NONE

Estimated Flow Rate: HIGH 500 GPM

STORMS KS 2-28-99 RAIN ENDING ≈ 10:00PM. VERY LITE RAIN 2-28-99

HIGH FOR RATE AT ALL SURFACE LOCATION DIFFICULT TO ESTIMATE

Comments:

Sulfide results (at creek):
Sample = 0.07 mg/L
Duplicate = 0.05 mg/L

CHEMETS DO = ~~8.5~~ 9.5 (KS) mg/L @ 1030

QA Samples Collected:

MS/MSD	Duplicate ID No.:
YES	FD 02299901

Signature(s): Scott [illegible]
N. S. Simp

SURFACE WATER SAMPLE LOG FORM

Project Site Name: NSWC CRANE, IN
Project No.: CTO 39 7651

[] Stream
[✓] Spring

Sample ID No.: A SPA 1A 99
Sample Location: SPRING A
Sampled By: SIMPSON & NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 2/28/99	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time-Start: 1405 End: 1420								
Depth: SAMPLED @ 4" BS	Cloudy	7.30	0.106	8.1	15.9	12.65	178.7	None
Method: Direct Fill								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1405
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1407
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1408
TOX	H_2SO_4/4°C KS	(1) 1000 mL Amber Glass	1409
Explosives (Subsets A)	4°C/Dark (4)	(~~2~~) 1000 mL Amber Glass	1410, 1411, 1411, 1412
Explosives (Subsets B)	4°C/Dark	(2) 500 mL Amber Glass	1413, 1414
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1415
Cyanide	NaOH/4°C 1000	(1) ~~500~~ mL Polyethylene KS	1416
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1416
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1417
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1417
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1418
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1419
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1420

OBSERVATIONS / NOTES:

Reaction of sample to preservative: SULFIDE FORMED A PRECIPITATE

Estimated Flow Rate: 150 gpm

T-Storm on 2/27/99.

Comments:

Sulfide @ ~~SPR~~ SN Spring = 0.00 mg/L

Chemetics DO = 10 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]
[illegible] S. Simp

ATTACHMENT 7

FIELD CHEMICAL ANALYTICAL FORMS
MONITORING EVENT NO. 2

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: A. Kendrick

Sample ID No.: Lab Blank

Sample Location: Trailer

Duplicate: ☐

SAMPLING DATA:

Date: 2/23/99	Color	pH	S.C.	Temp.	Turbidity	DO	Lab Blank (Deionized H2O)
Time: 13:00	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	
Method: Direct Pour	Clear						

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: Lab Blank

Equipment: HACH Digital Titrator OX-DT Analyst AWK Analysis Time: 14:30

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☒	1-5 mg/L	200 ml	0.200 N	0.01	870	x 0.01 =	8.70
~~☒~~ AK	2-10 mg/L	100 ml	0.200 N	0.02	~~870~~ AK	x 0.02 =	

Notes: Dissolved Oxygen exceeded range of 1-5 mg/L Range
Chemetrics CHEMets (0-12 ppm range) = 9.0 ppm = Good Correlation.

Alkalinity: Std. Addition performed on Lab Blank

Equipment: HACH Digital Titrator AL-DT Analyst AWK Analysis Time: 13:00

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	___ & ___	x 0.1 =	
☐	40-160 mg/L	25 ml	0.1600 N	0.4	___ & ___	x 0.4 =	
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 0	x 1.0 =	0 mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	___ & ___	x 2.0 =	
☐	500-2000 mg/L	20 ml	1.600 N	5.0	___ & ___	x 5.0 =	
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	___ & ___	x 10.0 =	

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	100% = 0 mg/L

Notes: Std. Addition checks out good with Addition Recovery Percentage = 97.3%

Standard Additions: ☒ Titrant Molarity: 1.6 N Digits Required: 1st.: 24 2nd.: 25 3rd.: 24

Carbon Dioxide: Std. Addition performed on Lab Blank

Equipment: HACH Digital Titrator CA-DT Analyst AWK Analysis Time: 14:00

	Range	Sample Vol.	Cartridge	Multiplier	Titration Count		Concentration
☒	10-50 mg/L	200 ml	0.3636 N	0.1	37	x 0.1 =	3.7 mg/L
☐	20-100 mg/L	100 ml	0.3636 N	0.2	___	x 0.2 =	
☐	100-400 mg/L	200 ml	3.636 N	1.0	___	x 1.0 =	
☐	200-1000 mg/L	100 ml	3.636 N	2.0	___	x 2.0 =	

Notes: Std. Addition checks out good with AR% = 97.3%

Standard Additions: ☒ Titrant Molarity: 0.3636 N Digits Required: 1st.: 47 2nd.: 51 3rd.: 48

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: Lab Blank

Sample Location: Trailer

Sampled By: A. Kendrick

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 93

Concentration: _____ mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 33

Concentration: _____ mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1738

Program No.: 60

Concentration: _____ mg/L Reagent Blank Correction: ☐

Standard Solution: ☒ Results: 0.094 mg/L

Notes: Spoke w. Neil 2/24/99. Std. Solution check: Range = 0.090 - 0.110 mg/L

Nitrate: 2/24/99

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 09:00

Program No.: 55

Concentration: Initial = 0.00 mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐

Standard Additions: ☒ Digits Required: 0.1ml: 0.02 mg/L 0.2ml: 0.10 mg/L 0.3ml: 0.18 mg/L

Notes: 1 Each 0.1 mL Add. should = 0.08 increase ⇒ Results as expected

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: _____ Sample ID No.: _____

Sample Location: _____

Sampled By: _____ Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 93

Concentration: _____ mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 33

Concentration: _____ mg/L Filtered: ☐

Notes:

Nitrite: 2-23-99

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 18:45

Program No.: 60

Concentration: _____ mg/L Reagent Blank Correction: ☒

Standard Solution: ☐ Results: _____

Notes: Reagent Blank Correction Performed. Results = 0.00 mg/L
Therefore, no Reagent Blank Correction will be req. for samples.

Nitrate: 2-23-99

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 19:55

Program No.: 55

Concentration: _____ mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☒

Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: Reagent Blank Correction performed. Results = 0.00 ml
Therefore, no Reagent Blank Correction will be req. for samples.

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: A. Kendrick

Sample ID No.: Lab Blank

Sample Location: Trailer

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 93

Concentration: _____ mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 33

Concentration: _____ mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 60

Concentration: _____ mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results: _____

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 2/24/99 17:32

Program No.: 55

Concentration: _____ mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☒ Results: 0.21 Reagent Blank Correction: ☐

Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: 95.2% 1 Std. Solution checks Good. Expected 0.20

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane, IN

Sampled By: S. Neil

Sample ID No.: ABØ41A99

Sample Location: ABG-Ø3BØ4

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	
Date: 2/23/99							ORP=-30.4
Time: 1508							No Odor
Method: Bladder Pump	Clear	6.99	0.206	9.0	2	1.12	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst AWK Analysis Time: 16:30

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☒	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
0	x 0.01	= 0 mg/L
	x 0.02	=

Notes: DO=0, No titration required

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst AWK Analysis Time: 16:45

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☒	40-160 mg/L	25 ml	0.1600 N	0.4	0 & 196	x 0.4	= 78.4
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	74.4 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst AWK Analysis Time: 17:00

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☒	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
468	x 0.2	= 93.6
	x 1.0	=
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AB041A99

Sample Location: ABG-03B04

Sampled By: S. Neil

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 18:03

Program No.: 93

Concentration: 0.0 mg/L Filtered: ☐

Notes: H_2S HACH Kit also reads 0 mg/L (HACH Kit HS-C)

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 18:13

Program No.: 33

Concentration: 3.30 E mg/L Filtered: ☐

Notes: Exceeded Detection Limit

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 19:06

Program No.: 60

Concentration: 0.00 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 19:32

Program No.: 55

Concentration: 0.00 mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AC251A99

Sample Location: ABG-Ø3C25

Sampled By: S. Neil

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	
Date: 2-24-99							ORP = -74.1
Time: 11:10							Odor =
Method: Bladder Pump	Clear	7.11	1.063	10.8	0	3.14	Lite Sulpher

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst AWK Analysis Time: 11:57

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☒	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
0	x 0.01 =	0.0
	x 0.02 =	

Notes: ChemMET Results = ~1.0 mg/L Titration < D.L. but slight color change noted.

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst AWK Analysis Time: 12:24

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1 =	
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4 =	
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0 =	
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 180	x 2.0 =	360/2
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0 =	=180
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0 =	

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	~~360~~ 180 mg/L

Notes: Dilution to 100 ml not performed. ALK = 0.5 times AWK the detected concentration = 180 mg/L

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst AWK Analysis Time: 12:35

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1 =	
	x 0.2 =	
191	x 1.0 =	191
	x 2.0 =	

Notes:

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name NSWC Crane

Sampled By: S. Neil

Sample ID No.: AC251A99

Sample Location: ABG-Ø3C25

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 15:47

Program No.: 93

Concentration: 0.04 mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 15:55

Program No.: 33

Concentration: 0.12 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 16:10

Program No.: 60

Concentration: 0.00 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 16:46

Program No.: 55

Concentration: 0.00 mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: K. Simpson

Sample ID No.: AC111A99

Sample Location: ABG-Ø3C11

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	
Date: 2/25/99							ORP=-54.5
Time: 10:08							No Odor
Method: Bladder Pump.	Clear	7.15	1.90	10.7	1	7.69	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst AWK Analysis Time: 14:43

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☒	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	=
266	x 0.02	= 5.32

Notes: CHEMetrics at well head = 5.5 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst AWK Analysis Time: 12:42

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 145	x 2.0	= 290
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	290 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst AWK Analysis Time: 12:36

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
165	x 1.0	= 165
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AC 111A99

Sample Location: AB6-03C 11

Sampled By: K. Simpson

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 12:56

Program No.: 93

Concentration: 0.08 mg/L Filtered: ☐

Notes: Analysis at 09:16 at well head = 0.47 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 14:55

Program No.: 33

Concentration: 0.02 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 15:06

Program No.: 60

Concentration: 0.01 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 15:42

Program No.: 55

Concentration: 0.726 mg/L

Nitrite Interference Treatment: ☒

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1 Colorimeter Results = 0.736 - 0.01 = 0.726

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: S. Neil

Sample ID No.: AC1Ø1A99

Sample Location: ABG-Ø3C1Ø

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	
Date: 2/25/99							ORP= 158.6
Time: 10:44							No Odor
Method: Bladder Pump	Clear	6.53	0.521	13.1	6	3.58	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst AWK Analysis Time: 16:15

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☒	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
253	x 0.01	= 2.53
	x 0.02	=

Notes: CHEMetrics at well head = 2.5 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst AWK Analysis Time: 16:07

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 100	x 2.0	= 200
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	200 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst AWK Analysis Time: 16:02

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
183	x 1.0	= 183
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AC1Ø1A99

Sample Location: ABG-Ø3C1Ø

Sampled By: S. Neil

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 15:54

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 16:20

Program No.: 33

Concentration: 0.00 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 16:46

Program No.: 60

Concentration: 0.002 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst AWK Analysis Time: 17:17

Program No.: 55

Concentration: 0.39 mg/L

Nitrite Interference Treatment: ☒

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 0.39-0.002=0.391 Sample without Pretreat = 0.55

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC CRANE

Sampled By: KEITH SIMPSON

Sample ID No.: AC041A99

Sample Location: 3 C04 ABG

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2·26·99						
Time: 1040						
Method: BLADDER PUMP	CLEAR	7.28	1.92	8.2	3	13.38

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst KES Analysis Time: 1237

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☒	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration (mg/L)
251	x 0.01	= 2.51
	x 0.02	=

Notes: STEPS 1 → 5 DONE IN THE FIELD
CHEMETRICS IN THE FIELD = 3 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst KES Analysis Time:

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 183	x 2.0	= 366
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	mg/L	mg/L	mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: Digits Required: 1st.: 2nd.: 3rd.:

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst KES Analysis Time: 1220

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration (mg/L)
	x 0.1	=
	x 0.2	=
250	x 1.0	= 250
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: Digits Required: 1st.: 2nd.: 3rd.:

FIELD CHEMICAL ANALYTICAL LOG FORM

A-6

Project Site Name: NSWC CRANE

Sample ID No.: AC04IA99

Sample Location: 3C04 ABG

Sampled By: KEITH SIMPSON

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1040

Program No.: 93

Concentration: 0 mg/L Filtered: ☐

Notes: TEST RUN AT WELL HEAD

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1257

Program No.: 33

Concentration: 1.09 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1307

Program No.: 60

Concentration: 0 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1328

Program No.: 55

Concentration: 0 mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC CRANE

Sampled By: SCOTT NEIL

Sample ID No.: AC071A99

Sample Location: ABG-03C07

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2/26/99						
Time: 1302						
Method: Bladder Pump	CLEAR	7.16	0.789	12.4	8	6.97

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1610

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 173	x 2.0	= 346 mg/L
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	346 mg/L

Notes: Only field parameter is alkalinity at this monitoring point.

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC CRANE

Sample ID No.: AC071A99

Sample Location: ABG-03C07

Sampled By: SCOTT NEIL

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 93

Concentration: _____ mg/L Filtered: ☐

Notes:

Ferrous Iron: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 33

Concentration: _____ mg/L Filtered: ☐

Notes:

Nitrite: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 60

Concentration: _____ mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results: _____

Notes:

Nitrate: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 55

Concentration: _____ mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐

Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: AC02P21AG9

Sample Location: ABG-03C02P2

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2/26/99						
Time: 1945						
Method: Bladder Pump	Clear	7.04	0.349	12.0	8	12.84

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1710

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 40	x 2.0	= 80 mg/L
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	80 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AC02P21A99

Sample Location: ABG-03C02P2

Sampled By: Keith Simpson

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 93

Concentration: _____ mg/L Filtered: ☐

Notes:

Ferrous Iron: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 33

Concentration: _____ mg/L Filtered: ☐

Notes:

Nitrite: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 60

Concentration: _____ mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results: _____

Notes:

Nitrate: NA

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 55

Concentration: _____ mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐

Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC CRANE

Sampled By: S. NEIL & R. SIMPSON

Sample ID No.: AC09P21A99

Sample Location: 3C09P2 ABG

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 3.1.99						
Time: 1221						
Method: BLADDER PUMP	CLEAR	6.87	0.492	13.0	8	8.01

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst KES Analysis Time: 1310

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 98	x 2.0	= 196
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	196 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

NA

Project Site Name: _____ Sample ID No.: _____

Sample Location: _____

Sampled By: _____ Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 93

Concentration: _____ mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 33

Concentration: _____ mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 60

Concentration: _____ mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results: _____

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst _____ Analysis Time: _____

Program No.: 55

Concentration: _____ mg/L

Nitrite Interference Treatment: ☐

Standard Solution: ☐ Results: _____ Reagent Blank Correction: ☐

Standard Additions: ☐ Digits Required: 0.1ml: _____ 0.2ml: _____ 0.3ml: _____

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AC031AG9

Sample Location: ABG-03C03

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2/27/99						
Time: 1130						
Method: Bladder Pump	Clear	9.22	0.887	13.7	1	0.65

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1418 ~~1448~~ SN

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☒	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
31	x 0.01	= 0.31 mg/L
	x 0.02	=

Notes: Chemetics field test = 0.25 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1410

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 178	x 2.0	= 356 mg/L
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	356 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1400

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
64	x 1.0	= 64 mg/L
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: A-C031A99

Sample Location: ABG-03C03

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: ~~1540~~ 1550 (SW)

Program No.: 93

Concentration: 0.03 mg/L Filtered: ☐

Notes: Field sulfide = ~~0.00~~ 0.04 mg/L SW

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1556

Program No.: 33

Concentration: 0.05 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1600

Program No.: 60

Concentration: 0.003 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1620

Program No.: 55

Concentration: 0.207 mg/L

Nitrite Interference Treatment: ☒

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: Pre-treatment done on sample. 0.21 − 0.003 =

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: ~~AC02~~ ~~AC102~~/AC121A99 (SN)

Sample Location: ABG-03C12

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2/27/99						
Time:						
Method: Bladder Pump	Clear	7.25	0.643	13.3	0	8.46

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst: SWN Analysis Time: 1700

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☒	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	=
35	x 0.02	= 7.02

Notes: Chemets = 6.5+ mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst: SWN Analysis Time: 1712

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 216	x 1.0	= 216mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	216 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst: SWN Analysis Time: 1721

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
136	x 1.0	= 136mg/L
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: A C121A99

Sample Location: ABG-03C12

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1730

Program No.: 93

Concentration: 0.01 mg/L mg/L Filtered: ☐

Notes: Field results (at well) = 0.00 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1739

Program No.: 33

Concentration: 0.01 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1747

Program No.: 60

Concentration: 0.000 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1810

Program No.: 55

Concentration: 0.550 mg/L

Nitrite Interference Treatment: ☐ NA

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson
Scott Neil

Sample ID No.: ACRB1A99

Sample Location: ABG-Creek @ Boundary

Duplicate: ☒

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO
Date: 2/28/99						
Time: 1000	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)
Method: Direct Fill	Cloudy	7.35	0.095	7.9	14.2	12.36

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1315

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☒	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	=
480	x 0.02	= 9.6mg/L

Notes: Chemets at creek = ~ 8.5mg/L
⊗ 9.5

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1346

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☒	40-160 mg/L	25 ml	0.1600 N	0.4	0 & 68	x 0.4	= 27.2mg/L
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	27.2 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1409

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
47	x 1.0	= 47mg/L
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: ACRB1A99

Sample Location: ~~ABG~~ - Creek @ Boundary

Sampled By: Keith Simpson, Scott Nail

Duplicate: ☒

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter | Analyst: SWN | Analysis Time: 1425

Program No.: 93

Concentration: 0.02 mg/L | Filtered: ☒

Notes: Sulfide at creek sampling point = 0.05 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter | Analyst: SWN | Analysis Time: 1447

Program No.: 33

Concentration: 0.00 mg/L | Filtered: ☒

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter | Analyst: SWN | Analysis Time: ~~1454~~ 1514 SN

Program No.: 60

Concentration: 0.000 mg/L | Reagent Blank Correction: ☐ NA

Standard Solution: ☐ | Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter | Analyst: SWN | Analysis Time: ~~1514~~ 1555 SN

Program No.: 55

Concentration: 0.22 mg/L

Nitrite Interference Treatment: ☐ NA

Standard Solution: ☐ | Results: | Reagent Blank Correction: ☐ NA

Standard Additions: ☐ | Digits Required: 0.1ml: | 0.2ml: | 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson
Scott Neil

Sample ID No.: ACRB1A99

Sample Location: ABG - Creek @ Boundary

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2/28/99						
Time: 1000						
Method: Direct Fill	Cloudy	7.35	0.095	7.9	14.2	12.36

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst: SWN Analysis Time: 1255

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☒	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	=
472	x 0.02	= 9.44 mg/L

Notes: Chemets at creek = ~~8.5~~ 9.5 mg/L (SN)

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst: SWN Analysis Time: 1336

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☒	40-160 mg/L	25 ml	0.1600 N	0.4	0 & 82	x 0.4	= 32.8 mg/L
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	32.8 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst: SWN Analysis Time: 1400

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
64	x 1.0	= 64 mg/L
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AERB1A99

Sample Location: ~~AEG~~ - Boundary of Creek

Sampled By: Keith Simpson
Scott Neil

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1415

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☒

Notes: Sulfide at creek sampling point = 0.07 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1440

Program No.: 33

Concentration: 0.00 mg/L Filtered: ☒

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1454

Program No.: 60

Concentration: 0.000 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1533 SN ~~1514~~

Program No.: 55

Concentration: 0.23 mg/L

Nitrite Interference Treatment: ☐ NA

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson / Scott Neil

Sample ID No.: ACRA1A99

Sample Location: Creek Below Spring A

Duplicate: ☐

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO
Date: 2/28/99						
Time: 1152	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)
Method: Direct Fill	Cloudy	7.35	0.104	7.9	15.1	12.67

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst: SWN Analysis Time: 1502

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☒	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	=
378	x 0.02	= 7.56 mg/L

Notes: Chemets at creek = 9.5 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst: SWN Analysis Time: 1507

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☒	10-40 mg/L	100 ml	0.1600 N	0.1	0 & 241	x 0.1	= 24.1 mg/L
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	24.1 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst: SWN Analysis Time: 1516

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☒	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
87	x 0.2	= 17.4 mg/L
	x 1.0	=
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: ACRA1A99

Sampled By: Keith Simpson / Scott Neil

Sample Location: Creek Below Spring A.

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1624

Program No.: 93

Concentration: 0.01 mg/L

Filtered: ☒

Notes: Sulfide at creek = 0.06 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1633

Program No.: 33

Concentration: 0.01 mg/L

Filtered: ☒

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1642

Program No.: 60

Concentration: 0.000 mg/L

Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1656

Program No.: 55

Concentration: 0.22 mg/L

Nitrite Interference Treatment: ☐ NA

Standard Solution: ☐ Results:

Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: ASPRCIA99

Sample Location: Spring C

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2/28/99						
Time:						
Method: Direct Fill	Cloudy	7.14	0.085	8.8	10.2	13.15

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1644

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☒	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
	x 0.01	=
534	x 0.02	= 10.68 mg/L

Notes: Chemetts DO at spring outlet = 10.5 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1648

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☒	10-40 mg/L	100 ml	0.1600 N	0.1	0 & 204	x 0.1	= 20.4 mg/L
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	20.4 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1722

	Range	Sample Vol.	Cartridge	Multiplier
☒	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
201	x 0.1	= 20.1 mg/L
	x 0.2	=
	x 1.0	=
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: ASPRCIA99

Sample Location: Spring C

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1730

Program No.: 93

Concentration: 0.02 mg/L Filtered: ☒

Notes: Sulfide at spring ~~source~~ outlet (SN) = 0.06 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1742

Program No.: 33

Concentration: 0.00 mg/L Filtered: ☒

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1746

Program No.: 60

Concentration: 0.000 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1807

Program No.: 55

Concentration: 0.20 mg/L

Nitrite Interference Treatment: ☐ NA

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: ASPRA1A99

Sample Location: Spring A

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 2/28/99						
Time: 1420						
Method: Direct Fill	Cloudy	7.30	0.106	8.1	15.9	12.65

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst: SWN Analysis Time: 1902

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☒	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
~~466~~ SW	x 0.01	=
466	x 0.02	= 9.32 mg/L

Notes: Chemetrics DO = 10 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst: SWN Analysis Time: 1830

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☒	10-40 mg/L	100 ml	0.1600 N	0.1	0 & 263	x 0.1	= 26.3 mg/L
☐	40-160 mg/L	25 ml	0.1600 N	0.4	&	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	26.3 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst: SWN Analysis Time: 1837

	Range	Sample Vol.	Cartridge	Multiplier
☒	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
178	x 0.1	= 17.8 mg/L
	x 0.2	=
	x 1.0	=
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: ____ Digits Required: 1st.: ____ 2nd.: ____ 3rd.: ____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: ASPRA1A99

Sample Location: Spring A

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1843

Program No.: 93

Concentration: 0.03 mg/L Filtered: ☒

Notes: Sulfide at spring outlet = 0.00mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1852

Program No.: 33

Concentration: 0.01 mg/L Filtered: ☒

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1858

Program No.: 60

Concentration: 0.000 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1919

Program No.: 55

Concentration: 0.20 mg/L

Nitrite Interference Treatment: ☐ NA

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

SW

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AC15 1A99

Sample Location: ABG-03C15

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 3/1/99						
Time: 1700						
Method: Dedicated Bladder Pump	Clear	7.15	0.826	12.9	1	1.89

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1805

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 286	x 1.0	= 286 mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	_____ & _____	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	286 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: AC271A99

Sample Location: 03C27- ABG

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 3/2/99						
Time:						
Method: Dedicated Bladder Pump	CLEAR	7.59	0.304	8.2	8	7.87

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1357

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 156	x 1.0	= 156 mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	_____ & _____	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	156 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Keith Simpson

Sample ID No.: AC271A99

Sample Location: 0327 - ABG

Duplicate: ☒

SAMPLING DATA:

Date: 3/2/99	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Time:						
Method: Dedicated Bladder Pump						

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1400

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 143	x 1.0	= 143 mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	_____ & _____	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	143 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AC261A99

Sample Location: ABG- 03C26

Duplicate: ☐

SAMPLING DATA:

Date: 3/2/99	Color	pH	S.C.	Temp.	Turbidity	DO
Time: 1205	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)
Method: Dedicated Bladder Pump	Clear	7.11	0.780	11.2	0	4.04

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1407

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 322	x 1.0	= 322 mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	_____ & _____	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	322 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AC171A99

Sample Location: ABG- 03C17

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 3/8/99						
Time: 1615 - 1714						
Method: Dedicated Bladder Pump	Clear	7.01	2.209	11.3	0	1.26

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: 1821

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1821

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 389	x 1.0	= 389 mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	_____ & _____	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	389 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AC301A99

Sample Location: ABG - 03C30

Duplicate: ☐

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO
Date: 3/9/99						
Time: 1305 - 1519	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)
Method: Dedicated Bladder Pump	Clear	8.32	0.778	10.9	0	0.77

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1710

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 204	x 2.0	= 408 mg/L
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	408 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AB021A99

Sample Location: ABG-03B02

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 3/10/99						
Time: 1515-1700						
Method: Ded. Bladder Pump	Cloudy	7.16	0.334	8.9	8	2.27

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1810

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☒	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
41	x 0.01	= 0.41 mg/L
	x 0.02	=

Notes: CHEMets @ well Head = ~~0.05~~ mg/L (SW) 0.5

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1817

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	&	x 0.1	=
☒	40-160 mg/L	25 ml	0.1600 N	0.4	(SW) 370 & 372	x 0.4	= 148.8 mg/L
☐	100-400 mg/L	100 ml	1.600 N	1.0	&	x 1.0	=
☐	200-800 mg/L	50 ml	1.600 N	2.0	&	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	&	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	&	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	148.8 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1826

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☒	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
	x 0.1	=
	x 0.2	=
86	x 1.0	= 86 mg/L
	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AB021A99

Sample Location: ABG-03B02

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1815

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes: Sulfide @ well Head = 0.06 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1833

Program No.: 33

Concentration: >3.30 mg/L Filtered: ☐

Notes: Exceeded Limit, Recheck done with same results.

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1845

Program No.: 60

Concentration: 0.000 mg/L Reagent Blank Correction: ☐ NA

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1904

Program No.: 55

Concentration: 0.00 mg/L

Nitrite Interference Treatment: ☐ NA

Standard Solution: ☐ Results: Reagent Blank Correction: ☐ NA

Standard Additions: ☐ Digits Required: 0.1ml: 0.2ml: 0.3ml:

Notes: 1

FIELD CHEMICAL ANALYTICAL LOG FORM

SW

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AC201A99

Sample Location: ABG-03C20

Duplicate: ☐

SAMPLING DATA:

Date: 3/11/99	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Time:						
Method: Ded. Bladder Pump	Clear	7.13	0.656	11.1	0	4.21

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWJ Analysis Time: 1335

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☐	100-400 mg/L	100 ml	1.600 N	1.0	_____ & _____	x 1.0	=
☒	200-800 mg/L	50 ml	1.600 N	2.0	0 & 123	x 2.0	= 246mg/L
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	246 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Scott Neil

Sample ID No.: AC08P21A99

Sample Location: ABG-03C08P2

Duplicate: ☐

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP mV
Date: 3/12/99							
Time: 1605-1802	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	
Method: Ded. Bladder Pump	Clear	7.22	0.937	10.0	0	~~165.3~~ 15 10.94	165.3

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen: NA

Equipment: HACH Digital Titrator OX-DT Analyst _____ Analysis Time: _____

Range Used:	Range	Sample Vol.	Cartridge	Multiplier
☐	1-5 mg/L	200 ml	0.200 N	0.01
☐	2-10 mg/L	100 ml	0.200 N	0.02

Titration Count	Multiplier	Concentration
_____	x 0.01	=
_____	x 0.02	=

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: ~~0635~~ 1835 (SN)

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☐	10-40 mg/L	100 ml	0.1600 N	0.1	_____ & _____	x 0.1	=
☐	40-160 mg/L	25 ml	0.1600 N	0.4	_____ & _____	x 0.4	=
☒	100-400 mg/L	100 ml	1.600 N	1.0	0 & 323	x 1.0	= 323 mg/L
☐	200-800 mg/L	50 ml	1.600 N	2.0	_____ & _____	x 2.0	=
☐	500-2000 mg/L	20 ml	1.600 N	5.0	_____ & _____	x 5.0	=
☐	1000-4000 mg/L	10 ml	1.600 N	10.0	_____ & _____	x 10.0	=

Relationship	Hydroxide	Carbonate	Bicarbonate
Concentration	0 mg/L	0 mg/L	323 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Carbon Dioxide: NA

Equipment: HACH Digital Titrator CA-DT Analyst _____ Analysis Time: _____

	Range	Sample Vol.	Cartridge	Multiplier
☐	10-50 mg/L	200 ml	0.3636 N	0.1
☐	20-100 mg/L	100 ml	0.3636 N	0.2
☐	100-400 mg/L	200 ml	3.636 N	1.0
☐	200-1000 mg/L	100 ml	3.636 N	2.0

Titration Count		Concentration
_____	x 0.1	=
_____	x 0.2	=
_____	x 1.0	=
_____	x 2.0	=

Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

ATTACHMENT 8

CHAIN-OF-CUSTODY RECORDS
PREPARED BY TETRA TECH NUS, INC.
MONITORING EVENT NO. 2

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

NSWC CRANE, INDIANA

0025
1 OF 2

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 / CTO 38
SAMPLERS (SIGNATURE): Scott W. Reid

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/8/99	1618	AC171A99	1				X															A226	
	1625		1						A													A219	
	1631		1						A													A220	
	1637		1						A													A221	
	1643		1							A,D												A223	
	1648		1								X											A225	
	1653		1												X							A227	
	1654		1													X		X				A228	
	1657		1																X			A229	
	1700	AC171A99 F	1																X			A230	FILTERED.
	1704		1							A,D												A224	FILTERED
3/9/99	1308	AC301A99	1				X															A336	
	1324		1						A													A329	
	1336		1						A													A330	
	1352		1						A													A331	
	1406		1							A,D												A333	
	1419		1								X											A335	
	1431		1												X							A337	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Scott W. Reid	3/11/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665310
TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C
COOLER CUSTODY SEAL NOS: A74, A75, A76, A77
REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

0026

PROJECT NO.: 7651/CT038

SAMPLERS (SIGNATURE): [signature]

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/9/99	1433	AC301A99	1													X		X				A338	
↓	1440	↓	1																X			A339	
	1448	AC301A99F	1																X			A340	FILTERED
↓	1455	↓	1							A,C,D												A334	FILTERED
3/10/99	1526	AB021A99	1				X															A15	
↓	1534	↓	1						A,B													A6	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	3/11/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8080636653 70 ~~A74, A75, A76, A77~~ (SN)

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A74, A75, A76, A77

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651/CTO 38

SAMPLERS (SIGNATURE): Scott W. Reid

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/10/99	1544	AB021A99	1						A,B													A7	
	1550		1						A													A8	Nitrocellulose
	1557		1						B													A9	Picric Acid
	1606		1						B													A10	Picric Acid
	1520		1			X																A17	
	1614		1							ABD												A12	
	1623		1								X											A14	
	1630		1												X							A16	
	1632		1													X		X				A18	
	1636	↓	1																X			A19	
	1645	AB021A99 F	1							ACD												A13	FILTERED
↓	1641	↓	1																X			A20	FILTERED
3/11/99	1049	AC201A99	1				X															A241	
	1055		1						A													A234	
	1102		1						A													A235	
	1107		1						A													A236	Nitrocellulose
↓	1112	↓	1							A,D												A238	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Scott W. Reid	3/11/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665310

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A78, A79, A80, A81

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0023

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651 / CTO 38

SAMPLERS (SIGNATURE): Scott W. Neil

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/11/99	1118	AC201A99	1								X											A240	
	1124		1												X							A242	
	1126		1													X		X				A243	
	1129		1																X			A244	
	1131	AC201A99F	1																X			A245	FILTERED
	1137		1							A,C,D												A239	FILTERED
3/8/99	1615	AC171A99	3	B																		A216, A217, A218	
3/8/99	0835	TB030899901	2	B																		A577, A578	Trip Blank
3/9/99	0700	TB030999901	2	B																		A576, A581	Trip Blank
3/9/99	1305	AC301A99	3	B																		A326, A327, A328	
3/10/99	0720	TB031099901	2	B,C																		A582, A583	Trip Blank
3/10/99	1515	AB021A99	3	B,C																		A1, A2, A3	
3/11/99	0700	TB031199901	2	B																		A584, A585	Trip Blank
3/11/99	1045	AC201A99	3	B																		A231, A232, A233	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Scott W. Neil	3/11/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665310

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A82, A83, A84, A85

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0029

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651/CT038

SAMPLERS (SIGNATURE): Scott W. Reid

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/10/98	1518	AB021AGG	2		A																	A0001, A0005	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Scott W. Reid	3/11/98 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665321

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A86, A87

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0030

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651 CTO 38

SAMPLERS (SIGNATURE): Scott W. Neil

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3-12	0715	TB031299 01	2	B																		A0586, 587	TRIP BLANK
	1605	AC08P21A99	3	B																		A0111, 112, 113	
	1622		1						A													A0114, ~~115~~	
	1633		1						A													A0115	
	1645		1						A													A0116	
	1610		1				X															A0121	
	1727		1													X		X				A0123	
	1724		1												X							A0122	
	1733		1																X			A0124	
	1711		1								X											A0120	
	1658		1							A, D												A0118	
	1749	AC08P21A99F	1							A, C, D												A0119	
	1743	AC08P21A99F	1																X			A0125	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	3/13/99 1010	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665332

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A88, A89, A90, A91

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0024

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 / CTO 38

SAMPLERS (SIGNATURE): [illegible]

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/2/99	1400	AC271A99	2							A,D												A0288, A0303	DO MS/MSD
	1430		3								X											A0290, A0305, A0320	
	1515		3												X							A292, A307, A322	
	1520		3													X		X				A293, A308, A323	
	1531		3																X			A309, A294, A324	
	1540		3																X			A295, A310, A325	
	1555		2							A,D												A289, A304	
3/1/99	0700	TB03019901	2	B																		A0568, A0569	Trip Blank
	1221	AC09P21A99	3	B																		A126, A127, A128	~~PCSD~~
	1250	TB03019902	2	B																		A570, A571	Trip Blank
	1605	AC151A99	3	B																		A201, A202, A203	
3/2/99	0700	TB03029901	2	B																		A572, A573	Trip Blank
	0705	TB03029902	2	B																		A574, A575	Trip Blank
	0000	FD03029901	3	B																		A536, A537, A538	Duplicate of AC271A99
	0955	AC271A99	9	B																		A261, A232, A263, A246, A247, A247	DO MS/MSD
																						A248, A311, A312, A313	
	1205	AC261A99	3	B																		A266, ~~A0~~ (CSD) 267, A268	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible]	3/2/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665354

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A70, A71, A72, A73

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0023

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651 / CTO 38

SAMPLERS (SIGNATURE): [illegible]

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/2/99	0000	FD0302990 1	1				X															A0546	Duplicate of AC271A99
			1						A													A0539	
			1						A													A0541	
			1						A													~~A0539~~ A0540	
			1							A,D												~~A0540~~ ~~A0544~~ (EN)	TAG NO. A0544
			1							A,D												A0543	
			1								X											A0545	
			1												X							A0547	
			1													X		X				A0548	
			1																X			A0549	
			1																X			A0550	
	1010	AC271A99	3				X															A0281, A0306, A0321	DO MS/MSD
	1130	AC271A99	3						A													A0285, A0289, A0301	
	1210	AC271A99	~~3~~ 2						A													A0286, A0300	
	1240	AC271A99	3						A													A0287, A0304, A0315	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible]	3/2/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665354

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A66, A67, A68, A69

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0022

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 / CTO 38

SAMPLERS (SIGNATURE): [signature]

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/1/99	1645	AC151A99	1													X		X				A0213	
	1648	AC151A99	1																X			A0214	
	1651	AC151A99 F	1																X			A0215	
↓	1655	AC151A99 F	1							A,C,D												A0209	
3/2/99	1207	AC261A99	1				X															A0276	
	1219		1						A													A0269	
	1232		1						A													A0270	
	1247		1						A													A0271	
	1259		1							A,D												A0273	
	1308		1								X											A0275	
	1316		1												X							A0277	
	1317		1													X		X				A0278	
	1322	↓	1																X			A0279	
	1327	AC261A99 F	1																X			A0280	
↓	1334	↓								A,C,D												A0274	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	3/2/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665354

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A62, A63, A64, A65

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0021

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651/CTO 38

SAMPLERS (SIGNATURE): Scott W. Reid

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
3/1/99	1225	AC09P21A99	1				X															A0136	
	1228	↓	1						A													A129	
	1233		1						A													A130	
	1235		1						A													A131	
	1239		1							A,D												~~A132~~ A0133	
	1243		1								X											A0135	
	1246		1												X							A0137	
	1247		1													X		X				A0138	
	1250	↓	1																X			A0139	
	1252	AC09P21A99 F	1																X			A0140	
	1254	↓	1							A,C,D												A0134	
	1615	AC151A99	1				X															A0211	
	1624	↓	1						A													A0204	
	1628		1						A													A0205	
	1633		1						A													A0206	
	1637		1							A,D												A0208	
	1642		1								X											A0210	
↓	1644	↓	1											X								A0212	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Scott W. Reid	3/2/99 1850	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665354

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A58, A59, A60, A61

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0002

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): Scott W. Neil, K. S. Simpson

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.24	1218	A C251A 99	1													X		X				A0263	
	1118	A C251A 99	1			X																A0262	
	1220	A C251A 99	1																X			A0264	TOTAL
	1222	A C251A 99F	1																X			A0265	FILTERED
	1225	A C251A 99F	1							ABD X												A0258	FILTERED
	1213	A C251A 99	1												X							A0261	
	1202	AC251A 99	1							ABD												A0257	TOTAL
	1207	A C251A 99	1								X											A0259	
	1142	A C251A 99	1						AB													A0256	
	1155	A C251A 99	1						A													A0253	
	1121	A C251A 99	1						A,B													A0251	
	1128	AC251A 99	1						A,B													A0252	
	1121	AC251A 99	1				X															A0260	
	1137	A C251A 99	1						B													A0255	
2.23	1530	AB041A 99	1						A,B													A0027	
	1521	A B041A 99	1				X															A0035	
	1604	A B041A 99	1								X											A0034	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Scott W. Neil	2/25/99 1845			

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AIR BILL NO.: 808063665387

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A1, A2, A3, A4

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): Scott W. Reid, Kim S. Simpson

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.23	1536	AB041A99	1						B													A0031	
	1542	AB041A99	1						B													A0030	
	1527	AB041A99	1						A,B													A0026	
	1550	AB041A99	1						A													A0028	
	1556	AB041A99	1						A													A0029	
	1623	AB041A99	1												X							A0036	
	1558	AB041A99	1							A,B,D												A0032	TOTAL
	1645	AB041A99F	1							A,C,D												A0033	FILTERED
	1633	AB041A99	1																X			A0039	TOTAL
	1640	AB041A99F	1																X			A0040	FILTERED
	1628	AB041A99	1													X		X				A0038	
	1514	AB041A99	1			X																A0037	
2.25	1102	AC101A99	1				X															A0155	
	1107	AC101A99	1						A,B													A0146	
	1126	AC101A99	1						A													A0148	
	1121	AC101A99	1						B													A0151	
	1113	AC101A99	1						A,B													A0147	
	1117	AC101A99	1						B													A0150	

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Scott W. Reid	2.25.99 1845	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665387

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A5, A6, A7, A8

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0004

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): Mf S. Simpson

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2-25	1131	AC101A99	1							ABD												A0152	TOTAL
	1150	AC101A99 F	1							ACD												A0153	FILTERED
	1135	AC101A99	1								X											A0154	
	1148	AC101A99F	1																X			A0160	FILTERED
	1144	AC101A99	1																X			A0159	TOTAL
	1141	AC101A99	1													X		X				A0158	
	0000	FD0225990 1	1																X			A0479	TOTAL
	0000	FD0225990 1	1																X			A 0480	FILTERED
	0000	FD0225990 1	1												X							A 0476	
	0000	FD0225990 1	1													X		X				A 0478	
	0000	FD0225990 1	1			X																A0477	

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	2-25-99 1845	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665387

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A5, A6, A7, A8

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

0005

PROJECT NO.: CTU 39 7651

SAMPLERS (SIGNATURE): Scott W. Neil, Neil S. Simpson

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.25	0000	FD0225990 1	1						B													A0471	
	0000	FD0225990 1	1						A,B													A0467	
	0000	FD0225990 1	1						A,B													A0466	
	0000	FD0225990 1	1						A													A0468	
	0000	FD0225990 1	1						B													A0470	
	0000	FD0225990 1	1				X															A0475	
	0000	FD0225990 1	1								X											A0474	
	0000	FD0225990 1 F	1							A,C,D												A0473	FILTERED
	0000	FD0225990 1	1							A,B,D												A0472	TOTAL
	1111	AC111A99	1						A													A0168	
	1316	AC111A99	1												X							A0176	
	1050	AC111A99	1						A,B													A0167	
	1328	AC111A99	1																X			A0179	TOTAL
	1335	AC111A99F	1																X			A0180	FILTERED
	1300	AC111A99	1								X											A0174	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Scott W. Neil	2.25.99 1845	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665387

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A9, A10, A11, A12

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0006

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [signature] / Kel S. Simpson

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.25	1220	AC111A99	1						B													A0171	
	1133	AC111A99	1						B													A0170	
	1038	AC111A99	1						A,B													A0166	
	1026	AC111A99	1				X															A0175	
	1318	AC111A99	1													X		X				A0178	
	1018	AC111A99	1			X																A0177	
	1240	AC111A99	1						A,B,D													A0172	TOTAL
	1347	AC111A99F	1							A,C,D												A0173	FILTERED
	1140	AC101A99	1												X							A0156	
2.25	1008	AC111A99	3	B,C																		A0161, A0163, A0162	(1008)
2.25	1044	AC101A99	3	B,C																		A0141, 142, 143	
2.23	1308	AB041A99	3	B,C																		A0021, 22, 23	
2.25	0000	FD02259901	3	B,C																		A0061, 62, 63	
2.24	1110	AC251A99	3	B,C																		A0246, 247, 248	
2.23	1330	TB022399 1	2	B,C																		A0551, 552	
2.24	0700	TB022499 1	2	BC																		A0553, 554	
2.25	0700	TB022599 1	2	BC																		A0555, 556	
2.25	0700	TB022599 2	2	BC																		A0557, 558	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	2.25.99 1845	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665387

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A13, A14, A15, A16

REMARKS:

AC111A99 DUP = FD02259901

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [illegible]

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.23	1310	AB041A99	2		A																	A0027, 25	
2.24	1116	AC251A99	2		A																	A00249, 250	
2.25	1015	AC111A99	2		A																	A0016A, 165	
2.25	1054	AC101A99	2		A																	A0144, 145	
2.25	0000	FD022599 01	2		A																	A0464, 465	AC111A99

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	
[illegible]	2.25.99 1845	FED EX			AIR BILL NO.: 808063665273
					TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C
RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME	COOLER CUSTODY SEAL NOS: A17, A18
					REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

0008

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [illegible] S. Simpson

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
1999 2-26	1440	AC071A99F	1							A,C,D												A0104	
	1425	AC071A99	1																X			A0109	
	1433	AC071A99F	1																X			A0110	
	1405	AC071A99	1								X											A0105	
	1354	AC071A99	1							A,D												A0103	AC111A99
	1420	AC071A99	1													X		X				A0108	
	1418	AC071A99	1												X							A0107	
	1305	AC071A99	1				X															A0106	
	1346	AC071A99	1						A													A0102	
	1339	AC071A99	1						A													A0101	
	1316	AC071A99	1						A													A0099	
	1324	AC071A99	1						A													A0100	
	1626	AC02P21A99F	1																X			A0055	
	1630	AC02P21A99F	1							A,C,D												A0049	
	1614	AC02P21A99	1								X											A0050	
	1610	AC02P21A99	1							A,D												A0048	
	1623	AC02P21A99	1																X			A0054	
	1620	AC02P21A99	1													X		X				A0053	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	3-1-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A44, A45, A46, A47

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0009

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): K. S. Simpson

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2-26	1619	AC02P21A99	1												X							A0052	
	1546	AC02P21A99	1				X															A0051	
	1604	AC02P21A99	2						A													A0046,047	
	1550	AC02P21A99	1						A													A0044	
	1556	AC02P21A99	1						A													A0045	
2-27	1240	AC031A99 F	1							A,C,D												A0068	
	1237	AC031A99F	1																X			A0075	TIME = 1237
	1230	AC031A99	1												X							A0071	
	1145	AC031A99	1			X																A0072	
	1220	AC031A99	1							A,B,D												A0067	
	1233	AC031A99	1																X			A0074	
	1231	AC031A99	1													X		X				A0073	
	1225	AC031A99	1								X											A0069	
	1147	AC031A99	1				X															A0070	
	1155	AC031A99	1						A,B													A0061	
	1200	AC031A99	1						A,B													A0062	
	1205	AC031A99	1						B													A0065	
	1210	AC031A99	1						B													A0066	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	3-1-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A40, A41, A42, A43

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0010

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): K. S. Simpson

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.27	1215	AC031A99	1						A													A0063	
2.26	1030	AC041A99	1													X		X				A0093	
2.27	0808	AC041A99	1				X															A0090	
↓	0815	AC041A99	1			X																A0092	
	0820	AC041A99	1						A,B													A0081	
	0850	AC041A99	1						A,B													A0082	
	0940	AC041A99	1						A													A0083	
2.28	1532	AC041A99	1																X			A0094	
↓	1542	AC041A99 F	1																X			A0095	
	1530	AC041A99	1												X							A0091	
	1525	AC041A99	1								X											A0089	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	3.1.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A40, A41, A42, A43

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0011

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [illegible] / K. S. Simpson

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.28	1455	AC041A99	1						B													A0086	
↓	1500	AC041A99	1							A,B,D												A0087	
↓	1557	AC041A99 F	1							A,C,D												A0088	
2.27	1418	AC121A99	1			X																A0197	
↓	1640	AC121A99 F	1																X			A0200	
↓	1634	AC121A99	1																X			A0199	
↓	1629	AC121A99	1												X							A0196	
↓	1631	AC121A99	1													X		X				A0198	
↓	1647	AC121A99 F	1							A,C,D												A0193	
↓	1600	AC121A99	1							A,B,D												A0192	
↓	1615	AC121A99	1								X											A0194	
↓	1420	AC121A99	1				X															A0195	
↓	1510	AC121A99	1						A,B													A0187	
↓	1520	AC121A99	1						A													A0188	
↓	1434	AC121A99	1						A,B													A0186	
↓	1535	AC121A99	1						A													A0189	
↓	1548	AC121A99	1						B													A0191	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	3.1.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A48, A49, A50, A51

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0012

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [illegible]

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.28	1415	ASPA1A99	1							A,B,D												A0432	
	1417	ASPA1A99	1																X			A0439	
	1419	ASPA1A99F	1							A,C,D												A0433	
	1418	ASPA1A99F	1																X			A0440	
	1416	ASPA1A99	1								X											A0434	
	1408	ASPA1A99	1			X																A0437	
	1417	ASPA1A99	1													X		X				A0438	
	1409	ASPA1A99	1				X															A0435	
	1410	ASPA1A99	1						A,B													A0426	
	1411	ASPA1A99	1						B													A0430	
	1411	ASPA1A99	1						A,B													A0427	
	1412	ASPA1A99	1						B													A0431	
	1413	ASPA1A99	1						A													A0428	
	1414	ASPA1A99	1						A													A0429	
	1416	ASPA1A99	1												X							A0436	
	1432	ASPC1A99	1			X																A0457	
	1442	ASPC1A99	1								X											A0454	
✓	1433	ASPC1A99	1				X															A0455	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	
[illegible]	3.1.99 1600	FED EX			AIR BILL NO.: 808063665365
					TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C
RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME	COOLER CUSTODY SEAL NOS: A32, A33, A34, A35
					REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0013

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 39 7651

SAMPLERS (SIGNATURE): K. S. Simpson

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2-28	1448	ASPC1A99 F	1							ACD												A0453	
↓	1447	ASPC1A99F	1																X			A0460	
↓	1443	ASPC1A99	1												X							A0456	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	3-1-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8080636653 65

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A32, A33, A34, A35

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0014

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): K. S. Simpson

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.28	1441	ASPC1A99	1							A,B,D												A0452	
	1444	ASPC1A99	1													X		X				A0458	
	1446	ASPC1A99	1																X			A0459	
	1434	ASPC1A99	1						A,B													A0446	
	1435	ASPC1A99	1						A,B													A0447	
	1437	ASPC1A99	1						B													A0450	
	1438	ASPC1A99	1						B													A0451	
	1439	ASPC1A99	1						A													A0449	
	1440	ASPC1A99	1						A													A0448	
	0000	FD0228990 1	1							A,B,D												A0492	
	0000	FD0228990 1	1																X			A0499	
	0000	FD0228990 1F	1							A,C,D												A0493	
	0000	FD0228990 1F	1																X			A0500	
		~~FD0228990 1F~~	1																X				VOID KS
	0000	FD0228990 1	1			X																A0497	
	0000	FD0228990 1	1				X															A0495	
	0000	FD0228990 1	1								X											A0494	
	0000	FD0228990 1	1													X		X				A0498	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	3.1.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8050636653 65

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB - °C

COOLER CUSTODY SEAL NOS: A28, A29, A30, A31

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): K. S. Simpson

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.28	0000	FD02289901	1												X							A0496	
↓	0000	FD02289901	2						A													A0488, 489	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	3.1.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8080636665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A28, A29, A30, A31

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0016

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): K. S. Simpson

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.28	0000	FD022899 01	2						A,B													A0486, 487	
	0000	FD022899 01	2						B													A0490, 491	
	1133	ACRA1A99	1							A,B,D												A0352	
	1147	ACRA1A99	1																X			A0359	
	1150	ACRA1A99F	1							A,C,D												A0353	
	1149	ACRA1A99F	1																X			A0360	
	1145	ACRA1A99	1													X		X				A0358	
	1122	ACRA1A99	1			X																A0357	
	1139	ACRA1A99	1								X											A0354	
	1143	ACRA1A99	1												X							A0356	
	1124	ACRA1A99	1				X															A0355	
	1131	ACRA1A99	2						A													A0348, 349	
	1126	ACRA1A99	2						A,B													A0346, 347	
	1126	ACRA1A99	2						B													A0350, 351	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	31.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A52, A53, A54, A55

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0017

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [signature]

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2-28	0916	ACRB1A99	3							A,B,D												A0372, 392, 412	RUN ALSO MS/MSD
	0950	ACRB1A99F	3							A,C,D												A0373, 393, 413	
	0939	ACRB1A99	3																X			A0379, 399, 419	
	0943	ACRB1A99F	3																X			A0380, 400, 420	
	0905	ACRB1A99	6						A													A0368, 369, 388, 389, 408, 409	
	0930	ACRB1A99	3												X							A0376, 396, 416	
	0838	ACRB1A99	3			X																A0377, 397, 417	
	0934	ACRB1A99	3													X		X				A0378, 398, 418	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	3-1-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 808063665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A36, A37, A38, A39

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0013

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [signature]

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2-28	0922	ACRBIA99	3								X											A0374, 394, 414	RUN ALSO MS/MSD
↓	0943	ACRBIA99	3				X															A0375, 395, 415	↓
	0855	ACRBIA99	5						A,B													A0367, 366, 386, 387, 407	
↓	0855	ACRBIA99	3						B													A0390, 391, 411	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	3-1-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8086366536 5

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A24, A25, A26, A27

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0019

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [signature]

DATE	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2.28	0000	FD0228990 1	3	B,C																		A0481,482,483	ACRB1A99
2.26	0700	TB0226990 1	2	B,~~C~~ VS																		A0559,560	
2.27	0700	TB0227990 1	2	B,C																		A0561,562	
2.27	0705	TB0227990 2	2	B,C																		A0563,564	
2.28	0700	TB0228990 1	2	B,C																		A0566,567	
2.26	1302	AC071A99	3	B																		A0096,97,98	
2.26	1540	AC02P21A99	3	B																		A0041,42,43	
2.27	0800	AC041A99	3	B,C																		A0076,77,78	
2.27	1130	AC031A99	3	B,C																		A0056,57,58	
2.27	1410	AC121A99	3	B,C																		A0181,182,183	
2.28	0815	ACRB1A99	3	B,C																		A0381,382,383	RUN ALSO MS/MSD
2.28	0815	ACRB1A99	3	B,C																		A0361,362,363	
2.28	0915	ACRB1A99	3	B,C																		A0401,402,403	
2.28	1115	ACRA1A99	3	B,C																		A0341,342,343	
2.28	1405	ASPA1A99	3	B,C																		A0421,422,423	
2.28	1430	ASPC1A99	3	B,C																		A0441,442,443	
2.28	0955	ACRB1A99	1						B													A0370	RUN ALSO MS/MSD
2.28	0855	ACRB1A99	1						B													A0371	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	3.1.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: E08063665365

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A19, A20, A21, A22

REMARKS:

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0020

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 38 7651

SAMPLERS (SIGNATURE): [signature]

DATE 1999	TIME	SAMPLE ID	NO. OF CONTAINERS	VOLATILES	DISSOLVED GASES	SULFIDE	TOX	SEMIVOLATILES	EXPLOSIVES	METALS	CYANIDE	PESTICIDES/PCBS	HERBICIDES	DIOXINS/FURANS	TOC	SULFATE	AMMONIA	CHLORIDE	PHOSPHORUS			TAG NO.	REMARKS
2-28	0000	FD022899 01	2		A																	A0484 485	
2-27	1140	AC031A99	2		A																	A0059, 060	
2-27	1416	AC121A99	2		A																	A0184, 185	
2-28	083	ACRB1A99	2		A																	A0404, 405	
2-28	1119	ACRA1A99	2		A																	A0344, 345	
2-28	1407	ASPA1A99	2		A																	A0424, 425	
2-28	1431	ASPC1A99	2		A																	A0444, 445	
2-28	1452	AC041A99	2		A																	A0079, 080	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	3-1-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8050636653 00

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A56, A57

REMARKS:

ATTACHMENT 9

EQUIPMENT CALIBRATION LOGS
MONITORING EVENT NO. 2

NSWC Crane
Field Form
Revison: 0
January 1999

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : PHOTOIONIZATION AIR MONITOR ~~(ED FK 241)~~ 2020 Sign 2/23/99 PROJECT NAME : NSWC Crane

SERIAL NUMBER: ED FK 241 PROJECT NUMBER : 7651/CT038

MANUFACTURER : PE PHOTOVAC

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
2/23/99	0.0	ZERO SUPPLENT AIR	PER MAN.	NONE	100	Scott Neil	100 ppm (STAND EXP. 1/15/02)
2.24.99	0.0	"	"	"	"	Scott Neil	"
2/25/99	0.0	"	"	"	"	Scott Neil	"
2/26/99	0.0	"	"	None	100	Scott Neil	100 ppm Std.
2/27/99	0.0	"	"	None	100	Scott Neil	100 ppm Std.
3/1/99	0.0	"	"	None	99.8	Scott Neil	100 ppm Std.
3/2/99	0.0	"	"	None	100	Scott Neil	100 ppm Std.
3/8/99	0.0	"	"	None	100	Tuttle	100 ppm Std (Exp 1/02)
3/9/99	0.0	"	"	None	100	Scott Neil	100 ppm Std.
3/10/99	0.0	"	"	None	100	Scott Neil	100 ppm Std.
3/11/99	0.0	"	"	None	100	Scott Neil	100 ppm Std.
3/12/99	0.0	"	"	None	99.8	Scott Neil	100 ppm Std.

Instrument Rented From: US ENVIRONMENTAL RENTAL CORP.

NSWC Crane
Field Form
Revison: 0
January 1999

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : YSI / 6820

PROJECT NAME : NSWC Crane

SERIAL NUMBER: 98K1154

PROJECT NUMBER : 7651 / C0038

MANUFACTURER : YSI Incorporated

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
2/23/99						KS - SN	METER IS FACTORY
2.24.99						KES	CALIBRATED AND
2.25.99						KES	CALIBRATION WAS FIELD
2.26.99						KES	CHECKED.
2.27.99						KES	
2/28/99						SWN	
3.1.99						KES	
3/2/99						SWN	
3/3/99						SWN	
3/8/99						SWN	

Instrument Rented From: QED

NSWC Crane
Field Form
Revison: 0
January 1999

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : YSI / 6820

PROJECT NAME : NSWC Crane

SERIAL NUMBER: 98J1342

PROJECT NUMBER : 7651/C0038

MANUFACTURER : YSI Incorporated

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
2/23/99						RS - SN	METER IS FACTORY
2·25·99						RES	CALIBRATED AND
2·26·99						RES	CALIBRATION WAS
2·27·99						RES	FIELD CHECKED
3/2/99						SWN	
3/3/99						SWN	

Instrument Rented From: QED

ATTACHMENT 10

FIELD NOTEBOOK PAGES
MONITORING EVENT NO. 2

CTO 38
ROUND 2 SAMPLING
FEB/MARCH 99
LOG BOOK # 2426

2426

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MONITORING POINT SUMMARY 1ST QTR. 1999	7
QA/QC SUMMARY 1ST QTR 1999	191

Scientific Binders Productions 1255 S. Wolcott Chicago, IL 60612

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SUBJECT	

TITLE NSWC CRANE

PROJECT NO. 7651

BOOK 2426

Work continued from Page

Weather: Light snow, upper 20's.

1335 Arrive at well 03B04 and set up to purge & sample w/ Keith Simpson & Scott Neal

1404 Begin purging - adjust flow rate from 115 mL/min to 180 mL/min with minimal drawdown. Readings every 5-10 min.

1435 KS departs for water levels and well inventory for wells 03B02 and 03C27.

1442 Cleaned ~~Specific~~ Sn# 203190 turbidity probe - water looked clear but turbidity rose from previous reading - 5 NTU's after cleaning probe.

1504 End purging - purge time = 60 min; volume purged = 2.77 gallons - extra volume purged due to unstable turbidity. pH = 6.99 S. cond = 0.206 Temp = 9.0 Turb = 2 DO = 1.12 ORP = -30.4 water level remained steady @ 6.72 - 6.74 ft.

1508 Began sampling - sample # AB04 1A99 - filled three VOC's, and put on ice.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 2

SIGNATURE Scott Neal

DATE 2/23/99

WITNESS

DATE

7

TITLE NSWC CRANE

PROJECT NO. 76[illegible]

BOOK 2426

Work continued from Page 1 Weather: Light snow upper 20's.

1510 Filled two 40 mL vials for dissolved gases and put on ice.

1514 Filled one sulfide container and iced. KS left to pick-up Andy Kendrick (AK)

1521 Filled one TOX container and iced - water level is 6.72 FT.

1527 Filled explosives bottle, one 1000mL container, and put on ice.

1530 Filled second explosive bottle, ~~for~~ 1000 mL container, and put on ice.

1536 Filled third explosive (1000mL) for picric acid, and iced.

1542 Filled fourth explosive (1000mL) for picric acid, and iced. Water level = 6.72 FT.

1550 Filled fifth explosive (500mL) for nitrocellulose, and iced.

1556 FILLED sixth explosive (500mL) for nitrocellulose - iced

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 3

SIGNATURE [signature] DATE 2/23/99

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7657

BOOK 2426

Work continued from Page 2 WEATHER: Light snow, mid 20's.

1558 Filled total metals container (1000mL) and iced. Water level = 6.74 FT.

1604 Filled cyanide container (1000mL) and iced. AK & KS arrived at site for Natural Attenuation sampling/analyses.

1623 Filled TOC container (125mL) and put on ice. Water Level = 6.72 FT.

1628 Filled chloride/sulfate container (500mL) and put on ice - AK began to prepp for DO (Nat. Atten.).

1633 Filled total phosphorus container (500mL) and put on ice.

1636 AK grabbed his sample for DO.

1640 Filled dissolved phosphorus and iced.

1645 Filled dissolved metals and iced.

1650 End sampling and pack up for trailer

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 4

SIGNATURE [signature] DATE 2/23/99

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 3 WEATHER: Light snow, mid 20's.

1650 Final water level = 6.72 FT.

1712 Depart for trailer.

1722 Arrive at trailer. Unload sampling equipment and sample cooler. ~~Place samples in refrigerator~~ SWM 2/23/99 Place tags around sample containers.

1825 Put samples in refrigerator and begin to QC notes.

1900 AK trains on Natural Attenuation.

2000 Depart for BOQ.

Void
SWM 2/23/99

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page NA

SIGNATURE [signature] DATE 2/23/99
WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7651
BOOK 2426

Work continued from Page WEATHER: Foggy, low 30's.

0700 Arrive at trailer (AK, KS, SW) SW prepares vehicles for sampling. Calibrate PID and prep Trip Blank.

0825 Depart trailer for well 03C027.

0850 Arrive at creek bed before well - carried equipment to well - KS and SW.

0900 Began ~~to~~ purging. SWM 2/24/99 Water has light sulfur odor.

0930 Cleaned turbidity probe - turbidity in mid 300's when water looked clear - after cleaning, turbidity dropped to single digits.

0950 Cleaned turbidity probe - turbidity dropped to 4 NTU. KS departs to pick up AK.

1004 Cleaned turbidity probe. ~~AK~~ SWM

1108 ~~1100~~ End purge. ~~AK~~ & KS arrive at site. SWM 2/24/99

~~1110~~ 1110 Start sampling AC25MA99.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 6

SIGNATURE [signature] DATE 2/24/99
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

BOOK 2426

Work continued from Page 5 Cloudy, mid 30's.

1110	Began sampling - filled VOC's, dis. gases, sulfide, TOX, explosives (5), metals (total + dis.), CN, TOC, chloride/sulfate, phosphorus (total + dis.).
1230	Natural attenuation parameters sampled for.
1240	Pack van with equipment and samples and go to lunch.
1330	Return to trailer and pack for next well.
1420	Will not do another well - AK will conduct Natural Attenuation training.
1630	Natural Attenuation training completed - begin to get ready for tomorrow's sampling / general maintenance.
1900 ~~1830~~	AK & KS Depart for supplies at hardware store.
1900	SN returns to BOQ.

Work continued to Page 5 SN NK

SIGNATURE Scott W. Reid DATE 2/24/99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

BOOK 2426

Work continued from Page MONITORING POINT Summary

WELL ID	SAMPLE #	DATE	TIME	QC
03B04	AB041A99	2/23/99	1508-1650	None
03C25	AC251A99	2/24/99	1010-1200	None
03C10	AC101A99	2/25/99		None
03C11	AC111A99	2/25/99		Dup.
03C07	AC071A99	2/26/99	1302-1458	None
03C04	AC041A99	Begin: 2/26/99 End: 2/28/99		None
03C02P2	AC02P21A99			None
03C03	AC031A99	2/27/99	1130-1250	None
03C12	AC121A99	2/27/99		None
Creek @ Boundary	ACRB1A99	2/28/99		Dup - MS/MSD
Creek Below Spring A	ACRA1A99	2/28/99		None
Spring A	~~ACR~~ SN ASPRA1A99	2/28/99		None
Spring C	ASPRC1A99	2/28/99		None
03C09P2	AC09P21A99	3/1/99		None
03C15 SN	AC151A99	3/1/99		None
03C26	AC261A99	3/2/99		None
03C27	AC271A99	3/2/99		Dup - MS/MSD
03C17	AC171A99	3/8/99	1615-1714	None
03C30	AC301A99	3/9/99	1305-1519	None
03B02	AB021A99	3/10/99	1515-1700	None
03C20	AC201A99	3/11/99		None
03C09P2	AC09P21A99	3/12/99	1605-1803	None

Work continued to Page

SIGNATURE Scott W. Reid DATE 3/12/99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651
BOOK 2426

Work continued from Page WEATHER: Cloudy, mid 30's.

0700	Arrive at trailer - prepare Trip Blanks and load vehicles for sampling. (KS, AK, SN)
0721	Calibrate PID. (SN)
0738	Depart trailer for ABG (SN).
0757	Arrive at ABG - well number OBC11 - PID reading = 1.7.
0818	Begin purging at 180 ml/min. one casing volume = 4.7 gallons. Static water level = 50.12 FT. Total depth - 79.10 FT.
0833	Increased flow rate to 240 ml/min.
0843	Decreased flow rate to 210 ml/min due to drop in water level - 50.20 FT.
0853	Water back to normal at 50.15 FT.
0933	Cleaned turbidity probe.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 9

SIGNATURE Scott M. Reid DATE 2/25/99
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651
BOOK 2426

Work continued from Page 8 WEATHER: Overcast, mid 30's.

1038	End purging - break down equipment and put flow through cell away.
1044	Begin sampling - Sample # AC101A99 - filtered VOC's, dis. gases, sulfide, TOX, Explosives, Metals (total + dis), CN, TOC, chloride + sulfate, phos (total + dis), Natural Attenuation
1220	Loaded van.
1233	Depart for trailer.
1246	Arrive at trailer and unpack vehicle.
1305	Depart trailer for lunch.
1340	Depart from lunch to Tom Brent's and shipping/receiving to check for shipment of supplies.
1415	Return to trailer.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 10

SIGNATURE Scott M. Reid DATE 2/25/99
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

BOOK 2426

Work continued from Page 11 WEATHER: Sunny, low 40's

1435	Depart trailer for ice to pack samples.
1458	Return to trailer and help pack samples.
1720	AK departs site for airport.
1810	Depart trailer for FedEx.
1853	Arrive at FedEx - drop samples off.
1900	Depart FedEx for trailer.
1942	Arrive at trailer and prep. for tomorrow.
SW 2040	Depart for BOQ (SN, KS)

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page NA

SIGNATURE

DATE 2/25/99

WITNESS

DATE

TITLE NSWC CRANE PROJECT NO. 7651

BOOK 2426

Work continued from Page WEATHER: Cloudy, upper 20's.

0655	Arrive at trailer. (SN, KS)
0700	Prepare trip blank and load (SN) van for well purging & sampling.
0718	SN calibrates PID - calibrates at 100ppm; std = 100ppm.
0734	SN departs trailer for ABG.
0750	SN arrives at well # 03C07 - PID reading = 3.7. Set up equipment.
0810	Start purging - water level @ 79.02 Ft.
0815	Stop purging due to malfunctioning hose on control box - change hose.
0827	Start purging again: Flow rate = 80 ml/min
0837	Decrease flow rate: Flow rate = 72 ml/min
0842	Water level dropped to 79.59 Ft. Stop purging and wait for recovery.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 12

SIGNATURE

DATE 2/26/99

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7651

BOOK 2426

Work continued from Page 11 WEATHER: Sunny, upper 20's

0855	Checked water level - water level meter not functioning properly. Leave well and walk over to KS at well 03C04 to get his water level meter.
0914	Take water level: 79.18 Ft - Restart purging.
0919	Water level dropped 0.11 Ft. - decreased flow rate to 60 mL/min. All pertinent details of purging can be referenced to the Low Flow Purge Data Form.
1259	Purging ends - purged 4.0 gallons: one casing volume = 3.8 gallons.
1302	Sampling begins: VOC, TOX, Explosives, Total metals, CN, TOC, chloride/sulfate, Total phosphorus, Dissolved phosphorus, Dissolved Metals, Alkalinity (Field Test).
1458	End sampling - Sample # AC071A99. Begin packing vehicle

Work continued to Page 13

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 2/26/99

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7651

BOOK 2426

Work continued from Page 12 WEATHER: Mostly cloudy, windy, upper 30's.

1508	Depart ABG field trailer.
1532	Arrive at trailer. Unpack equipment and samples from van; put samples in refrigerator.
1554	Prep for Alkalinity test - Natural Attenuation parameter.
1610	Begin alkalinity test.
1644	Alkalinity test and cleanup finished; alkalinity = 340mg/L. Begin to prep for tommorrows sampling.
1655	KS returns from field. SN helps unload vehicle - puts samples in refrigerator.
1710	Run alkalinity on sample # AC02P21A99 Alkalinity = 80mg/L.
1738	Run Nitrite standard. Std. checks good 0.094 mg/L (Range = 0.090 - 0.110 mg/L)

Work continued to Page 14

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 2/26/99

WITNESS DATE

TITLE NSNC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 13 Weather: Cloudy, mid 60's

1817	Completed Nitrite Std. Solution. Cleaned glassware and gathered bottles/equipment for tomorrows sampling.
1910	Depart trailer for Office Max and BBQ.

KS
SN
2/26/99

Work continued to Page

SIGNATURE [signature] DATE 2/26/99
WITNESS DATE

TITLE NSNC Crane PROJECT 7651
BOOK 2426

Work continued from Page Weather: Overcast, low 50's.

0700	Arrive at trailer (SN + KS). Prepare trip blank for KS's cooler.
0705	Prepare SN's trip blank.
0711	Load van for GW sampling.
0727	SN calibrates PID: calibration good - 100 ppm.
0741	SN + KS depart trailer for ABG.
0759	Arrive @ well 03C03 and set up to purge (SN).
0815	Begin purging - PID = 29.1 ppm (B.H.); Static water level = 87.62 ft; one casing volume = 10.6 gallons; Initial flow rate = 180 ml/min.
0820	Heavy rain begins - persists off and on.
0911	Rain ends - flow rate has been adjusted from 180 ml/min to 200 ml/min

Work continued to Page 16

SIGNATURE [signature] DATE 2/27/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651 **BOOK** 2426

Work continued from Page 15 WEATHER: Overcast w/ rain off and on, mid 40's.

0918 No affect on water level from flow rate adjustment. (87.64 FT.).

0947 Adjusted flow rate to 240 ml/min.

0956 Adjusted flow rate does not affect water level: 87.64 FT.

1000 See field notes for any additional readings / comments.

1130 Begin sampling; Sample # AC031A99 - VOC, dis. gases, sulfide, TOX, Explosives A+B, Metals (total + dis.), CN, TOC, Chloride / Sulfate, phosphorus (total + dis.), Field Parameters (Full set) - sulfide and DO (Chemets) done in field.

1250 Sulfide field test = 0.04 mg/L

1256 DO Chemets method = 0.2 mg/L

1303 Load vehicle for return to trailer.

Work continued to Page 17

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Reid DATE 2/27/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651 **BOOK** 2426

Work continued from Page 16 WEATHER: Cloudy, mid 40's.

1324 Arrive at trailer, unload vehicle and place samples in refrigerator.

1335 Lunch.

1400 Begin Natural Attenuation field parameters on sample # AC031A99. CO_2 = 64 mg/L

1410 Alkalinity = 356 mg/L

1418 DO = 0.31 mg/L.

1427 Clean glassware and field chemistry table / area.

1500 Depart trailer for ABG.

1519 Arrive at ABG - KS gives SN samples to run back at the trailer for Natural Attenuation.

1532 SN depart ABG for trailer.

1547 SN arrives back at trailer.

Work continued to Page 18

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Reid DATE 2/27/99

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 17 Weather: overcast, Mid 50's.

1550 Begin running sulfide on AC031A99. Sulfide = 0.03 mg/L

1556 Ferrous Iron = 0.05 mg/L for sample AC031A99.

1600 Nitrite on sample AC031A99 is 0.003 mg/L - must do pretreatment for Nitrate.

1620 Perform Nitrate (on) analysis - 0.21 - 0.003 = 0.207 mg/L.

1700 Perform field chemistry for sample # AC121A99.

1835 Prepare for sampling of surface points

1947 Depart trailer for BOQ.

10/10 2/27/99

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE DATE 2/27/99
WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page WEATHER: Cloudy, low 30's.

0700 Arrive at trailer. Prepare trip blank for today's ~~sampling~~ (SN) sampling. (SN)

0712 Load vehicles for sampling.

0800 See KS Field Log Book for daily activities - / Field Forms also.

1245 SN arrives back at the trailer - unloads samples and equipment. Places samples in the refrigerator

1255 Begin field chemistry for sample ACRB1A99. This sample is a duplicate.

1502 Started field chemistry on sample ACRA1A99.

1644 Started field chemistry on sample ASPRC1A99.

1830 Started field chemistry on sample ASPRA1A99. See KS Log Book for further activities

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE DATE 2/28/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 19 Weather: no rain, low 30's.

0700 SN arrives at trailer. Prepares trip blank and loads vehicle for sampling.

0724 SN calibrates PID.

0742 SN departs trailer for the ABG.

0757 SN arrives at ABG office to inform personnel of sampling activities. OK to sample in burn areas.

0759 Arrive at well 03C09P2, and begin to set up purge/sampling equipment.

0803 PID reading = 0.0 ppm; water level = 45.19 FT.

0818 Begin purging. Water has brown color to it due to sediment content. See field forms for purging and sampling information

1205 KS comes out to relieve SN.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 21

SIGNATURE Scott W. Neil DATE 3/1/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 20 Weather: Sunny, upper 40's.

1210 SN departs ABG for lunch.

1250 SN arrives at trailer to load vehicle for sampling. Prepare trip blank.

1330 SN departs trailer for ABG.

1353 SN arrives at well 03C15 and begins to setup for purging/sampling.

1407 Begin purging - PID = 4.3 ppm; water level = 64.38 FT (static); pump rate = 212 mL/min; one casing volume = 6.2 gallons. Refer to field forms for purging/sampling information on this well.

1605 Begin sampling. - Sample # AC15A99.

1607 Nitrogen tank tipped out - changed cylinder and resumed sampling. -

1704 End sampling - pack vehicle with equipment/samples.

1718 Depart ABG for trailer.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 22

SIGNATURE Scott W. Neil DATE 3/1/99

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 21 Weather: Sunny, upper 30's.

1744 Arrive at trailer - unload equipment and samples - put samples in refrigerator.

1805 SN performs Alkalinity field test on sample AC15IA99.

1821 Prepare for tomorrow's field activity.

1900 Return to BOQ.

SN 3/1/99

Work continued to Page

SIGNATURE [signature] DATE 3/1/99

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page Weather: Light rain, upper 30's

0655 SN arrives at trailer.

0700 SN prepares Trip Blank TB030299 01.

0705 SN prepares Trip Blank TB030299 02.

0712 SN calibrates sonde for field parameters.

0731 SN loads vehicle for sampling and purging activities.

0746 SN departs trailer for (SN) ~~B30~~ AB6.

0803 SN arrives at AB6 well # 03C26. Sets up equipment for sampling/purging.

0810 Begin purging - sample # AC26IA99. PID reading = 0.0 ppm, static water level = 8.25 ft one casing volume = 4.1 gallons. Please refer to field forms for purging/sampling information.

1003 YSI Keypad not operational - went to KS's sample location to get his keypad.

Work continued to Page

SIGNATURE [signature] DATE 3/2/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 23 Weather: cloudy, mid 60's.

1021 Arrived back at 03C26 and resumed readings with different keypad. Purging was ongoing between the time SN left his well until the time he returned.

1205 Begin sampling - Sample # AC261A99 for VOC, TOX, Explosives, Metals (total & dis.), CN TOC, chloride / sulfate, phosphorus (total & dis.), Field test for Alkalinity.

1359 End sampling; pack vehicle and depart AOC. On the way out, stop at KS's well to get sample for Alkalinity test on well # 03C27, sample # AC271A99 (plus duplicate alkalinity).

1430 Arrive back at trailer. Unload samples and equipment.

1447 Begin packing samples for FED EX.

1815 Leave trailer for FED EX.

1850 Arrive at FED EX. Drop off samples. Return to SOQ.

Work continued to Page

SIGNATURE Scott M Neil DATE 3/2/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page WEATHER: Mostly sunny, upper 20's.

0700 Keith Simpson (KS), Tim Evans (TE), and Scott Neil (SN) arrive at trailer. Begin to prepare for workday.

0710 SN calibrates flow-through cell.

0730 Surveyors arrive at trailer - Eric Denlinger and Dave Meier

0745 TE calibrates PID. KE gives surveyors Health & Safety.

0830 KS & TE depart trailer with surveyors to Environmental office.

0930 SN departs trailer for well 03C30.

0957 SN arrives at well 03C30 and begins to set up for sampling / purging

1022 Begin purging - PID = 2.1 ppm; water level = 232.445 FT.

1027 Water is not coming out of tube -

Work continued to Page 26

SIGNATURE Scott M Neil DATE 3/8/99
WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 25 WEATHER: Cloudy, upper 30's.

con't Tried to get water to pump from well but was unsuccessful.

1046 Packed equipment and moved to another well.

1109 Arrive at well number 03C17 and setup for purging & sampling.

1133 Begin purging - PID = 0.0 ppm; water level = 138.41 FT.

1143 Check meter parameters - Sp. Cond. and Dis. Oxy. are out of whack. Stop purging.

1149 Pack up equipment and depart for trailer to re-calibrate instrument.

1222 Arrive at trailer to calibrate - Sp. Cond. won't calibrate.

1233 Call YSI environmental to (SN) for technical support. YSI takes us through calibration with 718 µS std. and inst. calib.

Work continued to Page 27

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neu DATE 3/8/99

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 26 WEATHER: Cloudy, upper 30's.

1255 SN departs trailer for 03C17.

1321 SN arrives at 03C17 and begins to set up for purging and sampling. PID = 0.4 ppm; water level = 138.38 FT.

1350 SN begins purging. All pertinent data collected during purging/sampling may be referenced from the field notes.

1615 Begin sampling - VOC, TOX, Explosives, Metals (total & dis.), Cyanide, TOC, Chloride/sulfate, Phosphorus (total & dis.).

1714 End sampling; pack equipment and sample cooler in van.

1722 Depart 03C17 for trailer.

1744 Arrive at trailer. Empty equipment from vehicle. Place samples in the refrigerator.

1821 Run Alkalinity field chemistry test

1905 Return to SDQ (SN).

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neu DATE 3/8/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page

Weather: Snow overnight changing to rain. Rain, mid 30's.

0655 SN arrives at trailer to begin prep for purging and sampling of well number 03C30.

0700 SN prepares Trip Blank - TB03099901.

0720 SN calibrates PID: 100 ppm of a 100 ppm std.

0735 SN departs trailer for well 03C30.

0758 SN arrives at well 03C30 - begins to set-up for purging and sampling; Rain persists.

0835 Begin purging: water level = 223.01 ft, PID = 1.4 ppm, flow rate = 63 ml/min. See field notes for purging and sampling of well # 03C30.

1305 Begin sampling - Sample # AC301A99.

Work continued to Page 29

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Reid DATE 3/9/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 28

Weather: Rain ended @ 1030, cloudy, upper 30's.

1305 Bottles to be filled: VOC's, TOX, Explosives, Metals (total & dis.), cyanide, TOC, sulfate/chloride, Phosphorus (total, dis.). Purged for four hours and started to sample per FSP.

1519 End sampling. Pack vehicle with equipment and samples.

1529 Depart for trailer.

1545 Stop at gas station to put gas in the vehicle.

~~1557~~ (SN)

1557 Arrive at trailer. Unload van - put samples in the refrigerator.

1635 E.P. Johns stopped at the trailer to make sure he knew where to meet SN & RS tomorrow morning.

1710 SN performs field chemistry (SN) for alkalinity on sample # AC301A99.

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Reid DATE 3/9/99
WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page WEATHER: cloudy, upper 20's

0700	SW arrives at trailer. Begins loading vehicle for purging and sampling at well # 03B02.
0710	SW calibrates PID - 100 ppm on a 100 ppm std.
0720	SW prepares Trip Blank - TB03109901.
0740	E.P. Johns arrives on site.
0752	Depart trailer for ABG SW + E.P.
0804	Arrive at ABG office - inform ABG personnel of activities at Old Jeep Trail.
0815	Arrive at well # 03B02. Begin to set-up for purging + sampling.
0839	Begin purging: PID = (SW) 0.0 ppm, water level = 5.12 FT, one casing volume = 2.3 gallons. See field notes for data on well purging + sampling.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 31

SIGNATURE Scott W. Neil DATE 3/10/99

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 30 Weather: cloudy, low 30's.

1126	Stopped purging due to control box problem - sapping too much Nitrogen from cylinder. Going to the trailer for another control box and cylinder of nitrogen
1142	Depart well 03B02 for trailer.
1202	Arrive at cafeteria with E.P. Johns to meet Bill Gates for lunch.
1240	Return to trailer - get another control box and new nitrogen cylinder.
1300	Depart trailer for well # 03B02
1319	Arrive at 03B02 - set up for purging + sampling - see field notes for purging / sampling data.
1700	(SW) End sampling. Perform CHEMETS for D.O.; perform sulfide; prep sample for D.O. at trailer. CHEMETS D.O. = 0.5 mg/L Sulfide = 0.6 mg/L

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 32

SIGNATURE Scott W. Neil DATE 3/10/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 31. WEATHER: Mostly sunny, upper 30's.

1730 Depart 03B02 for trailer.

1754 Arrive at trailer. Unload vehicle and refrigerate samples

1810 Begin Field Chemistry for D.O., Alkalinity, CO_2, Sulfide, Ferrous Iron, Nitrite, and Nitrate.

1930 End of Field Chem. Cleanup.

1935 Depart trailer for BOQ.

Void
SWN
3/10/99

SIGNATURE Scott W. Neu DATE 3/10/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page WEATHER: Mostly sunny, mid 20's.

0655 SW arrives at trailer.

0700 SW prepares Trip Blank. Loads vehicle for sampling (SW) and purging well 03C20 at the ABG.

0723 SW calibrates PID: 100 ppm on a 100 ppm std.

0735 SW departs trailer.

0753 SW stops at ABG office to check-in. Bobby tells him that they will be burning at about 9:00 AM and I may have to leave.

0758 SW arrives at well 03C20 and sets up for purging / sampling. PID = 9.5 ppm (0.0) in breathing zone; one casing volume = 5.2 gallons; water level = 89.70 FT.

0815 SW begins purging @ 120 mL/min. Refer to field notes for purging / sampling data.

SIGNATURE Scott W. Neu DATE 3/11/99
WITNESS DATE

TITLE NSWC Crane PROJECT NO. 765 BOOK 2426

Work continued from Page 33 Weather: Mostly sunny, low 30's.

0912	Stopped purging due to burning at the ABG - left well to wait at ABG office parking area.
0925	Burning activity over - resume purging. Water level = 89.72 FT.
1045	Begin sampling - sample # AC201A99. VOC's, TOX, Explosives, Metals (Total & dis.), Cyanide, TOC, Sulfate/Chloride, ~~Phosphorus~~ (SN) Phosphorus (Total & dis.).
1150 ~~1045~~ (SN)	End sampling. Begin to pack vehicle with equipment & samples.
1204	Depart ABG.
1227	Arrive at trailer. Unload equipment and refrigerate samples
1240	Lunch
1305	Return to trailer from lunch. QC field notes, prepare for alkalinity test, and prepare for shipping.

Work continued to Page 35

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 3/11/99

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651 BOOK 2426

Work continued from Page 34 WEATHER: Sunny, upper 30's.

1335	SN performs alkalinity on sample AC201A99. Results: 246 mg/L.
1400	SN begins packing samples for shipment - AC171A99, AC301A99, AB021A99, AC201A99.
1415	Hugh Prentice (Lauck's) calls inquiring status of remainder of samples.
1420	SN calls Microseeps to inform them of impending shipment of Dissolved Gases sample from AB021A99. (SN)
1519	Sample packing and associated paper work completed.
1525	Pack extra empty bottles & coolers in shed.
1815	Depart trailer for FED EX.
1850	Arrive at FED EX. Drop off samples. Return to BDQ.

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 3/11/99

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651
BOOK 2426

Work continued from Page WEATHER: Sunny, mid 20's.

0700 Arrive at trailer. Prepare for purging / sampling at ABG well 03C08P2.

0710 SN calibrates PID: 99.8ppm on a 100 ppm Std.

0715 SN prepares Trip Blank - TB03129901.

0730 Depart trailer for ABG

0752 Upon entering ABG (near office), SN encounters surveyors. They are going to an area where they can get a signal to make a cell phone call.

0800 SN arrives at well ~~03C8C~~ 03C08P2 and begins setting up for purging / sampling.
PID = 2.1 ppm
Water Level = 75.04 ft
One volume = 4.6 gallons

0830 Begin purging. See field forms for purging / sampling data.

SIGNATURE Scott W. Shed DATE 3/12/99
WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651
BOOK 2426

Work continued from Page 36 WEATHER: Sunny, upper 20's.

1118 Stopped purging. Problem w/ flow of water through flow-through cell. Checked all equipment and air supply; everything working fine - determined it was the bladder pump.

1150 Left ABG. Met up with KS + TE at Crane Café and enlisted their help.

1225 Departed the Crane Café w/ KS and TE to the ABG.

1242 Arrived at ABG well 03C08P2. Took pump out of the well and TE determined that the bladder must be ripped. ~~TE departed~~ SN

1307 TE departed for slug testing at the ORR. KS + SN departed for trailer.

1330 KS & SN arrive at trailer. KS calls QED and they confirm ripped bladder

SIGNATURE Scott W. Shed DATE 3/12/99
WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 37 Weather: Sunny, upper 30's.

1338 SN & KS get a pump designed for the SWL (dry well) and replace the pump at 03C08P2.

1357 Arrive at 03C08P2. KS & SN replace pump.

1405 SN takes KS to ORC to help TE.

1418 SN returns to ABG well 03C08P2; begins to setup for purging/sampling.

1430 SN begins purging. Refer to field notes for data on purging/sampling

1600 End purging. Purged for four hours then started sampling per FSP. DO not stabilized.

1605 Begin sampling - sample # AC08P21A99. VOCs, TOX, Explosives, Metals (T. & dis), Cyanide, TOC, Sulfate/chloride, phosphorus (T. & dis.).

Work continued to Page 39

SIGNATURE [signature] DATE 3/12/99
WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 38 Weather: Sunny, mid-low 30's.

1802 Sampling ends, pack equipment and samples in vehicle.

1812 Depart ABG for trailer.

1825 Arrive at trailer. Unload samples - place in refrigerator.

1835 Perform Alkalinity test on sample AC08P21A99. Alkalinity = 323 mg/L. Clean glassware.

1843 Unload equipment from vehicle.

1905 Depart for BOQ.

0038 Summary Last well purged & sampled on 3/12/99. Total of 18 wells & 4 surface points - (refer to page 7 of this logbook). QA/QC summary is on page 41 - 3 duplicates and 2 MS/MSD's, 17 trip blanks).

Work continued to Page

SIGNATURE [signature] DATE 3/12/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page WEATHER: Cloudy, mid 20's - low 30's.

0700 Arrive at trailer; prep for Slug Testing with TE. Please refer to TE's Logbook # 2456.

RMD
SWW
3/13/99

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 3/13/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE DATE

WITNESS DATE

NSWC
CRANE, IN
CTO 38

2397

START 2-8-98

CTO 38

ROUND 2 SAMPLING

FEB/MARCH '99

LOG BOOK # 2397

TITLE NSWC CRANE

PROJECT NO. 7651

SUNDAY 2.21.99

BOOK 2397

Work continued from Page

KS & SN TO AIRPORT & CRANE, IN BOQ

TRAVEL TO SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 2.21.99

WITNESS

DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

MONDAY 2.22.99 **BOOK** 2397

Work continued from Page WEATHER: 20-40°F SUNNY

0655 KS AND SN AT TRAILER, HOOK-UP ELECTRIC TO TRAILER.
HOOK-UP PHONE LINE TO TRAILER.
MOVE RENTED & PURCHASED EQUIPMENT & COOL W/BOTTLES FROM BLD 41 & 3260 TO TRAILER

1145 LUNCH
SCOTT CONTINUE TO SET-UP TRAILER AND MAKING BOTTLE SETS FOR SAMPLING
KS TO HARDWARE AND WAL-MART FOR TRAILER SUPPLIES.

1600 KS RETURN TO TRAILER CONTINUE SETTING UP TRAILER.

1905 DEPART TRAILER

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson DATE 2.22.99

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

TUESDAY 2.23.99 **BOOK** 2397

Work continued from Page WEATHER: LT SNOW 26-34°F

0655 ON SITE AT TRAILER, KEITH SIMPSON, SCOTT NEIL & ANDY KENDRICK.
AK SET-UP FOR NATURAL ATTENUATION TRAINING. KS & SN GETTING EQUIPMENT AND FIELD FORMS. SET-UP CALIBRATED FOR GW SAMPLING

0800 TRACKING OUR RENTED PID DOWN SHOULD HAVE ARRIVED FED EX MONDAY.

0900 KS TO BLD 41 TO LOOK FOR PID
IT WAS @ THE TRAILER

1015 CALLED TOM BRENT TO HAVE WATER TO TRAILER TURNED ON, TOM SAID IT SHOULD ONLY TAKE A FEW HOURS FOR PUBLIC WORKS TO BE THERE AND TURN WATER ON.

1020 KS & SN TO ABG AND WATER LEVELS/WELL INSPECTION.

1215 RETURN TO TRAILER AK, SN & KS TO LUNCH

1240 KS & SN LOAD TRUCKS FOR GW SAMPLING TO ABG AND SET-UP AT MW 03B04
AFTER SET-UP KS COMPLETED GW WATER LEVELS & WELL INSPECTION.

1515 KS TO TRAILER TO PICK-UP AK WITH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 48

SIGNATURE K. S. Simpson DATE 2.23.99

WITNESS DATE

TITLE NSWC CRANE
2.23.99

PROJECT NO. 7651
BOOK 2397

Work continued from Page 47

HACH KIT FOR FIELD CHEM. ANALYSIS
1530 KS, SN & AK AT 03B04 SN IS IN THE PROCESS OF SAMPLING AK TAKES & PREPS FIELD TEST (CHEM. ANALYSIS) LOAD EQUIPMENT AND SAMPLES INTO TO TRUCKS
1722 RETURN TO TRAILER AK RUNNING FIELD CHEM. ANALYSIS KS & SN TRAINING FOR FIELD CHEM ANALYSIS
SEE ALSO LOG BOOK # 1309
1900 KS & SN CLEAN EQUIPMENT AND PAPER WORK
CALIBRATED BOTH YSI/FLOW THRU CELLS FOR 2.24.99
2030 DEPART TRAILER FOR BOQ

— DAILY SUMMARY —
ON SITE TT NUS:
KEITH SIMPSON,
SCOTT NEIL & ANDY KENDRICK
SAMPLED ONE WELL
TRAINED FOR FIELD CHEM ANALYSIS
SEE ALSO LOG BOOK #'S 2426 & 1309

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS
DATE
DATE

TITLE NSWC CRANE

PROJECT NO. 7651
BOOK 2397

Work continued from Page

ROUND 2 ABC SAMPLING

MONITORING POINT	SAMPLE DATE	QA	COMMENTS	
03B02	3.10.99	—	E.P. JOHNS ON SITE	
03B04	2.23.99	—		2
03C0RP2	2.26.99	—		3
03C03	2.27.99	—		4
03C04	2.26→28.99	—	SLOW WELL	5
03C07	2.26.99	—		6
03C09P2	3.12.99	—		7
03C09P2	3.1.99	—		8
03C10	2.25.99	—		9
03C11	2.25.99	DUP	WESS ON SITE	10
03C12	2.27.99	—		11
03C15	3.1.99	—		12
03C17	3.8.99	—		13
03C20	3.11.99	—		14
03C25	2.24.99	—	4X4 + WALK IN	15
03C26	3.2.99	—		16
03C27	3.2.99	DUP & MS/MSD		17
03C30	3.9.99	—		18
CRA	2.28.99	—		
CRB	2.28.99	DUP-MS/MSD		
SPA	2.28.99	—		
SPC	2.28.99	—		

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS
DATE
DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

WEDNESDAY 2.24.99 **BOOK** 2397

Work continued from Page WEATHER: OVERCAST 29-35°F

0655 ON SITE @ TRAILER KS, SN & AK
PREP FOR GW SAMPLING.
0720 PROBLEM WITH ONE OF THE
ENTERPRISE SUV STILL RUNNIG
WILL TRY AND USE IT TODAY
AND TRADE IT OUT TONIGHT
0730 KS & SN TO ABG SET-UP ON
WELL C25
1000 KS TO OUT TO MEET/PICK-UP
AK FOR FIELD CHEM ANALYSIS
1035 RETURN TO MW C25, COMPLETE
SAMPLING,
1315 LUNCH
1338 RETURN TO TRAILER SAMPLES
HELD IN FRIDGE RUN NA TEST.
1630 PREP EQUIPMENT, BOTTLES & TRUCKS
FOR 2-25-99 SAMPLING
CLEAN TRAILER DEPART BASE FOR
1910 HARDWARE STORE
— DAILY SUMMARY —
ON SITE TTNUS: K. SIMPSON,
S. NEIL & A. KENDRICK
SAMPLED ONE WELL
TRAINED ON FIELD CHEM. ANALYSIS

Work continued to Page

SIGNATURE K. S. Simpson WITNESS DATE 2.24.99 DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

THURSDAY 2.25.99 **BOOK** 2397

Work continued from Page WEATHER: OVERCAST 35-45°F

0700 KS, AK & SN AT TRAILER LOAD TRUCKS
AND CALIBRATE YSI's & PID.
0730 KS & SN TO ABG SAMPLING WELLS
03C10 & 03C11
0850 AK ARRIVES AT ABG SEE LOG BOOK #
1309
0915 JAMES MAY & DANNY HARRELSON WES
ARRIVE ON SITE (ABG) DISCUSS
SAMPLING & NA WITH KS & AK
1145 AK & JAMES & DANNY DEPART ABG
TO TRAILER RUNNING FIELD CHEM
TEST. SN & KS CONTINUE GW
SAMPLING.
1235 SN COMPLETES SAMPLING, TO TRAILER
1400 KS COMPLETE SAMPLING AC11A99 +
DUP FD0225990I
RETURN TO TRAILER
AK RUNNING FIELD CHEM TEST
SN & KS FILLING-OUT COC'S AND
PACKING SAMPLES FOR SHIPMENT
1735 AK DEPARTS FOR AIRPORT AND HOME
JAMES MAY & DANNY HARRELSON (WES)
STOPPED AT TRAILER ≈ 1600 DISCUSSED
SAMPLING & NA FIELD TEST BEFORE
DEPARTING BASE TO AIRPORT.

Work continued to Page 52

SIGNATURE K. S. Simpson WITNESS DATE 2.25.99 DATE

TITLE NSWC CRANE
2-25-99

PROJECT NO. 7651
BOOK 2397

Work continued from Page 51

1815 SN TO FED EX FOR SAMPLE SHIPMENT
SEE COC's # LAUCKS 2,3,4,5,6
MICROSEEPS COC # 7
KS CLEANING EQUIPMENT & TRAILER.
HOOKED DRAIN LINE (3" PVC) FOR TRAILER
1920 UPDATING NOTES & PREPING FOR
2-26-99 SAMPLING
2005 SN RETURNED CONTINUE PREPING
FOR 2-26-99 SAMPLING.
2100 DEPART SITE FOR BOQ

— DAILY SUMMARY —
ON SITE: TT NUS - K. SIMPSON, S. NEIL
A. KENDRICK DEPARTS 1735
WES - JAMES MAY & DANNY HARRELSON
2 WELLS SAMPLED ONE DUP
SHIPPED SAMPLES FED EX
HOOKED UP TRAILER DRAIN
SEE ALSO LOG BOOKS: 2426 & 1309

Work continued to Page

SIGNATURE K-1 S. Simpson
WITNESS
DATE 2-25-99
DATE

TITLE NSWC CRANE
FRIDAY 2-26-99

PROJECT NO. 7651
BOOK 2397

Work continued from Page WEATHER: SUNNY 24-47°F

0700 KS & SN AT TRAILER CALLED IN HURS
LOAD TRUCKS.
0730 TO ABG - KS SET UP ON MW 03C04-
SN SET-UP ON MW 03C07
WELL 03C04 IS A POOR PRODUCER
WILL PURGE TO PUMP INLET & SAMPLE
FOR FIELD CHEM. TEST AND
CONTINUE SAMPLING SAT. & SUN.
UNTIL REQUIRED BOTTLES ARE FILLED
1100 03C04 DRY RETURN TO TRAILER
KS RUNNING FIELD CHEM. TEST
ORDERED A REPLACEMENT WATER LEVEL
METER "OUR" 300' ONE IS WORKING
SPORADICALLY.
1400 DEPART TRAILER TO ABG SET-UP ON
MW 03C2P2
1700 COMPLETE WELL RETURN TO TRAILER
CLEANING EQUIPMENT & PAPER WORK.
1910 DEPART BASE TO OFFICE DEPOT FOR
SUPPLIES, TO BOQ

— DAILY SUMMARY —
ON SITE TT NUS: K. SIMPSON, S. NEIL
2 WELLS SAMPLED
1 WELLS PURGED: RECHARGE OVERNITE
SEE ALSO: LOG BOOKS 2426 & 1309

Work continued to Page

SIGNATURE K-1 S. Simpson
WITNESS
DATE 2-26-99
DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

SATURDAY 2-27-99 **BOOK** 2397

Work continued from Page WEATHER: RAIN OVERNITE, RAIN @ 0800 TO 0930 47-58°F MORE RAIN @ 1630

0650 KS & SN ON SITE AT TRAILER CAL. EQUIPMENT LOAD TRUCKS
A. KENDRICK CALLED WE DISCUSSED NA SAMPLING & JOB STAFFING. HE WILL BE MEETING WITH RALPH B. & STEVE R. MONDAY AM.

0700 KS & SN TO ABG KS CONTINUE WITH 3C04 SN TO 3C03
NOTE: PURGE/DECON WATER CONTINUES TO BE DUMPED INTO ON-SITE MH 327 AS DIRECTED BY FSP & NSWC CRANE ENVIRONMENTAL. FOR VOLUMNS SEE PURGE DATA, DECON WATER AMOUNTS TO ONLY A FEW QT./DAY.
MW 3C04 DRY TO PUMP INLET
≈ 2/3 COMPLETE WITH SAMPLING WILL COMPLETE 3C04 ON SUNDAY.

1005 KS TO TRAILER CALLED FED EX TO CHECK ON SAT. DELIVERY OF W/L METER SHOULD BE HERE BY

1100 12:00, TO SERVICE STATION ON BASE FOR GAS & ICE

1205 RETURN TO ABG SAMPLING MW 3C12

1235 SN DEPARTS ABG FOR TRAILER

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. J. S. Simpson DATE 2-27-99

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

2-27-99 **BOOK** 2397

Work continued from Page

RUNNING FIELD CHEM. TEST AND LUNCH

1510 SN RETURNS TO ABG PICKS-UP SAMPLES FOR FIELD CHEM. TEST AT MW 3C12 AND RETURNS TO TRAILER

1710 KS COMPLETES AT MW 3C12 & RETURNS TO TRAILER
WORKING ON PAPER WORK AND EQUIPMENT. ALSO PREPING FOR SW SAMPLING SUNDAY

1905 DEPART TRAILER FOR BOQ

— DAILY SUMMARY —
ON SITE TTNUS: K. SIMPSON & S. NEIL
CONTINUE SAMPLING MW 3C04
SAMPLED MW 03C03 & 03C12
SEE ALSO LOG BOOK # 2426 & 1309

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. J. S. Simpson DATE 2-27-99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

SUNDAY 2-28-99 BOOK 2397

Work continued from Page WEATHER: TEMP FALLING 45-35°F

RAIN OVER NITE

0700 KS & SN AT TRAILER PREP FOR SURFACE WATER SAMPLING

0800 TO ABG / OJT SAMPLED CREEK AT BOUNDARY (CRB) & CREEK BELOW SPRING A (CRA)

RETURNED TO TRAILER KS FILTERED DISSOLVED METALS & PHOS.

SN RUNNING FIELD CHEM. TEST.

1325 KS RETURNS TO ABG AND SAMPLES SPRINGS A & C

1500 TO WELL C04 TO COMPLETE SAMPLING, POOR PRODUCER WELL TOOK 3 DAYS TO SAMPLE

1640 KS RETURN TO TRAILER, SN CONTINUES WORKING ON FIELD CHEM. TEST

KS WORKING ON COC'S / SAMPLE PAPER WORK

2115 DEPART TRAILER FOR BOQ

— DAILY SUMMARY —

ON SITE TTNUS: K. SIMPSON, S. NEIL

SAMPLED ALL 4 SURFACE POINTS

COMPLETED WELL 3C04

SEE ALSO LOG BOOK # 2426 & 1309

TITLE NSWC CRANE PROJECT NO. 7651

MONDAY 3-1-99 BOOK 2397

Work continued from Page WEATHER: 36-45°F CLEAR

0650 KS & SN AT TRAILER SN PREPING FOR SAMPLING AT ABG WELL 3C09P2

KS PAPER WORK AND SAMPLE PACKING

0750 SN TO ABG

KS PACKING SAMPLES FOR FED EX SHIPMENT

1130 LUNCH KS. KS TO ABG SN TO LUNCH. COMPLETE SAMPLING MW C9P2

KS TO TRAILER CONTINUE PACKING FOR FED EX

SN TO MW 03C15

1620 FED EX PICK-UP AT TRAILER 9 COOLERS TO LAUCKS & 1 COOLER TO MICROSEEPS

KS CATCHING UP ON PAPER WORK CLEANING EQUIPMENT AND TRAILER

1735 SN RETURNS TO TRAILER 03C15 COMPLETE PREP FOR 3-2-99 SAMPLING

1916 DEPART SITE FOR BOQ

— DAILY SUMMARY —

ON SITE TTNUS K. SIMPSON & S. NEIL

SAMPLED 2 WELLS

SHIPPED SAMPLES FED EX

SEE ALSO LOG BOOK # 2426 & 1309

TITLE NSWC CRANE PROJECT NO. 7651

TUESDAY 3.2.99 BOOK 2397

Work continued from Page WEATHER: LT RAIN* 37-46°F

0645 SN & KS @ TRAILER CAL. & LOAD EQUIPMENT FOR GW SAMPLING

0715 TO ABG- KS SET UP ON 3C27

1310 SN RETURNS TO TRAILER TO PACK SAMPLES AND RUN FIELD CHEM. TEST

KS CONTINUE SAMPLING 3C27 THIS WELL IS DUPED AND WILL ALSO SAMPLE FOR MS/MSD

1620 DEPART ABG FOR TRAILER PACKING SAMPLES FOR SHIPMENT CLEAN EQUIPMENT AND SUV'S

1815 KS & SN TO FED EX

1935 RETURN TO BASE & BOQ

— DAILY SUMMARY —

ON SITE TT NUS: K. SIMPSON & S. NEIL

2 WELLS SAMPLED

SAMPLES SHIPPED FED EX

* LTE RAIN IN AM CLEAR FROM 0800 ON

Work continued to Page

SIGNATURE K. S. Simpson DATE 3.2.99

WITNESS DATE

58

TITLE NSWC CRANE PROJECT NO. 7651

WEDNESDAY 3.3.99 BOOK 2397

Work continued from Page WEATHER: RAIN TURNING TO SNOW 34-28°F

0700 CHECKED OUT OF BOQ TO TRAILER CLEAN TRAILER SN CALIBRATING CLEANING & CHECKING PID & YSI EQUIPMENT.

KS TO ENVIRONMENTAL TO COPY FIELD NOTES.

TALKED WITH PHIL KEITH AND SET-UP A MEETING TIME FOR 3.8.99 WITH PHIL & SURVEYORS

0900 KS RETURN TO TRAILER FILE PAPER WORK/NOTES TAKE FIELD NOTES TO PGH

0930 PUBLIC WORKS AT TRAILER WILL REPAIR WATER LINE TO TRAILER WED OR THUR.

1000 KS & SN TO ENTERPRISE THEN AIRPORT TO PGH

END OF SHIFT

Work continued to Page

SIGNATURE K. S. Simpson DATE 3.3.99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

SUNDAY 3.7.99 BOOK 2397

Work continued from Page

1645 KEITH SIMPSON, TIM EVANS & SCOTT NEIL TT NUS PGH TO CRANE

2320 CHECK INTO BOQ ON BASE

START SHIFT

TRAVEL TO SITE DAY

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson

WITNESS

DATE 3.8.7.99

DATE

TITLE NSWC CRANE PROJECT NO. 7651

MONDAY 3.8.99 BOOK 2397

Work continued from Page WEATHER: OVERCAST, COOL 27-33°F

0700 KS, SN & TE AT TRAILER
SN PREP FOR GW SAMPLING
SEE LOG BOOK #2426
SURVEYORS FROM BIENSOE TAPP &
0740 RIGGERT @ TRAILER ERIC DENLINGER
& DAVE MEIER
H & S MEETING
ERIC & KS CALLED KEITH HENN
TT NUS PGH TO CLEAR UP ? FROM
THE SPEC.
0910 TO BLD 3260 KS, TE & SURVEYORS
TO MEET WITH PHILL KEITH THEN
0950 TO BASE ENGINEERING AND MET
BILL ~~HAR~~ HUDSON HE HAD INFORMATION
ON SURVEYING CONTROL POINTS FOR
ERIC. PHILL KEITH RETURNED TO
BUILD 3260 KS, TE & SURVEYORS ON
SITE TOUR. ABE, ORR & DR WILL
TOUR SWL & CF LATER IN THE WEEK
1130 SURVEYORS TO LUNCH AND START
WORK AT ORR/DR
KS & TE TO BUILD 3260 PICK UP
EQUIPMENT FOR SLUG TEST.
1145 LUNCH
KS & TE TO ORR START SLUG TEST

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson

WITNESS

DATE 3.8.99

DATE

TITLE NSWC CRANE
3.8.99

PROJECT NO. 7651
BOOK 2397

Work continued from Page 61

* PRIOR TO DEPARTING FOR ORR
TALKED WITH RALPH B. UPDATE
ON JOB PROGRESS TO THIS POINT
RALPH ASK ME TO CALL E.P. JOHN
AND SET-UP A MEETING TIME &
PLACE FOR WEDNESDAY. E.P. WOULD
LIKE TO SEE THE WELL SAMPLING
AND CHEM. FIELD TEST + EPA
REQUIRED DOCUMENTION. SCOTT WILL
MEET EP AT TRAILER 3.10.99@0700
ALSO TROUBLE CALIBRATION THE FLOW
THRU CELL I CALLED YSI AND
HELPED SCOTT WORK THRU IT.
FLOW THRU CELL CAL'ED FINE.
1820 KS & TE RETURN TO TRAILER
UNLOAD TRUCK CLEAN EQUIPMENT.
TE IS DOWN LOADING SLUG TEST
DATA. 4 SLUG TEST WERE COMPLETED
AT ORR TODAY SEE FIELD NOTES
AND LOG BOOK 2456

Work continued to Page

SIGNATURE K. S. Simpson
DATE 3.8.99

TITLE NSWC CRANE
3.9.99

PROJECT NO. 7651
BOOK 2397

Work continued from Page

DAILY SUMMARY

ON SITE TT NUS: KEITH SIMPSON, SCOTT
NEIL & TIM EVANS.
KEITH HENN TO ARRIVE AT BOQ
@ 2000
SURVEYORS - DAY 1 ONSITE
ERIC DENLINGER & DAVE MEIER
PUBLIC WORKS TURNED WATER ON
TO TRAILER AFTER REPAIRING LINE
LAST WEEK AND IT STILL LEAKED
SN SAMPLED ONE WELL
KS & TE 4 SLUG TEST
SITE TOUR & H&S FOR SURVEYORS
+ CONTROLL POINT LOCATIONS LOCATED
SEE ALSO LOG BOOKS 2426 & 1309 & 2456

VOID
KES

Work continued to Page

SIGNATURE K. S. Simpson
DATE 3.9.98

TITLE NSWC CRANE PROJECT NO. 7651

TUESDAY 3.9.99 BOOK 2397

Work continued from Page

WEATHER: SLEET, SNOW OVER-
NIGHT TURNING TO RAIN IN TUESDAY
AM RAIN STOPED @ 10:00 OVER CAST 28-37°F
0655 KS, SN, TE AND KEITH HENN @
TRAILER.
0725 SN LOADED TRUCK TO ABG-
FOR C-W SAMPLING.
TE WORKING WITH SLUG TEST
DATA
KEITH HENN WORKING ON SOIL
BACKGROUND STUDY CTO 93
0730 SURVEYORS CALL; DUE TO THE
WEATHER THEY WON'T BE IN
TODAY
0733 CALL PHIL KEITH TO CHANGE TALK
DATE OF SITES.
CALLED SECURITY AND TALKED TO
PAT (CRANE SECURITY) AND
LET THEM KNOW THAT THE
SURVEYORS WOULD BE WORKING
BASE WIDE OVER THE NEXT
TWO WEEKS
0745 KS, TE & KH TO ORR HELPED
TIM SET-UP ON 4 WELL THEN
0820 KS & KH WORKING ON BACKGROUND
STUDY LOCATIONS SEE LOGBOOK 2446

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE K. S. Simpson DATE 3.9.99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

3.9.99 BOOK 2397

Work continued from Page 64

1150 KS & KH RETURN TO TRAILER
1155 TE RETURNS TO TRAILER
1210 TO LUNCH
KH PREPS FOR 2:00 MEETING
KS & TE TO MW 03C30 TO CHECK
WITH SN HE IS WORKING ALONE
1250 IN A WOODED AREA. EVERTHING IS
GOING GOOD WITH SCOTT.
KS & TE TO ORR CUT RISERS
@ 06C19 & 06C19P2
06C19 CUT 0.14±
06C19P2 CUT 0.17±
1205 KS & TE CONTINUE WITH SLUG TEST
@ ORR
1725 RETURN TO TRAILER, TE DOWN LOADING
SLUG TEST DATA, KS PAPER WORK
SN CHEM FIELD TEST, CLEAN EQUIP.
& PREP FOR WED. SAMPLING
DEPART TRAILER FOR BOQ

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE K. S. Simpson DATE 3.9.99

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

3.9.99 **BOOK** 2397

Work continued from Page 65

DAILY SUMMARY

ON SITE TT NUS: S. NEIL, R. SIMPSON, T. EVAN & K. HENN
S. DIV EP JOHNS
- 1 WELL SAMPLED
- 7 SLUG TEST COMPLETE
- INFORMATION GATHERED FOR BACKGROUND STUDY

SEE ALSO LOG BOOKS: 2426, 1309, 2456 & 2446

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE R. S. Simpson DATE 3.9.99

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

WEDNESDAY 3.10.99 **BOOK** 2397

Work continued from Page WEATHER: OVERCAST 27-36°F

0700 KS, SN & TE @ TRAILER. SN LOADS EQUIPMENT FOR GW SAMPLING TE PREP FOR SLUG TEST

0730 CALLED WALT WAGNER @ THE DR HE GAVE US THE OK TO WORK AT THE RANGE TODAY & THUR. FROM 0730 → 1715

0745 E.P JOHNES ARRIVES @ TRAILER, DISCUSSED GW SAMPLING EP & SN TO ABG SEE LOG BOOK #2426

0755 TE TO ORR WORKING ON SLUG TEST SEE LOG BOOK # 2456

0915 KS, PHILL KEITH & SURVEYORS TO ABG AND CHECK LOCATIONS OF SURFACE/BUILDING POINTS PHILL NEEDS SURVEYED ALSO TOURED DR & ORR WITH SURVEYORS

1015 PHILL RETURNED TO BUILDING 3260 SURVEYORS TO BASE ENGINEERING FOR CONTROL LOCATIONS THEN TO ORR TO SURVEY. KS TO ORR HELPING TE WITH SLUG TEST.

1205 KS, TE MEET SN, E.P JOHNS & BILL GATES AT CAFE FOR LUNCH DISCUSS GW SAMPLING, CTO 38 & 49, SLUG TEST

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE R. S. Simpson DATE 3.10.99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

BOOK 2397

3.10.99

Work continued from Page 67

1240 BILL & E.P. DEPART, SCOTT RETURNS TO ABG FOR GW SAMPLING.
KS & TE TO DR CONTINUE ON SLUG TEST
1830 RETURN TO TRAILER, TE DOWN LOAD SLUG TEST DATA, SN RUNNING FIELD CHEM TEST FROM WELL B302
CLEAN TRUCKS EQUIPMENT & TRAILER
PAPER WORK

DAILY SUMMARY

ON SITE: KS, SN & TE TITUS
E.P. JOHNS & BILL GATES S. DIV
ERIC D. & DAVE M. SURVEYORS
- SITE TOUR KS, PHILL KEITH & SURVEYORS
- ONE WELL SAMPLED
- 5 SLUG TEST COMPLETE
- E.P. JOHNS OBSERVED SAMPLING @ B302

SEE ALSO LOG BOOKS 2426, 1309 & 2456

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson DATE 3.10.99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

BOOK 2397

THURSDAY 3.11.99

Work continued from Page WEATHER: OVERCAST 23-39°F

0655 KS, TE & SN @ TRAILER PREP FOR FIELD WORK.
0715 SN TO ABG GW SAMPLING
0720 KS & TE TO DR SLUG TEST
KS & TE CONTINUE WITH SLUG TEST @ DR & ORR THROUGH-OUT THE DAY
1747 KS & TE RETURN TO TRAILER
SN PACKING SAMPLES FOR FED EX
1820 DEPART TRAILER FOR FED EX/HARDWARE STORE
1940 RETURN TO BASE/BOQ

DAILY SUMMARY

ON SITE: KEITH S, TIM E. SCOTT N. TITUS
ONE WELL SAMPLED
4 + 1 DRY WELL SLUG TEST COMPLETE
WATER LINE REPAIRED TO TRAILER
SAMPLES SHIPPED FED EX

SEE ALSO LOG BOOKS 2426, 1309, 2456

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson DATE 3.11.99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

FRIDAY 3-12-99 BOOK 2397

Work continued from Page WEATHER: SUNNY, COLD 22-38°F

0700 KS, TE & SN @ TRAILER. PAPER WORK CAL EQUIPMENT LOAD TRUCKS SN TO ABG LAST MW FOR ROUND 2

KS & TE TO DR & ORR SLUG TEST CALLED SECURITY TO OPEN GATE AT DR

KS & TE WORKING ON SLUG TEST THROUGHOUT THE DAY SEE LOG BOOK 2456

1300 SN HAVING TROUBLE WITH PUMP @ 03C08P2 - KS & TE TO ABG AND HELP SCOTT THE PUMP HAD A ~~TORN~~ TORN BLADDER WE REPLACED PUMP ONLY WITH A PUMP THAT WAS TO BE USED AT SWL 203 THAT WELL IS DRY AND THE PUMP WAS NEVER INSTALLED.

SN COMPLETED WELL SAMPLING END OF ROUND 2 @ ABG

KS & TE RETURN TO ORR FOR SLUG TESTING

1825 KS, TE & SN @ TRAILER UNLOAD TRUCKS CLEAN EQUIPMENT & PAPER WORK

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson DATE 3-12-99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

3-12-99 BOOK 2397

Work continued from Page

1835 TE TO HARDWARE STORE

1910 KS & SN DEPART TRAILER FOR BOQ

DAILY SUMMARY

ON SITE: K. SIMPSON, S NEIL & T EVANS FTNWS
ERIC D. & DAVE M SURVEYORS

- 8 SLUG TEST COMPLETE
- ONE GW WELL SAMPLED
  ABG ROUND 2 COMPLETE

SEE ALSO LOG BOOKS 2426, 1B09 & 2456

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson DATE 3-12-99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

SATURDAY 3.13.99 BOOK 2397

Work continued from Page WEATHER: PARTLY CLOUDY 35-44°F

0700 KS, SN & TE ON SITE @ TRAILER
SN & TE PREP FOR SLUG TEST
KS PACKED QED CONTROL BOX
AND ONE BLADDER PUMP TO
RETURN FOR REPAIR SENT TO
CHRIS CARK RETURN # 11914
KS PACKING SAMPLES FOR SHIPMENT
ONE COOLER TO LAUCKS
SENT UNUSED EMPTY COOLERS TO
MICROSEEPS FED EX EXPRESS SAVER
0910 TE & SN TO ORR WORKING ON
SLUG TEST
0930 KS TO FED EX AND PLUMBING
SUPPLY STORE
1125 KES RETURN FROM BLOOMINGTON
HOOK-UP WATER TO TRAILER
CALLED R. BASINSKI AND DISCUSSED
JOB PROGRESS FOR CTO 38 & 48
ORDERED NITROGEN FOR MONDAY
DELIVERY
1300 KS TO SWC TO INSTALL PUMPS
16 PUMPS INSTALLED SEE P9 33
1725 RETURN TO TRAILER
WORKING ON LIST OF NEED PARTS
& PUMPS TO ORDER FROM QED

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 74

SIGNATURE [signature] DATE 3.13.99
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

3.13.99 BOOK 2397

Work continued from Page 72

SWL PUMP/WELL INFO.

	ID	INSTALLED	COMMENTS
1	MW201A	3.13.99	
2	MW1A	NA	DRY
3	MW1B	3.13.99	
4	MW203	3.24.99	OK PUMP NEEDS REPAIRED
5	MW2A	3.13.99	
6	MW3A	↓	
7	MW4A		
8	MW5A		
9	MW6A		
10	MW7A		
11	MW3B	↓	
12	MW4B	3.24.99	OK PUMP NEEDS REPAIRED
13	MW5B	3.13.99	
14	MW6B	↓	
15	14-1-93		
16	14-2-93	↓	
17	14-3-93	NA	WL 43.91' DRY
18	14-4-93	3.13.99	
19	14-5-93	3.26.99	OK NEED TO ORDER PUMP
20	14-6-93	3.13.99	
21	14-7-93	3.13.99	

ALSO NEED ≈ 20' DISCHARGE LINE & FITTINGS

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 3.13.99
WITNESS DATE

TITLE NSWC CRANE
3.13.99

PROJECT NO. 7651
BOOK 2397

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1920 KS CONTINUE WORKING ON PAPER WORK
SN & TE @ DR WORKING ON SLUG TEST
1935 SN & TE @ TRAILER ALL SLUG TEST COMPLETE
1955 KS, SN & TE DEPART FOR BOQ

DAILY SUMMARY

ON SITE: T. EVANS, S. NEIL & K. SIMPSON TTNUS

- SHIPPED FED EX: 1 COOLER SAMPLES PUMP & CONTROLL BOX TO QED FOR REPAIR, EXTRA COOLERS TO MICROSEEPS.
- 9 SLUG TEST COMPLETE
- INSTALLED 16 PUMPS @ SWL

SEE ALSO LOG BOOKS 2426, 2456

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS
DATE 3.13.99
DATE

TITLE NSWC CRANE
SUNDAY 3.14.99

PROJECT NO. 7651
BOOK 2397

Work continued from Page WEATHER: SNOW OVERNITE ≈ 4"
STILL SNOWING AM.

0700 KS, SN & TE AT TRAILER TE GOING OVER SLUG TEST DATA
KS & SN WORKING ON CTO 10
0840 CHECK WATER LEVEL IN SWL 143.93
43.91' DRY WELL WILL NOT INSTALL PUMP
WORKING ON CTO 10 REMAINDER OF DAY
SEE LOG BOOKS: 2447, 2426 & 2456

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS
DATE 3.14.99
DATE

TITLE NSWC CRANE

PROJECT NO. 7651

BOOK 2397

MONDAY 3.15.99

Work continued from Page WEATHER: SUNNY 27-48 °F

0645 SN & KS @ TRAILER PACKING SLUG TEST EQUIPMENT FOR SHIPMENT

0720 CALL FED EX FOR PICK-UP # 17

0750 SN & KS TO BLD 41 DROPPED OF 7 PACKAGES FOR FED EX PICK-UP TO BLD 3260 PHIL KEITH WILL E-MAIL SURVEY LIST TO RALPH B.

0850 STOPPED @ ROCKEYE SITE TO CHECK ON ACCESS WHEN WORK STARTS ON CTO 10. ACCESS IS OK M-TH DURING WORK HOURS JUST SIGN IN @ OFFICE

0905 RETURN TO TRAILER CALLED RALPH B. TO UP-DATE HIM ON JOB PROGRESS. HE WANTS A SITE WIDE WL AT SWL BEFORE START OF SAMPLING.

1220 MET WITH SURVEYORS KS & SN TAKE SURVEYORS ON TOUR OF SWL & LF

1315 RETURN TO TRAILER, WORKING ON CTO 10

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [illegible]

WITNESS

DATE 3.15.99

DATE

TITLE NSWC CRANE

PROJECT NO. 7651

BOOK 2397

WED. 3.17.99

Work continued from Page WEATHER: NICE, SUNNY 50-68 °F

WORKING ON CTO 10 3.16 & 17.99

SEE LOG BOOK # 7141

1000 KS & SN DEPART BASE FOR AIRPORT & HOME

END OF SHIFT

AND

ROUND 2 SAMPLING

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [illegible]

WITNESS

DATE 3.17.99

DATE

NSWC

CRANE

1999

Field Analytical

Chemistry Log

Work continued from Page /

Date: February 23, 1999
Weather: Cloudy, 26°F, light snow, up to 34°F

Tetra Tech NUS (TtNUS) staff on site:
Keith Simpson (KS)
Scott Neil (SN)
Andy Kendrick (AK)

07:30 - KS and AK arrive on site (trailer).
- SN onsite setting up trailer; Joined by KS
- AK begins to unpack field chemistry equipment
- For general site activities, reference Site Log Book 2397 maintained by Keith Simpson.

09:00 - Setup DR/890 Colorimeter (HACH)
Program Version 2.0
P/N 48470-60
S/N 990290005087
6V @ 40 mA; Class 1 LED Product
- Setup Time and Date, and erase all existing data.
- Setup, organize, and label all chemical reagents
- Initial cleaning of all glassware.

12:00 - Run lab blank for Alkalinity (as $CaCO_3$)
- Use reagent grade deionized water
- Lot 1807032 Ricca # 9150-5
- Use Sulf. Acid Titration cart. of 0.160 N
- No color change w/ addition of phenolphthalein. ⇒ Total Alk = Bicarb.
- Immed. color change w/ addition of Brom Cresol & Titration tip.
∴ Alk ≃ 0 mg/L
- Result was as expected for deionized water.

12:15 - Go to lunch

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page 3

SIGNATURE Andrew M. Kendrick DATE 2/23/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

Lot Numbers for Reagents:

Parameter	Chemical/Reagent	Cat. No.	Lot No.	Purchase
Dissolved Oxygen	Manganous Sulfate	1071-66	M8310	2/99
" "	Alkaline Iodide-Azide	1072-66	M8247	" "
" "	Sulfamic Acid	20762-66	M8296	" "
Sulfide	Sulfide I	1816-32	U8313	" "
" "	Sulfide II	1817-32	U8327	" "
Ferrous Iron	Ferrous Iron Reagent	1037-69	M8303	" "
Nitrite	Nitriver 3	21071-69	M8310	" "
Nitrate	Nitraver 6	21072-49	M8282	" "
Nitrate	Nitriver 3	21071-69	M8268	" "
Alkalinity	Bromcresol Green-Methyl Red Ind.	943-99	M8324	" "
" "	Phenolphthalein	942-99	M8240	" "
Carbon Dioxide	Phenolphthalein	942-99	M8240	" "
Dissolved Oxygen	Starch Indicator	349-32	U8320	" "
" "	Sodium Thiosulfate 0.200 N Tit.	22675-01	D8317	" "
Alkalinity	Sulfuric Acid 1.600 N Tit.	14389-01	8352	" "
" "	Sulfuric Acid 0.1600 N Tit.	14388-01	8358	" "
Carbon Dioxide	Sodium Hydroxide 0.3636 N Tit.	14378-01	D8338	" "
" "	Sodium Hydroxide 3.636 N Tit.	14380-01	D8226	" "

Work continued from Page 1

12:50 - Return from lunch

13:00 - Run Std. Additions for Alkalinity. (See FCA Log Form A-1)
Use deionized water and 0.50 N Alk. Std. (HACH)
1st Addition (0.1 ml) = 24 digits
2nd " = 25 digits
3rd " = 24 digits Lot # N8345
Alk. Std = 0.5 N (25,000 mg/L as $CaCO_3$) Cat. No. 14278-10 (HACH)
Results as expected. Each addition of 0.1 ml Std. (25,000 mg/L) should ≃ 25 digits of 1.60 N Titrant

Reading No.	Std. Added (mL)	Tot. Digits	Std. Added (mg/L)(i)	Total Param. (mg/L)	Expected (mg/L)
1	0	0	0	0	0
2	0.1	24	25	24	25
3	0.2	49	50	49	50
4	0.3	73	75	73	75

(i) Total Standard Added

$$= \frac{\text{Total Standard (mL)}}{\text{Sample Volume (mL)}} \times \text{Std. Concent. (mg/L)}$$

$$= \frac{0.1\ \text{mL}}{100\ \text{mL}} \times 25{,}000\ \text{mg/L} = 25$$

0.2 ml Std = 50 mg/L
0.3 ml Std. = 75 mg/L

Calculate Addition Recovery Percentage = AR %

$$= 100 \times \frac{\text{Reading 2} - \text{Reading 1}}{\text{Expected Incr.}} = 100 \times \frac{24-0}{25} = 96\%$$

$$= 100 \times \frac{49-24}{25} = 100\%$$

$$= 100 \times \frac{73-49}{25} = 96\%$$

Avg. AR % = 97.3 % ∴ = Good

Work continued to Page 5

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

SIGNATURE Andrew W. Kuhrt DATE 2/23/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 3

14:00 Run Standard Additions for Carbon Dioxide
- Use deionized water and 10,000 mg/L CO_2 Std. (HACH)
- 1st Run Lab Blank: 200 mL deionized water and 0.3636-N NaOH
= 37 digits x 0.1 = 3.7 mg/L CO_2 Lot # N8365
CO_2 Std. = 10,000 mg/L as CO_2 Cat. No. 14275-10 (HACH)
Each addition of Std. should result in 50 digits of 0.3636-N NaOH

Reading No.	Total Std. Added (mL)	Tot. Digits	Total Std. Added (mg/L)(1)	Total Percent (mg/L)	Expected-Exist. (mg/L)
1	0 mL	37	0 mg/L	3.7 mg/L	NA mg/L
2	0.1	47+37 = 84	5	8.4	8.7-3.7 = 5
3	0.2	51+84 = 135	10	13.5	13.7-3.7 = 10
4	0.3	48+135 = 183	15	18.3	18.7-3.7 = 15

(1) Total Std. Added. (mg/L)

$$= \frac{\text{Tot. Std. (mL)}}{\text{Samp. Vol. (mL)}} \times \text{Concent (mg/L)} = \frac{0.1 \text{ mL}}{200 \text{ mL}} \times 10{,}000 \text{ mg/L} = 5 \text{ mg/L}$$

(per Addit.)

Calculate AR%

$$= 100 \times \frac{\text{Reading 2} - \text{Reading 1}}{\text{Expected Increase}} =$$

1st = 94 %
2nd = 102 %
3rd = 96 %
292/3 = 97.3 %

Since AR% should be 100% +/- 5%, 97.3% = Good.

14:30 Run Lab Blank for Dissolved Oxygen
- Use deionized water, Titrate to 870 x 0.01 = 8.7 mg/L
- Duplicate with Chemetrics CHEMets (0-12 ppm) = 9 mg/L
= Good Correlation

Work continued from Page 5

15:15 K.S. drives AK to ABG site, Well No. Ø3BØ4.
S.N. collecting samples. (ABØ41A99)
AK collects D.O., AlK., and CO_2 - See FCA Log Form A-2

16:30 D.O. = 0.0 mg/L
16:45 AlK = 78.4 (Total AlK. = Bicarbonate) mg/L
17:00 CO_2 = 93.6 mg/L

17:10 - Collect 2 x 1-Litre Amber Bottles for remaining field parameters.

18:03 - Sulfide = 0.0 mg/L Store #1
18:13 - Ferrous Iron = 3.30 mg/L LIMIT EXCEEDED Store #2
18:45 - Run Reagent Blank Correction for Nitrite = 0.000 mg/L = No Correction
19:06 - Nitrite = 0.0 mg/L Store #3 - No Pretreatment for Nitrate required
19:32 - Nitrate = 0.0 mg/L Store #4 - No Reagent Blank required?
19:55 - Nitrate Reagent Blank = 0.00 mg/L = No Correction.
Cleanup and assist K.S. and S.N. w/ equip. calib. checks.

20:35 - Leave site.

VOID AWK 2-23-99

Work continued to Page 9

SIGNATURE [signature] DATE 2-23-99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 7

Date: February 24, 1999
Weather: Foggy 29°-35° F

07:00 AK, KS, SN arrive on site
For general and sampling activities, see site log book # 2397
Set-up for daily sampling and analysis activities

07:40 Run Standard Additions on Nitrate
Use - Nitrate sample for AB041A99
- Nitrate Standard Solution Ampule, 12 mg/l as (NO_3-N)
(Lot N7220) Cat. No. 25587-20
Sample had been stored at 4°C. Therefore, warmed sample to room temp. prior to analysis.

09:00 Run NO_3 Std. Addition as above.

Reading No	Total Std. Added (mL)	Colorim. Tot. Reading (mg/L NO_3-N)	Total Std Added (mg/L)	Expected
1	0.0 mL	0.00	0.00	
2	0.1 mL	0.02	0.08	
3	0.2 mL	0.10	0.16	
4	0.3 mL	0.18	0.24	

Each addition should increase by 0.08 mg/L. Std. Add. checks Good.

09:15 Tom Brent and Chris Freeman visit trailer
09:45 AK Leave to meet KS and SN at ABG
10:05 Arrive at ABG and drive out to Johnson's Hollow.

Assist KS and SN with purge and sample of well 03C25.

Work continued to Page 11

SIGNATURE Andy Kindel DATE 2-24-99
DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 9

Collect Digital Titration samples on well Ø3C25.

Sample ID No. = AC251A99 - See FCA Log Form A-3

11:57 Dissolved Oxygen = 0.0 mg/L on digital titrator.
- Very slight blue color change indicates small D.O. concentration but below detection of titrator.
- Perform CHEMetrics analysis CHEMets (0-1.0 range). D.O. = 1.0 mg/L. Perform CHEMets (1-12 range) and result was below detection.

12:24 Alkalinity = 180 mg/L.
- Original result was 360 mg/L but dilution from 50 ml up to 100 ml was not performed. Therefore, final concentration should be 0.5 x Original. 360 x 0.5 = 180 mg/L.

12:35 Carbon Dioxide = 191 mg/L

- Return to trailer after lunch.

- Provide geochem. training and sample analyses.

15:47	Sulfide = 0.04 mg/L	Store #5
15:55	Ferrous Iron = 0.12 mg/L	Store #6
16:10	Nitrite = 0.00	Store #7
16:46	Nitrate = 0.00	Store #8

17:32 Run Std. Solution for Nitrate. Prepared 0.20 mg/L Std. by dilating 2.0 ml of 10.0 mg/L Std. Soln. to 100 ml. w/ deionized water. Analytical results = 0.21. = 95.2% = Acceptable.
- Cleanup and prepare for tomorrow.

19:00 - Off Site.

NTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page 13

SIGNATURE [signature] DATE 2-24-99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 11

Date: February 25, 1999

Weather: Cloudy, 34°, Foggy.

07:00 Arrive at trailer.
Set up to begin Sampling.

08:30 AK meets KS at ABG-Ø3C11 (AC111A99)
Check Fe^{2+} during purge. Start Purge at 08:14
08:46 Fe^{2+} = 0.02
08:58 ~~0.03~~ AK S^{2-} = 0.40
09:04 0.03
09:16 = 0.47

09:30 James May (WES) visits site.

11:06 Chemets D.O. = 5.5 mg/L

12:00 Return to trailer w/ preserved D.O. Sample and 2x 1L Amber volumes for geochem. analysis.

Sample Results for AC111A99: (See FCA Log Form A-4)

12:36 Carbon Dioxide = 165 mg/L (Total Alk. = Bicarbonate)
12:42 Alkalinity = 290 mg/L
12:56 Sulfide = 0.08 mg/L (Well head during purge = 0.47 mg/L)
- LUNCH -
14:43 Dissolved Oxygen = 5.32 (CHEMetrics = 5.5 mg/L)
14:55 Ferrous Iron = 0.02
15:06 Nitrite = 0.01
15:42 Nitrate = 0.726 - Pretreatment performed.

Work continued to Page 15

SIGNATURE [signature] DATE 2/25/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 13

Perform Analysis on sample AC1Ø1A99

15:54 - Sulfide = 0.00 mg/L
16:02 - Carbon dioxide = 183 mg/L
16:07 - Alkalinity = Bicarbonate = 200 mg/L
16:20 - Ferrous Iron = 0.0 mg/L
16:46 - Nitrite = 0.002 mg/L
16:55 - Nitrate = 0.55 mg/L - No Pretreatment performed.
16:15 - Dissolved Oxygen = 2.53 mg/L (CHEMetrics at well head = 2.5)
17:17 - Nitrate = Duplicate using Pretreatment = 0.39

AK cleans up and leaves site at 17:30

VOID
AWK
2/25/99

Work continued from Page

PREFORM ANALYSIS ON SAMPLE AC04IA99

1040 SULFIDE = 0.00 MG/L, ANALYZED IN THE FIELD
1220 CARBON DIOXIDE = 250 MG/L
1237 DISSOLVED OXYGEN = 251 MG/L
1246 ALKALINITY = 366 MG/L
1257 FERROUS IRON = 1.09 MG/L
1307 NITRITE = 0 MG/L
1328 NITRATE = 0 MG/L

CLEAN GLASS WARE

Perform analysis on sample # AC07IA99. (SWN)

1610 Alkalinity = 346 mg/L

NOTE: Alkalinity is the only field parameter required for ~~of~~ (SN) AC07IA99.

Clean glass ware. Scott Neil 2/26/99 @ 1444.

Perform analysis on sample # AC02P2IA99 (KES)

1710 Alkalinity = 80 mg/L

Cleaned glass ware.
Scott Neil 2/26/99 @ 1735.

1738 Run Nitrite Std. Solution. Prepared Std. solution by pipeting 5.00mL of fresh 250mg/L NO_2^--N standard into a 250.0mL flask, then diluting to 250.0mL w/ deionized water. From this solution, 10.0mL was taken and added to a 500mL flask, then diluted to 500mL w/ DI water.

Work continued from Page 17

This solution (500mL) is the standard solution.

Blank = 0.000 mg/L
Nitrite Std. Solution = 0.094 mg/L

Scott W. Neil 2/26/99

Perform analysis on sample AC031A99.

1250 Field Test for Sulfide = 0.04 mg/L.
1400 CO_2 = 64 mg/L
1410 Alkalinity = 356 mg/L
1418 DO = 0.31 mg/L
1540 Sulfide = 0.03 mg/L (Field reading = 0.04 mg/L.)
1556 Ferrous Iron = 0.05 mg/L
1600 Nitrite = 0.003 mg/L (must do pre treatment for Nitrate)
1620 Nitrate = 0.21 - 0.003 = 0.207 mg/L

Perform analysis on sample AC121A99.

1700 DO = 7.02 mg/L (Chemets = 6.5 +)
1712 Alkalinity = 216 mg/L
1721 CO_2 = 136 mg/L
1730 Sulfide = 0.01 mg/L (Field result @ well = 0.00 mg/L).
1739 Ferrous Iron = 0.01 mg/L
1747 Nitrite = 0.000 mg/L
1810 Nitrate = 0.550

1629 Clean glassware and ~~check~~ SW field chemistry area.

VOID
SWN 2/27/99

Work continued from Page

Perform field chemical analyses on sample ACRB1A99 and duplicate.

1255 Dissolved Oxygen = 9.44 mg/L ; Chemets = 9.5 mg/L
1315 Dissolved Oxygen (Dup) = 9.60 mg/L
1336 Alkalinity = 32.8 mg/L
1346 Alkalinity (Dup) = 27.2 mg/L
1400 Carbon Dioxide = 64 mg/L
1409 Carbon Dioxide (Dup) = 47 mg/L
1415 Sulfide = 0.00 mg/L (after filtering); 0.07 mg/L in field.
1425 Sulfide (Dup) = 0.02 mg/L (after filtering); 0.05 mg/L in field.
1440 Ferrous Iron = 0.00 mg/L (after filtering)
1447 Ferrous Iron (Dup) = 0.00 mg/L
1454 Nitrite = 0.000 mg/L
1514 Nitrite (Dup) = 0.000 mg/L
1533 Nitrate = 0.23 mg/L
1555 Nitrate (Dup) = 0.22 mg/L

Perform analyses on sample ACRA1A99.

1502 Dissolved Oxygen = 7.56 mg/L ; Chemets = 9 mg/L
1507 Alkalinity = 24.1 mg/L
1516 Carbon Dioxide = 17.4 mg/L
1624 Sulfide = 0.01 mg/L ; at creek = 0.06 mg/L
1633 Ferrous Iron = 0.01 mg/L
1642 Nitrite = 0.000 mg/L
1656 Nitrate = 0.22 mg/L

Perform analyses on sample ASPRC1A99.

1644 Dissolved Oxygen = 10.68 mg/L ; Chemets = 10.5 mg/L
1648 Alkalinity = 20.4 mg/L
1722 Carbon Dioxide = 20.1 mg/L
1730 Sulfide = 0.02 mg/L
1742 Ferrous Iron = 0.00 mg/L

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page 23

SIGNATURE Scott W. Neil DATE 2/28/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 21

Sample ASPRC1A99 continued.

1746 Nitrite = 0.000mg/L
1807 Nitrate = 0.20 mg/L

Perform analyses on ASPRA1A99.

1830 Alkalinity = 26.3mg/L
1837 Carbon Dioxide = 17.8 mg/L
1843 Sulfide = 0.03mg/L ; at spring = 0.00mg/L
1852 Ferrous Iron = 0.01mg/L
1858 Nitrite = 0.000mg/L
1902 Dissolved O_2 = 9.32mg/L; Chemets = 10 mg/L
1919 Nitrate = 0.20mg/L

SW cleans up

Void SW 2/28/99

Work continued from Page

SAMPLE AC09P21A99

ALKALINITY @ 1310 = 196 mg/L

Perform analysis on sample AC151A99.

1805 Alkalinity = 286 mg/L

VOID

SWN 3/1/99

Work continued from Page

Perform analysis on Sample AC271A99 + Duplicate.

1357 Alkalinity = 156 mg/L
1400 Duplicate = 143 mg/L

Perform analysis on Sample AC261A99.

1407 Alkalinity = 322 mg/L

VOID
SWN
3/2/99

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Scott W. Reid DATE 3/2/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page

Perform field analysis on sample AC171A99.

1821 - Alkalinity = 389 mg/L

All glassware cleaned.

Scott W. Neil 3/8/99

Perform field analysis on sample AC301A99.

1710 - Alkalinity = 408 mg/L

All glassware cleaned.

Scott W. Neil 3/9/99

VOID
SWN 3/9/99

Work continued from Page

Perform analyses on sample AB021A99.

1810 - Dissolved Oxygen = 0.41 mg/L CHEMets @ well head = 0.5 mg/L
1815 - Sulfide = 0.00 mg/L At well head = 0.06 mg/L
1817 - Alkalinity = 148.8 mg/L
1826 - Carbon Dioxide = 86 mg/L
1833 - Ferrous Iron = > 3.30 mg/L Exceeded Limit; Recheck-same.
1845 - Nitrite = 0.000 mg/L
1904 - Nitrate = 0.00 mg/L

Scott W. Neil 3/10/99

Perform analysis on sample AC201A99.

1335 - Alkalinity = 246 mg/L

Clean-up and prep for tomorrows analysis.

Scott W. Neil 3/11/99

Perform analysis on sample AC08P21A99.

1835 - Alkalinity = 323 mg/L

Clean-up; final analysis for this round of sampling.

SWN 3/12/99

ATTACHMENT 11

FEDERAL EXPRESS AIRBILLS
MONITORING EVENT NO. 2
FEBRUARY 1999

SPH43

FedEx *USA Airbill* FedEx Tracking Number 807470132642 Form I.D. No 0210 **Sender's Copy**

1 From (please print and press hard)

Date 3·13·99 Sender's FedEx Account Number 0152-0168-1

Sender's Name KEITH SIMPSON Phone (412) 821-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 Dept/Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) CTO 38 7651 CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIVING Phone (412) 826 5245

Company MICROSEEPS, INC

Address 220 WILLIAM PITT WAY (To "HOLD" at FedEx location, print FedEx address here) (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes) Dept/Floor/Suite/Room

☐ Check here if residence (Extra charge applies for FedEx Express Saver)

City PGH State PA ZIP 15238

For HOLD at FedEx Location check here

☐ **Hold Weekday** (Not available with FedEx First Overnight) ☐ **Hold Saturday** (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

For WEEKEND Delivery check here (Extra Charge. Not available to all locations)

☐ **Saturday Delivery** (Available for FedEx Priority Overnight and FedEx 2Day only) ☐ **NEW Sunday Delivery** (Available for FedEx Priority Overnight only)

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4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas

☐ FedEx Priority Overnight (Next business morning) ☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day) ☒ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas

☐ FedEx Overnight Freight (Next business day) ☐ FedEx 2Day Freight (Second business day) ☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice Dry Ice, 9, UN 1845 _____ x _____ kg. ☐ Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging

7 Payment

Bill to: ☒ Sender (Account No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
1	24	$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

8 Release Signature *Sign to authorize delivery without obtaining signature.*

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

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Questions?
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006356887 7

FedEx USA Airbill FedEx Tracking Number 808063665332 Form I.D. No. 0210 SPH21 **Sender's Copy**

1 From (please print and press hard)

Date 3·13·99 Sender's FedEx Account Number 0152-0168-1

Sender's Name SCOTT NEIL Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) CTO 38 7651 CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIVING Phone (206) 767 5060

Company LAUCKS TESTING LAB

Address 940 S. HARNEY ST. Dept./Floor/Suite/Room

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☐ Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day only) ☐ NEW Sunday Delivery (Available for FedEx Priority Overnight only)

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4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas

☒ FedEx Priority Overnight (Next business morning) ☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day) ☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas.

☐ FedEx Overnight Freight (Next business day) ☐ FedEx 2Day Freight (Second business day) ☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice Dry Ice, 9, UN 1845 _____ x _____ kg. ☐ Cargo Aircraft Only

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(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total
1	48	$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

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SPH21

FedEx *USA Airbill* FedEx Tracking Number 808063665321 Form I.D. No. 0210 **Sender's Copy**

1 From (please print and press hard)

Date 3/11/99 Sender's FedEx Account Number 0152-0168-1

Sender's Name SCOTT NEIL Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) CTO 38 7651 CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIVING Phone (412) 8265245

Company MICROSEEPS, INC

Address 220 WILLIAMPITT WAY Dept./Floor/Suite/Room

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City PGH State PA ZIP 15238

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☐ **Saturday Delivery** (Available for FedEx Priority Overnight and FedEx 2Day only)

☐ **NEW Sunday Delivery** (Available for FedEx Priority Overnight only)

4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas

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☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day)

☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas

☐ FedEx Overnight Freight (Next business day)

☐ FedEx 2Day Freight (Second business day)

☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg.

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice Dry Ice, 9, UN 1845 _____ x _____ kg.

☐ Cargo Aircraft Only

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FedEx Account No.

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1	5	$ .00	$

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FedEx USA Airbill — FedEx Tracking Number 808063665310 — Form I.D. No. 0210 — SPH21 — Sender's Copy

1 From (please print and press hard)

Date 3/11/99 — Sender's FedEx Account Number 0152-0168-1

Sender's Name SCOTT NEIL — Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 — Dept./Floor/Suite/Room

City PITTSBURGH — State PA — ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) CTO 38 7651 CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIVING — Phone (206) 767 5060

Company LAUCKS TESTING LAB

Address 940 S. HARNEY ST. — Dept./Floor/Suite/Room

(To "HOLD" at FedEx location, print FedEx address here) (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes)

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City SEATTLE — State WA — ZIP 98108

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4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas

☒ FedEx Priority Overnight (Next business morning) ☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day) ☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas

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(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg

Declared value limit $500

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg.

☐ Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging

7 Payment

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(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. — Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
3	209	$ .00	$

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8110 6042 4573 — 3 of 3 — Form I.D. No. 0260

8110 6042 4584 — ___ of ___ — Form I.D. No. 0260

8110 6042 4595 — ___ of ___ — Form I.D. No. 0260

8110 6042 4600 — ___ of ___ — Form I.D. No. 0260

PART 154288 • Format 0208 • Rev. Date 5/98 • GY1994-98 FedEx • PRINTED IN U.S.A. • SPW 1/99

FedEx USA Airbill — FedEx Tracking Number: 808063665354

Form I.D. No. 0210

SPH21

Sender's Copy

1 From (please print and press hard)

3/2/99 — Sender's FedEx Account Number: 0152-0168-1

Sender's Name: SCOTT NEIL — Phone: (412) 921-7090

Company: TETRA TECH NUS INC

Address: 661 ANDERSEN DR STE 5 — Dept./Floor/Suite/Room

City: PITTSBURGH — State: PA — ZIP: 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice): CTO 38 7651 CRANE

3 To (please print and press hard)

Recipient's Name: SAMPLE RECEIVING — Phone: (206) 7675060

Company: LAUCKS TESTING LAB

Address: 940 S. HARNEY ST. — Dept./Floor/Suite/Room

(To "HOLD" at FedEx location, print FedEx address here) (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes)

☐ Check here if residence (Extra charge applies for FedEx Express Saver)

City: SEATTLE — State: WA — ZIP: 98108

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☐ Hold Weekday (Not available with FedEx First Overnight) ☐ Hold Saturday (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

For WEEKEND Delivery check here (Extra Charge. Not available to all locations)

☐ Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day only) ☐ NEW Sunday Delivery (Available for FedEx Priority Overnight only)

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4a Express Package Service *Packages under 150 lbs.* — Delivery commitment may be later in some areas

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☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day) ☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* — Delivery commitment may be later in some areas

☐ FedEx Overnight Freight (Next business day) ☐ FedEx 2Day Freight (Second business day) ☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg.

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice — Dry Ice, 9, UN 1845 _____ x _____ kg. ☐ Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging.

7 Payment

Bill to: ☒ Sender (Account No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. — Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
4	264	$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

8 Release Signature *Sign to authorize delivery without obtaining signature*

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

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FedEx.

Domestic Multiple Package Shipment Labels

Shipment Date: 3.2.99

Master Airbill Number: 808063665354

8096	3062	1584	Form I.D. No. 0260	2 of 4
8096	3062	1595	Form I.D. No. 0260	3 of 4
8096	3062	1600	Form I.D. No. 0260	4 of 4
8096	3062	1610	Form I.D. No. 0260	___ of ___
8096	3062	1621	Form I.D. No. 0260	___ of ___

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FedEx *USA Airbill* FedEx Tracking Number 808063665300 Form I.D. No. 0210 SPH21 **Sender's Copy**

1 From (please print and press hard)

Date 3.1.99 Sender's FedEx Account Number 0152-0168-1

Sender's Name KEITH SIMPSON Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) CTO 38 7651 CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIVING Phone 412 826 5245

Company MICROSEEPS, INC

Address 220 WILLIAM PITT WAY (To "HOLD" at FedEx location, print FedEx address here) (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes) Dept./Floor/Suite/Room

☐ Check here if residence (Extra charge applies for FedEx Express Saver)

City PGH State PA ZIP 15238

For HOLD at FedEx Location check here

☐ **Hold Weekday** (Not available with FedEx First Overnight) ☐ **Hold Saturday** (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

For WEEKEND Delivery check here (Extra Charge. Not available to all locations)

☐ **Saturday Delivery** (Available for FedEx Priority Overnight and FedEx 2Day only) ☐ **NEW Sunday Delivery** (Available for FedEx Priority Overnight only)

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. SEE BACK OF SENDER'S COPY OF THIS AIRBILL FOR INFORMATION AND ADDITIONAL TERMS. We will not be responsible for any claim in excess of $100 per package whether the result of loss, damage, or delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss in a timely manner. Your right to recover from us for any loss includes intrinsic value of the package, loss of sales, interest, profit, attorney's fees, costs, and other forms of damage, whether direct, incidental, consequential, or special, and is limited to the greater of $100 or the declared value but cannot exceed actual documented loss. The maximum declared value for any FedEx Letter and FedEx Pak is $500. Federal Express may, upon your request, and with some limitations, refund all transportation charges paid. See the FedEx Service Guide for further details.

4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas

☒ FedEx Priority Overnight (Next business morning) ☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day) ☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas

☐ FedEx Overnight Freight (Next business day) ☐ FedEx 2Day Freight (Second business day) ☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice Dry Ice, 9, UN 1845 _____ x _____ kg. ☐ Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging

7 Payment

Bill to: ☒ Sender (Account No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
1	12	$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

8 Release Signature *Sign to authorize delivery without obtaining signature.*

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

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SPH21

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Form I.D. No. 0210 **Sender's Copy**

1 From (please print and press hard)

Date 2/25/99 Sender's FedEx Account Number 0152-0168-1

Sender's Name SCOTT NEIL Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) 7651 / CTO 38 CRANE

3 To (please print and press hard)

Recipient's Name Pam Johnson, Sample Receiving Phone (206) 767-5060

Company Laucks Testing Laboratories, Inc.

Check here if residence (Extra charge applies for FedEx Express Saver)

Address 940 South Harney Street

"0" at FedEx location, Ex address here) (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes) Dept./Floor/Suite/Room

City Seattle State WA ZIP 98108

For HOLD at FedEx Location check here

- Hold Weekday (Not available with FedEx First Overnight)
- Hold Saturday (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

For WEEKEND Delivery check here (Extra Charge. Not available to all locations)

- Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day only)
- NEW Sunday Delivery (Available for FedEx Priority Overnight only)

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. SEE BACK OF SENDER'S COPY OF THIS AIRBILL FOR INFORMATION AND ADDITIONAL TERMS. We will not be responsible for any claim in excess of $100 per package whether the result of loss, damage, or delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss in a timely manner. Your right to recover from us for any loss includes intrinsic value of the package, loss of sales, interest, profit, attorney's fees, costs, and other forms of damage, whether direct, incidental, consequential, or special, and is limited to the greater of $100 or the declared value but cannot exceed actual documented loss. The maximum declared value for any FedEx Letter and FedEx Pak is $500. Federal Express may, upon your request, and with some limitations, refund all transportation charges paid. See the FedEx Service Guide for further details.

4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas.

- [x] FedEx Priority Overnight (Next business morning)
- [ ] FedEx Standard Overnight (Next business afternoon)
- [ ] FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)
- [ ] FedEx 2Day (Second business day)
- [ ] FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas

- [ ] FedEx Overnight Freight (Next business day)
- [ ] FedEx 2Day Freight (Second business day)
- [ ] FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging

- [ ] FedEx Letter
- [ ] FedEx Pak (Declared value limit $500)
- [ ] FedEx Box
- [ ] FedEx Tube
- [x] Other Pkg.

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?*

- [x] No
- [ ] Yes (As per attached Shipper's Declaration)
- [ ] Yes (Shipper's Declaration not required)
- [ ] Dry Ice — Dry Ice, 9, UN 1845 _____ x _____ kg.
- [ ] Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging

7 Payment

Bill to:

- [x] Sender (Account No. in Section 1 will be billed)
- [ ] Recipient
- [ ] Third Party
- [ ] Credit Card
- [ ] Cash/Check

(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
4	268	$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

8 Release Signature *Sign to authorize delivery without obtaining signature.*

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

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FedEx *USA Airbill* FedEx Tracking Number 808063665273

Form I.D. No. 0210

SPH2

Sender's Copy

1 From (please print and press hard)

Date 2/25/99 Sender's FedEx Account Number 0152-0168-1

Sender's Name SCOTT NEIL Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) 7651/CTO 38 CLANE

3 To (please print and press hard)

Recipient's Name Sample Receiving Phone (412) 826-5245

Company Microseeps, Inc.

Address 220 William Pitt Way (To "HOLD" at FedEx location, print FedEx address here) (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes) Dept./Floor/Suite/Room

☐ Check here if residence (Extra charge applies for FedEx Express Saver)

City Pittsburgh State PA ZIP 15238

For HOLD at FedEx Location check here

☐ Hold Weekday (Not available with FedEx First Overnight) ☐ Hold Saturday (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

For WEEKEND Delivery check here (Extra Charge. Not available to all locations)

☐ Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day only) ☐ NEW Sunday Delivery (Available for FedEx Priority Overnight only)

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. SEE BACK OF SENDER'S COPY OF THIS AIRBILL FOR INFORMATION AND ADDITIONAL TERMS. We will not be responsible for any claim in excess of $100 per package whether the result of loss, damage, or delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss in a timely manner. Your right to recover from us for any loss includes intrinsic value of the package, loss of sales, interest, profit, attorney's fees, costs, and other forms of damage, whether direct, incidental, consequential, or special, and is limited to the greater of $100 or the declared value but cannot exceed actual documented loss. The maximum declared value for any FedEx Letter and FedEx Pak is $500. Federal Express may, upon your request, and with some limitations, refund all transportation charges paid. See the FedEx Service Guide for further details.

4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas

☒ FedEx Priority Overnight (Next business morning) ☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day) ☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas

☐ FedEx Overnight Freight (Next business day) ☐ FedEx 2Day Freight (Second business day) ☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg.

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice Dry Ice, 9, UN 1845 _____ x _____ kg. ☐ Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging

7 Payment

Bill to: ☒ Sender (Account No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
1		$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

8 Release Signature *Sign to authorize delivery without obtaining signature*

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

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SPH43

FedEx 9/95A Airbill — FedEx Tracking Number 807470132620 — Form I.D. No. 0210 — **Sender's Copy**

1 From (please print and press hard) 3·26·99

Sender's FedEx Account Number 0152-0168-1

Sender's Name SCOTT NEIL Phone (412) 821-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) CTO 38 765Y CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIVING Phone 206 767 5060

Company LAUCKS TEST LAB

Address 7607 PERIMETER RD (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes) Dept./Floor/Suite/Room

(To "HOLD" at FedEx location, print FedEx address here)

☐ Check here if residence (Extra charge applies for FedEx Express Saver)

City SEATTLE State WA ZIP 98108

For HOLD at FedEx Location check here

☐ Hold Weekday (Not available with FedEx First Overnight) ☒ Hold Saturday (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

For WEEKEND Delivery check here (Extra Charge. Not available to all locations)

☐ Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day only) ☐ NEW Sunday Delivery (Available for FedEx Priority Overnight only)

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. SEE BACK OF SENDER'S COPY OF THIS AIRBILL FOR INFORMATION AND ADDITIONAL TERMS. We will not be responsible for any claim in excess of $100 per package whether the result of loss, damage, or delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss in a timely manner. Your right to recover from us for any loss includes intrinsic value of the package, loss of sales, interest, profit, attorney's fees, costs, and other forms of damage, whether direct, incidental, consequential, or special, and is limited to the greater of $100 or the declared value but cannot exceed actual documented loss. The maximum declared value for any FedEx Letter and FedEx Pak is $500. Federal Express may, upon your request, and with some limitations, refund all transportation charges paid. See the FedEx Service Guide for further details.

4a Express Package Service *Packages under 150 lbs.* Delivery commitment may be later in some areas

☒ FedEx Priority Overnight (Next business morning) ☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

☐ FedEx 2Day (Second business day) ☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* Delivery commitment may be later in some areas

☐ FedEx Overnight Freight (Next business day) ☐ FedEx 2Day Freight (Second business day) ☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging ☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg

6 Special Handling (One box must be checked)

Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice — Dry Ice, 9, UN 1845 _____ x _____ kg. ☐ Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging.

7 Payment

Bill to: ☒ Sender (Account No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

(Enter FedEx Account No. or Credit Card No. below)

FedEx Account No.

Credit Card No. Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
2	47	$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

8 Release Signature *Sign to authorize delivery without obtaining signature*

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

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PICK-UP# 6

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Domestic Multiple Package Shipment Labels 2 of 2

Shipment Date 3·26·99

Master Airbill Number 807470132620

8077	9028	6211	Form I.D. No. 0260
8077	9028	6222	Form I.D. No. 0260 ___ of ___
8077	9028	6233	Form I.D. No. 0260 ___ of ___
8077	9028	6244	Form I.D. No. 0260 ___ of ___
8077	9028	6255	Form I.D. No. 0260 ___ of ___

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FedEx USA Airbill — FedEx Tracking Number: 808063665365 — Form I.D. No. 0210 — SPH21 — **Sender's Copy**

1 From (please print and press hard)

Date 3.1.99 — Sender's FedEx Account Number 0152-0168-1

Sender's Name SCOTT NEIL — Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR STE 5 — Dept./Floor/Suite/Room

City PITTSBURGH — State PA — ZIP 15220

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice): CTO 38 7651 CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIVING — Phone (206) 7675060

Company LAUCKS TESTING LAB

Address 940 S. HARNEY ST. — Dept./Floor/Suite/Room

(To "HOLD" at FedEx location, print FedEx address here) (We Cannot Deliver to P.O. Boxes or P.O. ZIP Codes)

☐ Check here if residence (Extra charge applies for FedEx Express Saver)

City SEATTLE — State WA — ZIP 98108

For HOLD at FedEx Location check here
☐ Hold Weekday (Not available with FedEx First Overnight)
☐ Hold Saturday (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

For WEEKEND Delivery check here (Extra Charge. Not available to all locations)
☐ Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day only)
☐ NEW Sunday Delivery (Available for FedEx Priority Overnight only)

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. SEE BACK OF SENDER'S COPY OF THIS AIRBILL FOR INFORMATION AND ADDITIONAL TERMS. We will not be responsible for any claim in excess of $100 per package whether the result of loss, damage, or delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss in a timely manner. Your right to recover from us for any loss includes intrinsic value of the package, loss of sales, interest, profit, attorney's fees, costs, and other forms of damage, whether direct, incidental, consequential, or special, and is limited to the greater of $100 or the declared value but cannot exceed actual documented loss. The maximum declared value for any FedEx Letter and FedEx Pak is $500. Federal Express may, upon your request, and with some limitations, refund all transportation charges paid. See the FedEx Service Guide for further details.

4a Express Package Service *Packages under 150 lbs.* — Delivery commitment may be later in some areas
☒ FedEx Priority Overnight (Next business morning)
☐ FedEx Standard Overnight (Next business afternoon)
☐ FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)
☐ FedEx 2Day (Second business day)
☐ FedEx Express Saver (Third business day)
FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.* — Delivery commitment may be later in some areas
☐ FedEx Overnight Freight (Next business day)
☐ FedEx 2Day Freight (Second business day)
☐ FedEx Express Saver Freight (Up to 3 business days)
(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging
☐ FedEx Letter ☐ FedEx Pak (Declared value limit $500) ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg.

6 Special Handling (One box must be checked)
Does this shipment contain dangerous goods?* ☒ No ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)
☐ Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg.
☐ Cargo Aircraft Only
*Dangerous Goods cannot be shipped in FedEx packaging.

7 Payment
Bill to: ☒ Sender (Account No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check
(Enter FedEx Account No. or Credit Card No. below)
FedEx Account No.
Credit Card No. — Exp. Date

Total Packages	Total Weight	Total Declared Value*	Total Charges
9	412	$ .00	$

*When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

8 Release Signature *Sign to authorize delivery without obtaining signature.*

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

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Questions?
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Domestic Multiple Package Shipment Labels

Shipment Date 3.1.99 — 2 of 9

Master Airbill Number 808063665365 — Form I.D. No. 0260

8096 3062 1481

3 of 9 — Form I.D. No. 0260 — 8096 3062 1492

4 of 9 — Form I.D. No. 0260 — 8096 3062 1507

5 of 9 — Form I.D. No. 0260 — 8096 3062 1518

6 of 9 — Form I.D. No. 0260 — 8096 3062 1529

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Domestic Multiple Package Shipment Labels

Shipment Date 3.1.99

Master Airbill Number 808063665300 65

7 of ~~10~~ 9

8096	3062	1437

Form I.D. No. 0260

8 of ~~10~~ 9

8096	3062	1448

Form I.D. No. 0260

9 of ~~10~~ 9

8096	3062	1459

Form I.D. No. 0260

10 of 10

8096	3062	1460

Form I.D. No. 0260

___ of ___

8096	3062	1470

Form I.D. No. 0260

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ATTACHMENT 12

TABULAR LISTING OF GROUND WATER/SURFACE WATER DATA AMMUNITION BURNING GROUND MONITORING EVENT NO. 2 FEBRUARY 1998

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03B02	03B02	03B04	03B04	03C02P2	03C02P2	03C03	03C03	03C04	03C04	03C07	03C07	03C08P2	03C08P2	03C09P2	03C09P2	03C10	03C10	03C11
aquifer	ALLUVIUM	ALLUVIUM	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEECH CREEK	BEAVER BEND	BEAVER BEND	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK
matrix	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW
nsample	AB021A99	AB021A99-F	AB041A99	AB041A99-F	AC02P21A99	AC02P21A99-F	AC031A99	AC031A99-F	AC041A99	AC041A99-F	AC071A99	AC071A99-F	AC08P21A99	AC08P21A99-F	AC09P21A99	AC09P21A99-F	AC101A99	AC101A99-F	AC111A99
sample	AB021A99	AB021A99-F	AB041A99	AB041A99-F	AC02P21A99	AC02P21A99-F	AC031A99	AC031A99-F	AC041A99	AC041A99-F	AC071A99	AC071A99-F	AC08P21A99	AC08P21A99-F	AC09P21A99	AC09P21A99-F	AC101A99	AC101A99-F	AC111A99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	03/10/99	03/10/99	02/23/99	02/23/99	02/26/99	02/26/99	02/27/99	02/27/99	02/27/99	02/27/99	02/26/99	02/26/99	03/12/99	03/12/99	03/01/99	03/02/99	02/25/99	02/25/99	02/25/99
lab_id	9903327-04	9903327-12	9902595-04	9902595-12	9903043-07	9903043-17	9903043-09	9903043-19	9903043-08	9903043-18	9903043-06	9903043-16	9903344-02	9903344-03	9903089-02	9903089-07	9902595-03	9902595-11	9902595-01
duplicate																			
Volatile Organics (ug/L)																			
1,1,1-TRICHLOROETHANE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
1,1-DICHLOROETHANE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
1,1-DICHLOROETHENE	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U
1,2-DICHLOROETHANE	0.5 U		0.5 U				0.5 U		0.5 U								29		0.5 U
BENZENE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
CARBON TETRACHLORIDE	0.5 U		0.5 U				0.5 U		0.5 U								1.6		0.5 U
CHLOROETHANE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
CHLOROFORM	0.5 U		0.5 U				0.5 U		0.5 U								2.2		2
CIS-1,2-DICHLOROETHENE	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		14		0.5 U		0.5 U		13
ETHYLBENZENE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
METHYLENE CHLORIDE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
TETRACHLOROETHENE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
TOLUENE	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
TRANS-1,2-DICHLOROETHENE	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U
TRICHLOROETHENE	0.5 U		0.5 U		7.7		0.5 U		0.5 U		4.7		71		160		63		2100
VINYL CHLORIDE	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U
XYLENES, TOTAL	0.5 U		0.5 U				0.5 U		0.5 U								0.5 U		0.5 U
Dissolved Gases (ug/L)																			
ETHANE	0.081		1.494				0.195		0.069								0.274		0.372
ETHENE	0.045		0.232				0.042		0.027								0.054		0.057
METHANE	8.426		13.569				13.376		8.794								1.798		800
Energetics (ug/L)																			
1,3,5-TRINITROBENZENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
1,3-DINITROBENZENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
2,4,6-TRINITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
2,4-DIAMINO-6-NITROTOLUENE	0.58 U		0.94 U				1.0 U		0.46 U								1.5 U		1.0 U
2,4-DINITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
2,6-DIAMINO-4-NITROTOLUENE	0.58 U		0.94 U				1.0 U		0.46 U								1.5 U		1.0 U
2,6-DINITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.70 J		1.5 U		1.0 U
2-AMINO-4,6-DINITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		2.6		0.44 U		1.5 U		1.0 U
2-NITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
3,5-DINITROANILINE	0.58 U		0.94 U				1.0 U		0.46 U								1.5 U		1.0 U
3-NITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
4,4'-TN-AZOXY	0.58 U		0.94 U				1.0 U		0.46 U								1.5 U		1.0 U
4-AMINO-2,6-DINITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		4.5		0.44 U		1.5 U		1.0 U
4-NITROTOLUENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
HMX	0.58 U		0.94 U		5.1		1.0 U		0.46 U		4.4		31		2.8		6.7		5.5
MNX	0.58 U		0.94 U				1.0 U		0.46 U								3.1		1.0 U
NITROBENZENE	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
NITROGLYCERIN	5.8 U		9.4 U		4.9 U		10 U		4.5 U		12 U		12 U		4.4 U		15 U		10 U
PETN	2.9 U		4.6 U		2.4 U		5.1 U		2.2 U		6.1 U		6.1 U		2.2 U		7.4 U		5.1 U
PICRIC ACID	1.0 UJ		1.0 UJ				1.1 UJ		1.1 UJ								1.0 U		1.1 UJ
RDX	0.58 U		0.94 U		2.9		1.0 U		0.46 U		23		110		130		140		34
TETRYL	0.58 U		0.94 U		0.49 U		1.0 U		0.46 U		1.2 U		1.2 U		0.44 U		1.5 U		1.0 U
TNX	0.58 U		0.94 U				1.0 U		0.46 U								1.5 U		1.0 U
Total Metals (ug/L)																			
ANTIMONY	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U
ARSENIC	6.7		4.1		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U
BARIUM	78.1		77.4		61.2		38.3		31.4		29.6		70.2		15.4		42.4		22.9
BERYLLIUM	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03B02	03B02	03B04	03B04	03C02P2	03C02P2	03C03	03C03	03C04	03C04	03C07	03C07	03C08P2	03C08P2	03C09P2	03C09P2	03C10	03C10	03C11
aquifer	ALLUVIUM	ALLUVIUM	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEECH CREEK	BEAVER BEND	BEAVER BEND	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK
matrix	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW
nsample	AB021A99	AB021A99-F	AB041A99	AB041A99-F	AC02P21A99	AC02P21A99-F	AC031A99	AC031A99-F	AC041A99	AC041A99-F	AC071A99	AC071A99-F	AC08P21A99	AC08P21A99-F	AC09P21A99	AC09P21A99-F	AC101A99	AC101A99-F	AC111A99
sample	AB021A99	AB021A99-F	AB041A99	AB041A99-F	AC02P21A99	AC02P21A99-F	AC031A99	AC031A99-F	AC041A99	AC041A99-F	AC071A99	AC071A99-F	AC08P21A99	AC08P21A99-F	AC09P21A99	AC09P21A99-F	AC101A99	AC101A99-F	AC111A99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	03/10/99	03/10/99	02/23/99	02/23/99	02/26/99	02/26/99	02/27/99	02/27/99	02/27/99	02/27/99	02/26/99	02/26/99	03/12/99	03/12/99	03/01/99	03/02/99	02/25/99	02/25/99	02/25/99
lab_id	9903327-04	9903327-12	9902595-04	9902595-12	9903043-07	9903043-17	9903043-09	9903043-19	9903043-08	9903043-18	9903043-06	9903043-16	9903344-02	9903344-03	9903089-02	9903089-07	9902595-03	9902595-11	9902595-01
duplicate																			
CADMIUM	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U
CHROMIUM	5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U
COBALT	3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U
COPPER	2.2 U		2.2 U		2.2 U		2.8		2.2 U		2.2 U		18.2		2.2 U		2.2 U		2.2 U
IRON	13500		6160				111 U		134								121		111 U
LEAD	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		3.1		1.1 U		1.1 U		1.1 U
MANGANESE	1430		1850		16.7 U		16.7 U		76.3		16.7 U		16.7 U		59.6		16.7 U		16.7 U
MERCURY	0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U
NICKEL	11.1 U		137		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U
SELENIUM	1.1 U		1.1 U		1.1 U		1.1 U		2.1		1.9		2.6		2.1		3.2		3.7
SILVER	3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U
THALLIUM	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U
TIN	11.1 U		11.1 UJ		11.1 UJ		11.1 UJ		11.1 UJ		11.1 UJ		11.1 U		11.1 U		11.1 UJ		11.1 UJ
VANADIUM	2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U
ZINC	11.1 U		56.8 J		11.1 U		44.2 J		11.1 U		11.1 U		11.1 U		11.1 U		44.8 J		11.1 U
Dissolved Metals (ug/L)																			
ANTIMONY, FILTERED		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	
ARSENIC, FILTERED		6.0		3.6		1.1 U		1.1 U		1.6		1.1 U		1.1 U		1.1 U		1.1 U	
BARIUM, FILTERED		75.2		95.9		71.6		47.6		49		41		63.1		13.4		47.7	
BERYLLIUM, FILTERED		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	
CADMIUM, FILTERED		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	
CALCIUM, FILTERED		44100		25100		36600		1140		149000		100000		112000		81300		91300	
CHROMIUM, FILTERED		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U	
COBALT, FILTERED		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U	
COPPER, FILTERED		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U	
LEAD, FILTERED		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	
MAGNESIUM, FILTERED		6210		3790		8340		1110 U		199000		48500		39700		15700		11800	
MANGANESE, FILTERED		1420		1660		16.7 U		16.7 U		665		16.7 U		16.7 U		16.7 U		16.7 U	
MERCURY, FILTERED		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U	
NICKEL, FILTERED		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U	
POTASSIUM, FILTERED		1130		1230		2150		1110 U		3690		5160		30600		1290		1110 U	
SELENIUM, FILTERED		1.1 U		1.1		1.6		1.1 U		2.2		2.3		2.2		2.2		3.2	
SILVER, FILTERED		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U	
SODIUM, FILTERED		9020		5470		21300		218000		63900		23800		19700		4790		7190	
THALLIUM, FILTERED		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	
TIN, FILTERED		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U	
VANADIUM, FILTERED		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U	
ZINC, FILTERED		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U	
Miscellaneous (mg/L)																			
ALKALINITY (MG/L)	148.6		78.4		80		356		366		346		323		196		200		290
BICARBONATE ALKALINITY (MG/L)	148.6		74.4		80		356		NA		346		323		196		200		290
CARBON DIOXIDE (MG/L)	86		93.6		NA		64		250		NA		NA		NA		183		165
CARBONATE ALKALINITY (MG/L)	0		0		0		0		NA		0		0		0		0		0
CHLORIDE	3		2		37		2		7		9		12		5		9		40
CYANIDE	0.01 U		0.01 U		0.01 U		0.01 U		0.01 U		0.01 U		0.01 U		0.01 U		0.01 U		0.01 U
DISSOLVED OXYGEN-HACH (MG/L)	0.41		0		NA		0.31		2.51		NA		NA		NA		2.53		5.32
DISSOLVED OXYGEN-METER (MG/L)	2.27		1.12		12.84		0.65		13.38		6.97		10.94		8.01		3.56		7.69
FERROUS IRON (MG/L)	3.30		3.30		NA		0.05		1.09		NA		NA		NA		0		0.02
HYDROXIDE ALKALINITY (MG/L)	0		0		0		0		NA		0		0		0		0		0
NITRATE (MG/L)	0		0		NA		0.207		0		NA		NA		NA		0.39		0.726
NITRITE (MG/L)	0		0		NA		0.003		0		NA		NA		NA		0.002		0.01

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03B02	03B02	03B04	03B04	03C02P2	03C02P2	03C03	03C03	03C04	03C04	03C07	03C07	03C08P2	03C08P2	03C09P2	03C09P2	03C10	03C10	03C11
aquifer	ALLUVIUM	ALLUVIUM	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEECH CREEK	BEAVER BEND	BEAVER BEND	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK
matrix	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW
nsample	AB021A99	AB021A99-F	AB041A99	AB041A99-F	AC02P21A99	AC02P21A99-F	AC031A99	AC031A99-F	AC041A99	AC041A99-F	AC071A99	AC071A99-F	AC08P21A99	AC08P21A99-F	AC09P21A99	AC09P21A99-F	AC101A99	AC101A99-F	AC111A99
sample	AB021A99	AB021A99-F	AB041A99	AB041A99-F	AC02P21A99	AC02P21A99-F	AC031A99	AC031A99-F	AC041A99	AC041A99-F	AC071A99	AC071A99-F	AC08P21A99	AC08P21A99-F	AC09P21A99	AC09P21A99-F	AC101A99	AC101A99-F	AC111A99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	03/10/99	03/10/99	02/23/99	02/23/99	02/26/99	02/26/99	02/27/99	02/27/99	02/27/99	02/27/99	02/26/99	02/26/99	03/12/99	03/12/99	03/01/99	03/02/99	02/25/99	02/25/99	02/25/99
lab_id	9903327-04	9903327-12	9902595-04	9902595-12	9903043-07	9903043-17	9903043-09	9903043-19	9903043-08	9903043-18	9903043-06	9903043-16	9903344-02	9903344-03	9903089-02	9903089-07	9902595-03	9902595-11	9902595-01
duplicate																			
NITROCELLULOSE	1000 U		1000 U		1000 U		1000 U		1000 U		1000 U		1000 U		1000 U		1000 U		1000 U
OXIDATION REDUCTION POTENTIAL (MV)	-116.9		-30.4		182.1		-5.8		-18.2		117.9		185.3		165.8		158.6		-54.5
PH ()	7.16		6.99		7.04		9.22		7.28		7.16		7.22		6.87		6.53		7.15
SPECIFIC CONDUCTIVITY (MS/CM)	0.334		0.206		0.349		0.887		1.92		0.789		0.937		0.492		0.521		1.9
SULFATE	26 J		16		35		76		950		86		120 J		43 J		58		710
SULFIDE	1 U		1 U				1 U		1 U								1 U		1 U
SULFIDE (MG/L)	0.06		0		NA		0.04		0		NA		NA		NA		0		0.47
TEMPERATURE (C)	8.9		9.0		12.0		13.7		8.2		12.4		10.0		13.0		13.1		10.7
TOTAL ORGANIC CARBON	1.4		1 U		1.6		1.6		1.6		1.9		2		2.6		1.6		3.3
TOTAL ORGANIC HALOGENS	0.02 U		0.03		0.02 U		0.02 U		0.02 U		0.02 U		0.06		0.13		0.06		0.86
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TURBIDITY (NTU)	8		2		8		1		3		8		0		8		8		1
WATER LEVEL (FT)	6.00		6.58		37.43		87.77		78.10		78.80		74.78		45.45		50.14		44.40

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03C11	03C11	03C11	03C12	03C12	03C15	03C15	03C17	03C17	03C20	03C20	03C25	03C25	03C26	03C26	03C27	03C27	03C27
aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK
matrix	GW	GF	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GW	GF
nsample	AC111A99-D	AC111A99-F	AC111A99-F-D	AC121A99	AC121A99-F	AC151A99	AC151A99-F	AC171A99	AC171A99-F	AC201A99	AC201A99-F	AC251A99	AC251A99-F	AC261A99	AC261A99-F	AC271A99	AC271A99-D	AC271A99-F
sample	FD02259901	AC111A99-F	FD02259901-F	AC121A99	AC121A99-F	AC151A99	AC151A99-F	AC171A99	AC171A99-F	AC201A99	AC201A99-F	AC251A99	AC251A99-F	AC261A99	AC261A99-F	AC271A99	FD03029901	AC271A99-F
sacode	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	02/25/99	02/25/99	02/25/99	02/25/99	02/27/99	03/01/99	03/02/99	03/08/99	03/08/99	03/11/99	03/11/99	02/24/99	02/24/99	03/02/99	03/02/99	03/02/99	03/02/99	03/02/99
lab_id	9902595-05	9902595-02	9902595-13	9902595-01	9903043-20	9903089-03	9903089-08	9903327-02	9903327-10	9903327-01	9903327-09	9902595-06	9902595-14	9903089-05	9903089-10	9903089-01	9903089-04	9903089-06
duplicate	AC111A99		AC111A99-F														AC271A99	
Volatile Organics (ug/L)																		
1,1,1-TRICHLOROETHANE	0.5 U			0.5 U								0.5 U						
1,1-DICHLOROETHANE	0.5 U			0.5 U								0.5 U						
1,1-DICHLOROETHENE	0.5 U			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U	
1,2-DICHLOROETHANE	0.5 U			0.5 U								0.5 U						
BENZENE	0.5 U			0.5 U								0.5 U						
CARBON TETRACHLORIDE	0.5 U			0.5 U								0.5 U						
CHLOROETHANE	0.5 U			0.5 U								0.5 U						
CHLOROFORM	2			0.5 U								0.5 U						
CIS-1,2-DICHLOROETHENE	13			0.7		0.5 U		0.5 U		67		0.5 U		0.5 U		0.5 U	0.5 U	
ETHYLBENZENE	0.5 U			0.5 U								0.5 U						
METHYLENE CHLORIDE	0.5 U			0.5 U								0.5 U						
TETRACHLOROETHENE	0.5 U			0.5 U								0.5 U						
TOLUENE	0.5 U			0.5 U								0.5 U						
TRANS-1,2-DICHLOROETHENE	0.5 U			0.5 U		0.5 U		0.5 U		7.3		0.5 U		0.5 U		0.5 U	0.5 U	
TRICHLOROETHENE	2100			22		0.5 U		0.5 U		3700		0.5 U		4.2		4	8.9	
VINYL CHLORIDE	0.5 U			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U	
XYLENES, TOTAL	0.5 U			0.5 U								0.5 U						
Dissolved Gases (ug/L)																		
ETHANE	0.273			0.163								0.583						
ETHENE	0.039			0.03								0.099						
METHANE	660			0.912								55.04						
Energetics (ug/L)																		
1,3,5-TRINITROBENZENE	1.1 U			0.74 U		0.49 U		1.2 U		8.1		1.2 U		1.4 U		1.3 U	0.55 U	
1,3-DINITROBENZENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
2,4,6-TRINITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
2,4-DIAMINO-6-NITROTOLUENE	1.1 U			0.74 U								1.2 U						
2,4-DINITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
2,6-DIAMINO-4-NITROTOLUENE	1.1 U			0.74 U								1.2 U						
2,6-DINITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
2-AMINO-4,6-DINITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		12.0		1.2 U		1.4 U		1.3 U	0.55 U	
2-NITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
3,5-DINITROANILINE	1.1 U			0.74 U								1.2 U						
3-NITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
4,4'-TN-AZOXY	1.1 U			0.74 U								1.2 U						
4-AMINO-2,6-DINITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		18.0		1.2 U		1.4 U		1.3 U	0.55 U	
4-NITROTOLUENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
HMX	5.6			27		0.49 U		1.2 U		25		1.2 U		1.4 U		1.3 U	0.55 U	
MNX	1.1 U			0.74 U								1.2 U						
NITROBENZENE	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
NITROGLYCERIN	11 U			7.4 U		4.9 U		12 U		5.6 U		12 U		14 U		13 U	5.5 U	
PETN	5.4 U			3.6 U		2.4 U		6.1 U		2.8 U		5.7 U		6.7 U		6.4 U	2.7 U	
PICRIC ACID	1.1 UJ			1.1 UJ								1.0 UJ						
RDX	34			14		0.49 U		1.2 U		180		1.2 U		1.4 U		1.3 U	0.55 U	
TETRYL	1.1 U			0.74 U		0.49 U		1.2 U		0.56 U		1.2 U		1.4 U		1.3 U	0.55 U	
TNX	1.1 U			0.74 U								1.2 U						
Total Metals (ug/L)																		
ANTIMONY	1.1 U			1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	1.1 U	
ARSENIC	1.1 U			1.1 U		1.2		1.9		1.1 U		1.1 U		1.1 U		1.1 U	1.1 U	
BARIUM	22.0			88.7		23.1		11.0		29.7		15.6		37.4		34.3	32.3	
BERYLLIUM	1.1 U			1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	1.1 U	

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03C11	03C11	03C11	03C12	03C12	03C15	03C15	03C17	03C17	03C20	03C20	03C25	03C25	03C26	03C26	03C27	03C27	03C27
aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK
matrix	GW	GF	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GW	GF
nsample	AC111A99-D	AC111A99-F	AC111A99-F-D	AC121A99	AC121A99-F	AC151A99	AC151A99-F	AC171A99	AC171A99-F	AC201A99	AC201A99-F	AC251A99	AC251A99-F	AC261A99	AC261A99-F	AC271A99	AC271A99-D	AC271A99-F
sample	FD02259901	AC111A99-F	FD02259901-F	AC121A99	AC121A99-F	AC151A99	AC151A99-F	AC171A99	AC171A99-F	AC201A99	AC201A99-F	AC251A99	AC251A99-F	AC261A99	AC261A99-F	AC271A99	FD03029901	AC271A99-F
sacode	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	02/25/99	02/25/99	02/25/99	02/25/99	02/27/99	03/01/99	03/02/99	03/08/99	03/08/99	03/11/99	03/11/99	02/24/99	02/24/99	03/02/99	03/02/99	03/02/99	03/02/99	03/02/99
lab_id	9902595-05	9902595-02	9902595-13	9902595-01	9903043-20	9903089-03	9903089-08	9903327-02	9903327-10	9903327-01	9903327-09	9902595-06	9902595-14	9903089-05	9903089-10	9903089-01	9903089-04	9903089-06
duplicate	AC111A99		AC111A99-F														AC271A99	
CADMIUM	1.1 U			1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	1.1 U	
CHROMIUM	5.6 U			5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U	5.6 U	
COBALT	3.3 U			3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U	3.3 U	
COPPER	2.2 U			2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U	2.2 U	
IRON	111 U			111 U								140				111 U		
LEAD	1.1 U			1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	1.1 U	
MANGANESE	16.7 U			16.7 U		36.2		114		16.7 U		24.1		40.0		16.7 U	16.7 U	
MERCURY	0.20 U			0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U	0.20 U	
NICKEL	11.1 U			11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U	11.1 U	
SELENIUM	4.0			1.2		1.9		1.6		1.3		1.1 U		1.3		1.1	1.6	
SILVER	3.3 U			3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U	3.3 U	
THALLIUM	1.1 U			1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U	1.1 U	
TIN	11.1 UJ			11.1 UJ		11.1 U		11.1 U		11.1 U		11.1 UJ		11.1 U		11.1 U	11.1 U	
VANADIUM	2.2 U			2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U	2.2 U	
ZINC	11.1 U			11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U	11.1 U	
Dissolved Metals (ug/L)																		
ANTIMONY, FILTERED		1.1 U	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U			1.1 U
ARSENIC, FILTERED		1.1 U	1.1 U		1.1 U		1.1 U		2.1		1.1 U		1.1 U		1.1 U			1.1 U
BARIUM, FILTERED		26.2	26.8		105		22.9		11.0		29.9		20.8		36.9			32.7
BERYLLIUM, FILTERED		1.1 U	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U			1.1 U
CADMIUM, FILTERED		1.1 U	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U			1.1 U
CALCIUM, FILTERED		233000	234000		99600		104000		201000		86000		106000		96700			59600
CHROMIUM, FILTERED		5.6 U	5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U		5.6 U			5.6 U
COBALT, FILTERED		3.3 U	3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U			3.3 U
COPPER, FILTERED		2.2 U	2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U			2.2 U
LEAD, FILTERED		1.1 U	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U			1.1 U
MAGNESIUM, FILTERED		130000	129000		8130		45100		199000		29900		60700		53100			3280
MANGANESE, FILTERED		16.7 U	16.7 U		16.7 U		35.1		110		16.7 U		24.7		39.9			16.7 U
MERCURY, FILTERED		0.20 U	0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U		0.20 U			0.20 U
NICKEL, FILTERED		11.1 U	11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U			11.1 U
POTASSIUM, FILTERED		3180	3190		2060		1960		3220		1990		2650		2110			1220
SELENIUM, FILTERED		3.9	4.2		1.4		1.9		1.9		1.4		1.1		1.6			1.3
SILVER, FILTERED		3.3 U	3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U		3.3 U			3.3 U
SODIUM, FILTERED		94500	92300		13400		26900		115000		12000		63600		16800			5680
THALLIUM, FILTERED		1.1 U	1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U		1.1 U			1.1 U
TIN, FILTERED		11.1 U	11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U			11.1 U
VANADIUM, FILTERED		2.2 U	2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U		2.2 U			2.2 U
ZINC, FILTERED		11.1 U	11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		11.1 U		14.0			11.1 U
Miscellaneous (mg/L)																		
ALKALINITY (MG/L)	0 NS			216		286		389		246		180		322		156	143	
BICARBONATE ALKALINITY (MG/L)	0 NS			216		286		389		246		180		322		156	143	
CARBON DIOXIDE (MG/L)	0 NS			136		NA		NA		NA		191		NA		NA	NA	
CARBONATE ALKALINITY (MG/L)	NA			0		0		0		0		0		0		0	0	
CHLORIDE	40			32		4		4		6		2		4		3	3	
CYANIDE	0.01 U			0.01 U		0.01 U		0.01 U		0.01 U		0.01 U		0.01 U		0.01 U	0.01 U	
DISSOLVED OXYGEN-HACH (MG/L)	0 NS			7.02		NA		NA		NA		0		NA		NA	NA	
DISSOLVED OXYGEN-METER (MG/L)	NA			8.46		1.89		1.26		4.21		3.14		4.04		7.07	NA	
FERROUS IRON (MG/L)	0 NS			0.01		NA		NA		NA		0.12		NA		NA	NA	
HYDROXIDE ALKALINITY (MG/L)	NA			0		0		0		0		0		0		0	0	
NITRATE (MG/L)	0 NS			0.550		NA		NA		NA		0		NA		NA	NA	
NITRITE (MG/L)	0 NS			0		NA		NA		NA		0		NA		NA	NA	

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03C11	03C11	03C11	03C12	03C12	03C15	03C15	03C17	03C17	03C20	03C20	03C25	03C25	03C26	03C26	03C27	03C27	03C27
aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK
matrix	GW	GF	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GF	GW	GW	GF
nsample	AC111A99-D	AC111A99-F	AC111A99-F-D	AC121A99	AC121A99-F	AC151A99	AC151A99-F	AC171A99	AC171A99-F	AC201A99	AC201A99-F	AC251A99	AC251A99-F	AC261A99	AC261A99-F	AC271A99	AC271A99-D	AC271A99-F
sample	FD02259901	AC111A99-F	FD02259901-F	AC121A99	AC121A99-F	AC151A99	AC151A99-F	AC171A99	AC171A99-F	AC201A99	AC201A99-F	AC251A99	AC251A99-F	AC261A99	AC261A99-F	AC271A99	FD03029901	AC271A99-F
sacode	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	02/25/99	02/25/99	02/25/99	02/25/99	02/27/99	03/01/99	03/02/99	03/08/99	03/08/99	03/11/99	03/11/99	02/24/99	02/24/99	03/02/99	03/02/99	03/02/99	03/02/99	03/02/99
lab_id	9902595-05	9902595-02	9902595-13	9902595-01	9903043-20	9903089-03	9903089-06	9903327-02	9903327-10	9903327-01	9903327-09	9902595-06	9902595-14	9903089-05	9903089-10	9903089-01	9903089-04	9903089-06
duplicate	AC111A99		AC111A99-F														AC271A99	
NITROCELLULOSE	1000 U			1000 U		1000 U		1000 U		1000 U		1000 U		1000 U		1000 UR	1000 U	
OXIDATION REDUCTION POTENTIAL (MV)	NA			139.4		3.5		-22.9		169.2		-74.1		106.1		164.9	NA	
PH ()	NA			7.25		7.15		7.01		7.13		7.11		7.11		7.59	NA	
SPECIFIC CONDUCTIVITY (MS/CM)	NA			0.643		0.826		2.209		0.656		1.063		0.780		0.304	NA	
SULFATE	920			58		170 J		1100 J		100 J		270		92 J		17 J	12 J	
SULFIDE	1 U			1 U								1 U						
SULFIDE (MG/L)	0 NS			0		NA		NA		NA		0.04		NA		NA	NA	
TEMPERATURE (C)	NA			13.3		12.9		11.3		11.1		10.8		11.2		8.2	NA	
TOTAL ORGANIC CARBON	1.9			1.7		1.3		1.4		1.2		1 U		1 U		1.4	1.1	
TOTAL ORGANIC HALOGENS	1			0.02		0.02 U		0.02 U		3		0.03		0.02 U		0.02 U	0.02 U	
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TURBIDITY (NTU)	NA			0		1		0		0		0		0		8	NA	
WATER LEVEL (FT)	NA			41.86		64.71		138.12		89.50		46.81		82.67		60.73	NA	

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03C27	03C30	03C30	CREEK	CREEK	CREEK	CREEK	CREEK	CREEK	SPRING A	SPRING A	SPRING C	SPRING C
aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK										
matrix	GF	GW	GF	SF	GF	SF	SW	SF	SF	SW	SF	SW	SF
nsample	AC271A99-F-D	AC301A99	AC301A99-F	ACRA1A99	ACRA1A99-F	ACRB1A99	ACRB1A99-D	ACRB1A99-F	ACRB1A99-F-D	ASPA1A99	ASPA1A99-F	ASPC1A99	ASPC1A99-F
sample	FD03029901-F	AC301A99	AC301A99-F	ACRA1A99	ACRA1A99-F	ACRB1A99	FD02289901	ACRB1A99-F	FD02289901-F	ASPA1A99	ASPA1A99-F	ASPC1A99	ASPC1A99-F
sacode	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	03/02/99	03/08/99	03/09/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99
lab_id	9903089-09	9903327-03	9903327-11	9903043-12	9903043-22	9903043-11	9903043-01	9903043-21	9903043-15	9903043-13	9903043-23	9903043-14	9903043-24
duplicate	AC271A99-F						ACRB1A99		ACRB1A99-F				
Volatile Organics (ug/L)													
1,1,1-TRICHLOROETHANE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
1,1-DICHLOROETHANE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
1,1-DICHLOROETHENE		0.5 U		0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
1,2-DICHLOROETHANE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
BENZENE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
CARBON TETRACHLORIDE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
CHLOROETHANE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
CHLOROFORM				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
CIS-1,2-DICHLOROETHENE		0.5 U		0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
ETHYLBENZENE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
METHYLENE CHLORIDE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
TETRACHLOROETHENE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
TOLUENE				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
TRANS-1,2-DICHLOROETHENE		0.5 U		0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
TRICHLOROETHENE		0.5 U		0.5 U		0.5 U	0.5 U			0.6		0.5 U	
VINYL CHLORIDE		0.5 U		0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
XYLENES, TOTAL				0.5 U		0.5 U	0.5 U			0.5 U		0.5 U	
Dissolved Gases (ug/L)													
ETHANE				0.147		0.147	0.192			0.112		0.119	
ETHENE				0.033		0.034	0.038			0.027		0.026	
METHANE				0.764		0.901	1.557			0.501		0.536	
Energetics (ug/L)													
1,3,5-TRINITROBENZENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
1,3-DINITROBENZENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
2,4,6-TRINITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.49 J		1.6 U	
2,4-DIAMINO-6-NITROTOLUENE				0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
2,4-DINITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
2,6-DIAMINO-4-NITROTOLUENE				0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
2,6-DINITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
2-AMINO-4,6-DINITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
2-NITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
3,5-DINITROANILINE				0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
3-NITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
4,4'-TN-AZOXY				0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
4-AMINO-2,6-DINITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
4-NITROTOLUENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
HMX		0.56 U		2.6		2.0	2.0			4.0		1.6 U	
MNX				0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
NITROBENZENE		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
NITROGLYCERIN		5.6 U		7.0 U		6.5 U	6.4 U			0.29 U		16 U	
PETN		2.8 U		3.5 U		3.2 U	3.1 U			1.4 U		8.0 U	
PICRIC ACID				1.2 UJ		1.0 UJ	1.0 UJ			1.0 UJ		1.0 UJ	
RDX		0.56 U		1.6		1.0	0.93			1.5		1.7	
TETRYL		0.56 U		0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
TNX				0.70 U		0.65 U	0.64 U			0.29 U		1.6 U	
Total Metals (ug/L)													
ANTIMONY		1.1 U		1.1 U		1.1 U	1.1 U			1.1 U		1.1 U	
ARSENIC		1.1 U		1.1 U		1.1 U	1.1 U			1.1 U		1.1 U	
BARIUM		61.1		37.1		35.0	34.2			42.0		27.6	
BERYLLIUM		1.1 U		1.1 U		1.1 U	1.1 U			1.1 U		1.1 U	

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03C27	03C30	03C30	CREEK	CREEK	CREEK	CREEK	CREEK	CREEK	SPRING A	SPRING A	SPRING C	SPRING C
aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK										
matrix	GF	GW	GF	SF	GF	SF	SW	SF	SF	SW	SF	SW	SF
nsample	AC271A99-F-D	AC301A99	AC301A99-F	ACRA1A99	ACRA1A99-F	ACRB1A99	ACRB1A99-D	ACRB1A99-F	ACRB1A99-F-D	ASPA1A99	ASPA1A99-F	ASPC1A99	ASPC1A99-F
sample	FD03029901-F	AC301A99	AC301A99-F	ACRA1A99	ACRA1A99-F	ACRB1A99	FD02289901	ACRB1A99-F	FD02289901-F	ASPA1A99	ASPA1A99-F	ASPC1A99	ASPC1A99-F
sacode	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	03/02/99	03/08/99	03/09/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99
lab_id	9903089-09	9903327-03	9903327-11	9903043-12	9903043-22	9903043-11	9903043-01	9903043-21	9903043-15	9903043-13	9903043-23	9903043-14	9903043-24
duplicate	AC271A99-F						ACRB1A99		ACRB1A99-F				
CADMIUM		1.1 U		1.1 U		1.1 U	1.1 U			1.1 U		1.1 U	
CHROMIUM		5.6 U		5.6 U		5.6 U	5.6 U			5.6 U		5.6 U	
COBALT		3.3 U		3.3 U		3.3 U	3.3 U			3.3 U		3.3 U	
COPPER		2.2 U		2.2 U		2.2 U	2.2 U			2.2 U		2.2 U	
IRON				450		191	121			507		111 U	
LEAD		1.1 U		1.1 U		1.1 U	1.1 U			1.1 U		1.1 U	
MANGANESE		30.3		16.7 U		16.7 U	16.7 U			16.7 U		16.7 U	
MERCURY		0.20 U		0.20 U		0.20 U	0.20 U			0.20 U		0.20 U	
NICKEL		11.1 U		11.1 U		11.1 U	11.1 U			11.1 U		11.1 U	
SELENIUM		1.1 U		1.1 U		1.1 U	1.1 U			1.1 U		1.1 U	
SILVER		3.3 U		3.3 U		3.3 U	3.3 U			3.3 U		3.3 U	
THALLIUM		1.1 U		1.1 U		1.1 U	1.1 U			1.1 U		1.1 U	
TIN		11.1 U		11.1 UJ		11.1 UJ	11.1 UJ			11.1 UJ		11.1 UJ	
VANADIUM		2.2 U		2.2 U		2.2 U	2.2 U			2.2 U		2.2 U	
ZINC		11.1 U		11.1 U		11.1 U	11.1 U			11.1 U		11.1 U	
Dissolved Metals (ug/L)													
ANTIMONY, FILTERED	1.1 U		1.1 U		1.1 U			1.1 U	1.1 U		1.1 U		1.1 U
ARSENIC, FILTERED	1.1 U		1.1 U		1.1 U			1.1 U	1.1 U		1.1 U		1.1 U
BARIUM, FILTERED	31.9		57.7		48.3			39.7	44.3		48.8		30.2
BERYLLIUM, FILTERED	1.1 U		1.1 U		1.1 U			1.1 U	1.1 U		1.1 U		1.1 U
CADMIUM, FILTERED	1.1 U		1.1 U		1.1 U			1.1 U	1.1 U		1.1 U		1.1 U
CALCIUM, FILTERED	57000		71000		11500			11600	11700		13500		10900
CHROMIUM, FILTERED	5.6 U		5.6 U		5.6 U			5.6 U	5.6 U		5.6 U		5.6 U
COBALT, FILTERED	3.3 U		3.3 U		4.0			3.3 U	3.3 U		3.3 U		3.4
COPPER, FILTERED	2.2 U		11.2		2.2 U			2.2 U	2.2 U		2.2 U		2.2 U
LEAD, FILTERED	1.1 U		1.1 U		1.1 U			1.1 U	1.1 U		1.1 U		1.1 U
MAGNESIUM, FILTERED	3150		36700		2710			2730	2740		3220		2470
MANGANESE, FILTERED	16.7 U		39.4		16.7 U			16.7 U	16.7 U		16.7 U		16.7 U
MERCURY, FILTERED	0.20 U		0.20 U		0.20 U			0.20 U	0.20 U		0.20 U		0.20 U
NICKEL, FILTERED	11.1 U		11.1 U		11.1 U			11.1 U	11.1 U		11.1 U		11.1 U
POTASSIUM, FILTERED	1220		2790		1220			1130	1220		1400		1110
SELENIUM, FILTERED	2		1.1 U		1.1 U			1.2	1.1 U		1.1 U		1.1 U
SILVER, FILTERED	3.3 U		3.3 U		3.3 U			3.3 U	3.3 U		3.3 U		3.3 U
SODIUM, FILTERED	5800		68000		1780			1730	1750		2240		1530
THALLIUM, FILTERED	1.1 U		1.1 U		1.1 U			1.1 U	1.1 U		1.1 U		1.1 U
TIN, FILTERED	11.1 U		11.1 U		11.1 U			11.1 U	11.1 U		11.1 U		11.1 U
VANADIUM, FILTERED	2.2 U		2.2 U		2.2 U			2.2 U	2.2 U		2.2 U		2.2 U
ZINC, FILTERED	11.1 U		11.1 U		11.1 U			11.1 U	17.4		11.1 U		11.1 U
Miscellaneous (mg/L)													
ALKALINITY (MG/L)		408		24.1		32.8	27.2			26.3		20.4	
BICARBONATE ALKALINITY (MG/L)		408		24.1		32.8	27.2			26.3		20.4	
CARBON DIOXIDE (MG/L)		NA		17.4		64	47			17.8		20.1	
CARBONATE ALKALINITY (MG/L)		0		0		0	0			0		0	
CHLORIDE		2		2		2	2			2		1	
CYANIDE		0.01 U		0.01 U		0.01 U	0.01 U			0.01 U		0.01 U	
DISSOLVED OXYGEN-HACH (MG/L)		NA		7.56		9.44	9.6			9.32		10.68	
DISSOLVED OXYGEN-METER (MG/L)		0.77		12.67		12.38	NA			12.65		13.15	
FERROUS IRON (MG/L)		NA		0.01		0	0			0.01		0	
HYDROXIDE ALKALINITY (MG/L)		0		0		0	0			0		0	
NITRATE (MG/L)		NA		0.22		0.23	0.22			0.20		0.2	
NITRITE (MG/L)		NA		0		0	0			0		0	

NSWC CRANE
ABG ROUND 2 GW RESULTS
NORMAL SAMPLES

location	03C27	03C30	03C30	CREEK	CREEK	CREEK	CREEK	CREEK	CREEK	SPRING A	SPRING A	SPRING C	SPRING C
aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK										
matrix	GF	GW	GF	SF	GF	SF	SW	SF	SF	SW	SF	SW	SF
nsample	AC271A99-F-D	AC301A99	AC301A99-F	ACRA1A99	ACRA1A99-F	ACRB1A99	ACRB1A99-D	ACRB1A99-F	ACRB1A99-F-D	ASPA1A99	ASPA1A99-F	ASPC1A99	ASPC1A99-F
sample	FD03029901-F	AC301A99	AC301A99-F	ACRA1A99	ACRA1A99-F	ACRB1A99	FD02289901	ACRB1A99-F	FD02289901-F	ASPA1A99	ASPA1A99-F	ASPC1A99	ASPC1A99-F
sacode	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	03/02/99	03/08/99	03/09/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99
lab_id	9903089-09	9903327-03	9903327-11	9903043-12	9903043-22	9903043-11	9903043-01	9903043-21	9903043-15	9903043-13	9903043-23	9903043-14	9903043-24
duplicate	AC271A99-F						ACRB1A99		ACRB1A99-F				
NITROCELLULOSE		1000 U		1000 U		1000 U	1000 U			1000 U		1000 U	
OXIDATION REDUCTION POTENTIAL (MV)		-112.9		157.0		186.4	NA			157.0		165.8	
PH ()		8.32		7.35		7.35	NA			7.30		7.14	
SPECIFIC CONDUCTIVITY (MS/CM)		0.778		0.104		0.095	NA			0.106		0.085	
SULFATE		130 J		17		16	16			19		18	
SULFIDE				1 U		1 U	1 U			1 U		1 U	
SULFIDE (MG/L)		NA		0.06		0.07	0.05			0.030		0.06	
TEMPERATURE (C)		10.9		7.9		7.9	NA			8.1		8.8	
TOTAL ORGANIC CARBON		1.8		2.5		3	3.5			3		2.4	
TOTAL ORGANIC HALOGENS		0.05		0.02 U		0.02 U	0.03			0.02 U		0.02 U	
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
TURBIDITY (NTU)		0		15.1		14.2	NA			15.9		10.2	
WATER LEVEL (FT)		223.38		NA		NA	NA			NA		NA	

ATTACHMENT 13

POSITIVE DETECTIONS
FOR
GROUND WATER/SURFACE WATER
AMMUNITION BURNING GROUNDS
MONITORING EVENT NO. 2
FEBRUARY 1999

TABLE 2
SUMMARY OF PARAMETERS DETECTED AT LEAST ONCE
MONITORING EVENT NO. 2
AMMUNITION BURNING GROUNDS

location	03B02	03B04	03C02P2	03C03	03C04	03C07	03C08P2	03C09P2	03C10	03C11	03C11	03C12	03C15	03C17	03C20	03C25	03C26	03C27	03C27	03C30	CREEK	CREEK	CREEK	SPRING A	SPRING C
aquifer	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEAVER BEND	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK					
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	SW	SW	SW	SW	SW
nsample	AB021A99	AB041A99	AC02P21A99	AC031A99	AC041A99	AC071A99	AC08P21A99	AC09P21A99	AC101A99	AC111A99	AC111A99-D	AC121A99	AC151A99	AC171A99	AC201A99	AC251A99	AC261A99	AC271A99	AC271A99-D	AC301A99	ACRA1A99	ACRB1A99	ACRB1A99-D	ASPA1A99	ASPC1A99
sample	AB021A99	AB041A99	AC02P21A99	AC031A99	AC041A99	AC071A99	AC08P21A99	AC09P21A99	AC101A99	AC111A99	FD02259901	AC121A99	AC151A99	AC171A99	AC201A99	AC251A99	AC261A99	AC271A99	FD03029901	AC301A99	ACRA1A99	ACRB1A99	FD02289901	ASPA1A99	ASPC1A99
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL
sample_dat	03/10/99	02/23/99	02/26/99	02/27/99	02/27/99	02/26/99	03/12/99	03/01/99	02/25/99	02/25/99	02/25/99	02/25/99	03/01/99	03/08/99	03/11/99	02/24/99	03/02/99	03/02/99	03/02/99	03/08/99	02/28/99	02/28/99	02/28/99	02/28/99	02/28/99
duplicate											AC111A99								AC271A99				ACRB1A99		
Volatile Organics (ug/L)																									
1,2-DICHLOROETHANE	0.5 U	0.5 U		0.5 U	0.5 U				29	0.5 U	0.5 U	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CARBON TETRACHLORIDE	0.5 U	0.5 U		0.5 U	0.5 U				1.6	0.5 U	0.5 U	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROFORM	0.5 U	0.5 U		0.5 U	0.5 U				2.2	2	2	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	14	0.5 U	0.5 U	13	13	0.7	0.5 U	0.5 U	67	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLENE CHLORIDE	0.5 U	0.5 U		0.5 U	0.5 U				0.5 U	0.5 U	0.5 U	0.5 U				0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	7.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U	7.7	0.5 U	0.5 U	4.7	71	160	63	2100	2100	22	0.5 U	0.5 U	3700	0.5 U	4.2	4	8.9	0.5 U	0.5 U	0.5 U	0.5 U	0.6	0.5 U
Dissolved Gases (ug/L)																									
ETHANE	0.081	1.494		0.195	0.069				0.274	0.372	0.273	0.163				0.583					0.147	0.147	0.192	0.112	0.119
ETHENE	0.045	0.232		0.042	0.027				0.054	0.057	0.039	0.03				0.099					0.033	0.034	0.038	0.027	0.026
METHANE	8.426	13.569		13.376	8.794				1.798	800	660	0.912				55.04					0.764	0.901	1.557	0.501	0.536
Energetics (ug/L)																									
1,3,5-TRINITROBENZENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	1.2 U	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	6.1	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
2,4,6-TRINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	1.2 U	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	0.56 U	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.49 J	1.6 U
2,6-DINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	1.2 U	0.70 J	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	0.56 U	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
2-AMINO-4,6-DINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	2.6	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	12.0	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
4-AMINO-2,6-DINITROTOLUENE	0.58 U	0.94 U	0.49 U	1.0 U	0.46 U	1.2 U	4.5	0.44 U	1.5 U	1.0 U	1.1 U	0.74 U	0.49 U	1.2 U	18.0	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
HMX	0.58 U	0.94 U	5.1	1.0 U	0.46 U	4.4	31	2.8	6.7	5.5	5.6	27	0.49 U	1.2 U	25	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	2.6	2.0	2.0	4.0	1.6 U
MNX	0.58 U	0.94 U		1.0 U	0.46 U				3.1	1.0 U	1.1 U	0.74 U				1.2 U					0.70 U	0.65 U	0.64 U	0.29 U	1.6 U
RDX	0.58 U	0.94 U	2.9	1.0 U	0.46 U	23	110	130	140	34	34	14	0.49 U	1.2 U	180	1.2 U	1.4 U	1.3 U	0.55 U	0.56 U	1.6	1.0	0.93	1.5	1.7
Total Metals (ug/L)																									
ARSENIC	6.7	4.1	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2	1.9	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
BARIUM	76.1	77.4	61.2	38.3	31.4	29.6	70.2	15.4	42.4	22.9	22.0	88.7	23.1	11.0	29.7	15.6	37.4	34.3	32.3	61.1	37.1	35.0	34.2	42.0	27.6
COPPER	2.2 U	2.2 U	2.2 U	2.8	2.2 U	2.2 U	18.2	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
IRON	13500	6160		111 U	134				121	111 U	111 U	111 U				140		111 U			450	191	121	507	111 U
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	3.1	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
MANGANESE	1430	1650	16.7 U	16.7 U	76.3	16.7 U	16.7 U	59.6	16.7 U	16.7 U	16.7 U	16.7 U	36.2	114	16.7 U	24.1	40.0	16.7 U	16.7 U	30.3	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U
NICKEL	11.1 U	137	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U
SELENIUM	1.1 U	1.1 U	1.1 U	1.1 U	2.1	1.9	2.6	2.1	3.2	3.7	4.0	1.2	1.9	1.6	1.3	1.1 U	1.3	1.1	1.6	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
ZINC	11.1 U	58.8 J	11.1 U	44.2 J	11.1 U	11.1 U	11.1 U	11.1 U	44.8 J	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U
Dissolved Metals (ug/L)																									
ARSENIC, FILTERED	6.0	3.6	1.1 U	1.1 U	1.6	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
BARIUM, FILTERED	75.2	95.9	71.6	47.8	49	41	63.1	13.4	47.7	26.2	26.8	105	22.9	11.0	29.9	20.8	36.9	32.7	31.9	57.7	48.3	39.7	44.3	48.8	30.2
CALCIUM, FILTERED	44100	25100	36600	1140	149000	100000	112000	81300	91300	233000	234000	99600	104000	201000	86000	106000	98700	59800	57000	71000	11500	11600	11700	13500	10900
COBALT, FILTERED	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	4.0	3.3 U	3.3 U	3.3 U	3.4
COPPER, FILTERED	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	11.2	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
MAGNESIUM, FILTERED	6210	3790	8340	1110 U	199000	48500	39700	15700	11800	130000	129000	8130	45100	199000	29900	60700	53100	3280	3150	36700	2710	2730	2740	3220	2470
MANGANESE, FILTERED	1420	1660	16.7 U	16.7 U	665	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	35.1	110	16.7 U	24.7	39.9	16.7 U	16.7 U	39.4	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U
POTASSIUM, FILTERED	1130	1230	2150	1110 U	3690	5160	30800	1290	1110 U	3180	3190	2060	1960	3220	1990	2650	2110	1220	1220	2790	1220	1130	1220	1400	1110
SELENIUM, FILTERED	1.1 U	1.1	1.6	1.1 U	2.2	2.3	2.2	2.2	3.2	3.9	4.2	1.4	1.9	1.9	1.4	1.1	1.6	1.3	2	1.1 U	1.1 U	1.2	1.1 U	1.1 U	1.1 U
SODIUM, FILTERED	9020	5470	21300	218000	63900	23800	19700	4790	7190	94500	92300	13400	26900	115000	12000	63600	16800	5980	5800	68000	1780	1730	1750	2240	1530
ZINC, FILTERED	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	14.0	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	17.4	11.1 U	11.1 U
Miscellaneous (mg/L)																									
ALKALINITY (MG/L)	148.8	78.4	80	356	366	346	323	196	200	290	0 NS	216	286	389	246	180	322	156	143	408	24.1	32.8	27.2	26.3	20.4
BICARBONATE ALKALINITY (MG/L)	148.8	74.4	80	356	NA	346	323	196	200	290	0 NS	216	286	389	246	180	322	156	143	408	24.1	32.8	27.2	26.3	20.4
CARBON DIOXIDE (MG/L)	86	93.6	NA	64	250	NA	NA	NA	183	165	0 NS	136	NA	NA	NA	191	NA	NA	NA	NA	17.4	64	47	17.8	20.1
CHLORIDE	3	2	37	2	7	9	12	5	9	40	40	32	4	4	6	2	4	3	3	2	2	2	2	2	1
DISSOLVED OXYGEN-HACH (MG/L)	0.41	0	NA	0.31	2.51	NA	NA	NA	2.53	5.32	0 NS	7.02	NA	NA	NA	0	NA	NA	NA	NA	7.56	9.44	9.6	9.32	10.68
DISSOLVED OXYGEN-METER (MG/L)	2.27	1.12	12.84	0.65	13.38	6.97	10.94	8.01	3.58	7.69	NA	8.46	1.89	1.26	4.21	3.14	4.04	7.87	NA	0.77	12.67	12.36	NA	12.65	13.15
FERROUS IRON (MG/L)	3.30	3.30	NA	0.05	1.09	NA	NA	NA	0	0.02	0 NS	0.01	NA	NA	NA	0.12	NA	NA	NA	NA	0.01	0	0	0.01	0
NITRATE (MG/L)	0	0	NA	0.207	0	NA	NA	NA	0.39	0.726	0 NS	0.550	NA	NA	NA	0	NA	NA	NA	NA	0.22	0.23	0.22	0.20	0.2
NITRITE (MG/L)	0	0	NA	0.003	0	NA	NA	NA	0.002	0.01	0 NS	0	NA	NA	NA	0	NA	NA	NA	NA	0	0	0	0	0
OXIDATION REDUCTION POTENTIAL (MV)	-116.9	-30.4	162.1	-5.8	-18.2	117.9	165.3	165.6	158.6	-54.5	NA	139.4	3.5	-22.9	169.2	-74.1	106.1	164.9	NA	-112.9	157.0	186.4	NA	157.0	165.8
PH ()	7.16	6.99	7.04	9.22	7.28	7.16	7.22	6.87	6.53	7.15	NA	7.25	7.15	7.01	7.13	7.11	7.11	7.59	NA	8.32	7.35	7.35	NA	7.30	7.14
SPECIFIC CONDUCTIVITY (MS/CM)	0.334	0.206	0.349	0.887	1.92	0.789	0.937	0.492	0.521	1.9	NA	0.643	0.826	2.209	0.656	1.063	0.780	0.304	NA	0.778	0.104	0.095	NA	0.106	0.085
SULFATE	26 J	16	35	76	950	86	120 J	43 J	58	710	920	58	170 J	1100 J	100 J	270	92 J	17 J	12 J	130 J	17	16	16	19	16
SULFIDE (MG/L)	0.06	0	NA	0.04	0	NA	NA	NA	0	0.47	0 NS	0	NA	NA	NA	0.04	NA	NA	NA	NA	0.06	0.07	0.05	0.030	0.06
TEMPERATURE (C)	8.9	9.0	12.0	13.7	8.2	12.4	10.0	13.0	13.1	10.7	NA	13.3	12.9	11.3	11.1	10.8	11.2	8.2	NA	10.9	7.9	7.9	NA	8.1	8.8
TOTAL ORGANIC CARBON	1.4	1 U	1.6	1.6	1.6	1.9	2	2.6	1.6	3.3	1.9	1.7	1.3	1.4	1.2	1 U	1 U	1.4	1.1	1.8	2.5	3	3.5	3	2.4
TOTAL ORGANIC HALOGENS	0.02 U	0.03	0.02 U	0.02 U	0.02 U	0.02 U	0.06	0.13	0.06	0.86	1	0.02	0.02 U	0.02 U	3	0.03	0.02 U	0.02 U	0.02 U	0.05	0.02 U	0.02 U	0.03	0.02 U	0.02 U
TURBIDITY (NTU)	8	2	8	1	3	8	0	8	6	1	NA	0	1	0	0	0	0	8	NA	0	15.1	14.2	NA	15.9	10.2
WATER LEVEL (FT)	6.00	6.58	37.43	87.77	76.10	78.80	74.78	45.45	50.14	44.40	NA	41.86	64.71	138.12	89.50	46.81	82.67	60.73	NA	223.38	NA	NA	NA	NA	NA

ATTACHMENT 14

RINSATE, TRIP, AND AMBIENT BLANKS
AMMUNITION BURNING GROUND
MONITORING EVENT NO. 2
FEBRUARY 1999

NSWC CRANE
ABG ROUND 2 GW RESULTS
TRIP BLANKS

location	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK
aquifer																	
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	TB02239901	TB02249901	TB02259901	TB02259902	TB02269901	TB02279901	TB02279902	TB02289901	TB03019901	TB03019902	TB03029901	TB03029902	TB03089901	TB03099901	TB03109901	TB03119901	TB03129901
sample	TB02239901	TB02249901	TB02259901	TB02259902	TB02269901	TB02279901	TB02279902	TB02289901	TB03019901	TB03019902	TB03029901	TB03029902	TB03089901	TB03099901	TB03109901	TB03119901	TB03129901
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB
sample_dat	02/23/99	02/24/99	02/25/99	02/25/99	02/26/99	02/27/99	02/27/99	02/28/99	03/01/99	03/01/99	03/02/99	03/02/99	03/08/99	03/09/99	03/10/99	03/11/99	03/12/99
lab_id	9902595-07	9902595-08	9902595-09	9902595-10	9903043-02	9903043-03	9903043-04	9903043-05	9903089-11	9903089-12	9903089-13	9903089-14	9903327-05	9903327-06	9903327-07	9903327-08	9903344-01
duplicate																	
Volatile Organics (ug/L)																	
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
BENZENE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
CARBON TETRACHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
CHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
CHLOROFORM	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
CIS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
METHYLENE CHLORIDE	0.5 U	0.5 U	0.5	0.5		0.7	0.5 U	0.6							0.5 U		
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
TOLUENE	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		
TRANS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
XYLENES, TOTAL	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.5 U							0.5 U		

ATTACHMENT 15

LAUCKS TESTING DATA PACKAGE
AND
ELECTRONIC DATA DELIVERABLE
(AVAILABLE IN NSWC CRANE
GROUND WATER MONITORING
INFORMATION RESPOSITORY)
MONITORING EVENT NO. 2
FEBRUARY 1999

ATTACHMENT 16

DATA VALIDATION LETTERS
FOR
LAUCKS TESTING ANALTICAL DATA
(AVAILABLE IN NSWC CRANE
INFORMATION RESPOSITORY)
MONITORING EVENT NO. 2
FEBRUARY 1999

ATTACHMENT 17

MICROSEEPS DATA PACKAGES AND
ELECTRONIC DATA DELIVERABLE
AND
TETRA TECH NUS VALIDATION LETTER
(AVAILABLE IN NSWC CRANE
GROUND WATER MONITORING
INFORMATION REPISITORY)
MONITORING EVENT NO. 2
FEBRUARY 1999