N00164.AR.000661
NSWC CRANE
5090.3a

Monitoring Event No. 3
2nd Quarter 1999
May 17 - 26, 1999
Ammunition Burning Grounds

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

010019/P

MONITORING EVENT NO. 3
2nd QUARTER 1999
May 17 - 26, 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:

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

TABLE OF CONTENTS

Volume I

Letter Report	
Table 1	Ammunition Burning Grounds Ground Water/Surface Water/Spring Water Monitoring Points
Figure 1	Ammunition Burning Grounds Local Ground Water Contour Map, Beech Creek Aquifer
Figure 2	Ammunition Burning Grounds Regional Ground Water Contour Map, Beech Creek Aquifer
Table 2	Summary of Parameters Detected at Least Once
Figure 3	Ammunition Burning Grounds Proper Positive Detections - Organic Parameters and Total Metals
Figure 4	Ammunition Burning Grounds Surrounding Areas Positive Detections - Organic Parameters and Total Metals
Figure 5	Piper Diagram of Water Chemistry Analysis; Beech Creek Aquifer Wells
Figure 6	Piper Diagram of Water Chemistry Analysis; Beaver Bend Aquifer Wells
Attachment 1	Summary of Field Activities
Attachment 2	Monitoring Well Inspection Forms
Attachment 3	Water Level Measurement Forms
Attachment 4	Low Flow Purge Data Forms/ Ground Water Sample Log Forms
Attachment 5	Surface Water Sample Log Forms
Attachment 6	Field Chemical Analytical Log Forms
Attachment 7	Chain of Custody Records Prepared by Tetra Tech NUS, Inc.
Attachment 8	Equipment Calibration Logs
Attachment 9	Field Notebook Pages
Attachment 10	Federal Express Airbills
Attachment 11	Tabular Listing of Ground Water/Surface Water Data
Attachment 12	Positive Detections for Ground Water/Surface Water Data
Attachment 13	Summary of Ambient and Trip Blank Results

TABLE OF CONTENTS (Continued)

Volume II	**(Provided Only in the Record Copy Maintained in the NSWC Crane Ground Water Monitoring Information Repository)**
Attachment 14	Laucks Testing Laboratories, Inc., Data Packages and Electronic Deliverable; TtNUS Electronic Database File
Attachment 15	Data Validation Letters for Laucks Testing Laboratories, Inc., Analytical Data
Attachment 16	Microseeps, Inc., Data Packages and Electronic Deliverable and TtNUS Data Validation Letter

MONITORING EVENT NO. 3
(May 17-26, 1999)

Naval Surface Warfare Center (NSWC)
Crane Division
Crane, Indiana

VOLUME I OF II

(Volume II of II is included in only the record copy of this report, which is maintained in the NSWC Crane Ground Water Monitoring Information Repository.)

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

PITT-10-9-266

November 1, 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 3
for Naval Surface Warfare Center Crane, Indiana

Dear Mr. Johns:

Monitoring Event No. 3 has been completed. During this monitoring event samples from ground water, surface waters, and springs were collected at the Ammunition Burning Grounds (ABG) from May 17 through May 26, 1999 and analyzed.

Enclosed is the Report for Monitoring Event No. 3. All field sampling was conducted in accordance with the May 1999 Field Sampling Plan (FSP). Table 1 summarizes the ground water monitoring wells, surface waters, and springs sampled at the ABG. Water level measurement 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 obtained when wells located beyond the Point of Compliance are included.

Table 2 highlights the positive detections. Figures 3 and 4 are tag maps depicting, for the ABG proper and ABG surrounding areas, respectively, the locations and concentrations of positively detected organic parameters and total metals. These figures also highlight parameters detected at concentrations exceeding risk-based target levels.

Piper diagrams (Figures 5 and 6, respectively) were constructed for the Beech Creek and Beaver Bend Aquifers. These Piper diagrams were used to determine if changes in the behavior of the aquifers have occurred that could result in the need to modify the existing ground water monitoring program. Comparisons of Figures 5 and 6 were made to the Piper Diagrams in the Section 7.5 of the approved Ground Water Monitoring Plan (GWMP).

The Piper diagram for the Beech Creek Aquifer (Figure 5) shows a calcium+magnesium-bicarbonate chemistry. This chemistry is consistent with the chemistry shown on the Piper diagram for the Beech Creek Aquifer found in the Section 7.5 of the GWMP, thus confirming that the behavior of the Beech Creek Aquifer has not changed.

The Piper diagram for the Beaver Bend Aquifer shows a sodium+potassium-bicarbonate chemistry. Comparison with the Piper diagram for the Beaver Bend Aquifer found in Section 7.5 of the GWMP indicates that a similar chemistry exists, thus confirming that the behavior of the Beaver Bend Aquifer has not changed.

Following is a listing of the documentation provided in this report.

ABG FIELD SAMPLING ACTIVITIES

Samples were collected from 18 monitoring wells, 2 surface waters, and 2 springs at the ABG. Field chemical analysis for natural attenuation parameters was performed for the second time.

Attachment 1 contains a summary of the field activities.

Attachment 2 contains the Monitoring Well Inspection Forms.

Attachment 3 contains the Water Level Measurement Forms.

Attachment 4 contains the Low Flow Purge Data Sheet and the Ground Water Sample Log Sheet for each monitoring well that was sampled.

Attachment 5 contains the Surface Water Sample Log Sheet for each surface water and spring location that was sampled.

Attachment 6 contains the Field Chemical Analysis Log Form for each monitoring point at which field chemical analysis was conducted.

Attachment 7 contains a copy of the Chain of Custody (COC) records as completed by the TtNUS field staff. Because their size (8"x14") does not allow for them to be included in a binder, the original COC records are provided separately for inclusion in the Crane Ground Water Monitoring Information Repository.

Attachment 8 contains the Equipment Calibration Logs.

Attachment 9 contains a copy of the Field Notebook pages.

Attachment 10 contains the Federal Express airbills as completed by TtNUS.

LABORATORY ANALYSIS

Eighteen ground water, two surface water, and two spring water samples were analyzed for the parameters indicated in Table 4-2 of the Field Sampling Plan for RCRA Ground Water Monitoring at the Ammunition Burning Grounds, Old Rifle Range, and Demolition Range. All analyses were conducted in accordance with the procedures described in the May 1999 Quality Assurance Project Plan (QAPP).

Attachment 11 contains a tabular summary of the results for all parameters that were analyzed.

Attachment 12 contains a tabular summary of positive detections, as printed from the TtNUS database, for all parameters that were positively detected in one or more samples.

Attachment 13 contains a tabular summary of ambient blank and trip blank results.

Attachments 1 through 13 constitute Volume I of this report.

Attachment 14 contains the data packages and electronic deliverable received from Laucks Testing Laboratories, Inc. Also included for the NSWC information repository in Attachment 14 is one copy of the TtNUS electronic database file after data validation was completed. 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 15 contains the data validation letters for the Laucks Testing Laboratories, Inc., 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 16 contains the Microseeps, Inc., data packages, electronic deliverable, and data validation letters. 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.

Attachments 14, 15, and 16, as well as the original COC forms previously mentioned, constitute Volume II of this report. One copy each of these attachments is provided separately (to Tom Brent's attention) 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

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/DER, (wo/ enclosures)
Mr. M. Perry, Project File CTO 0038 (unbound - w/enclosures - 1 copy of Volume 1) (Volume 2 maintained at TtNUS Warehouse)

TABLE 1

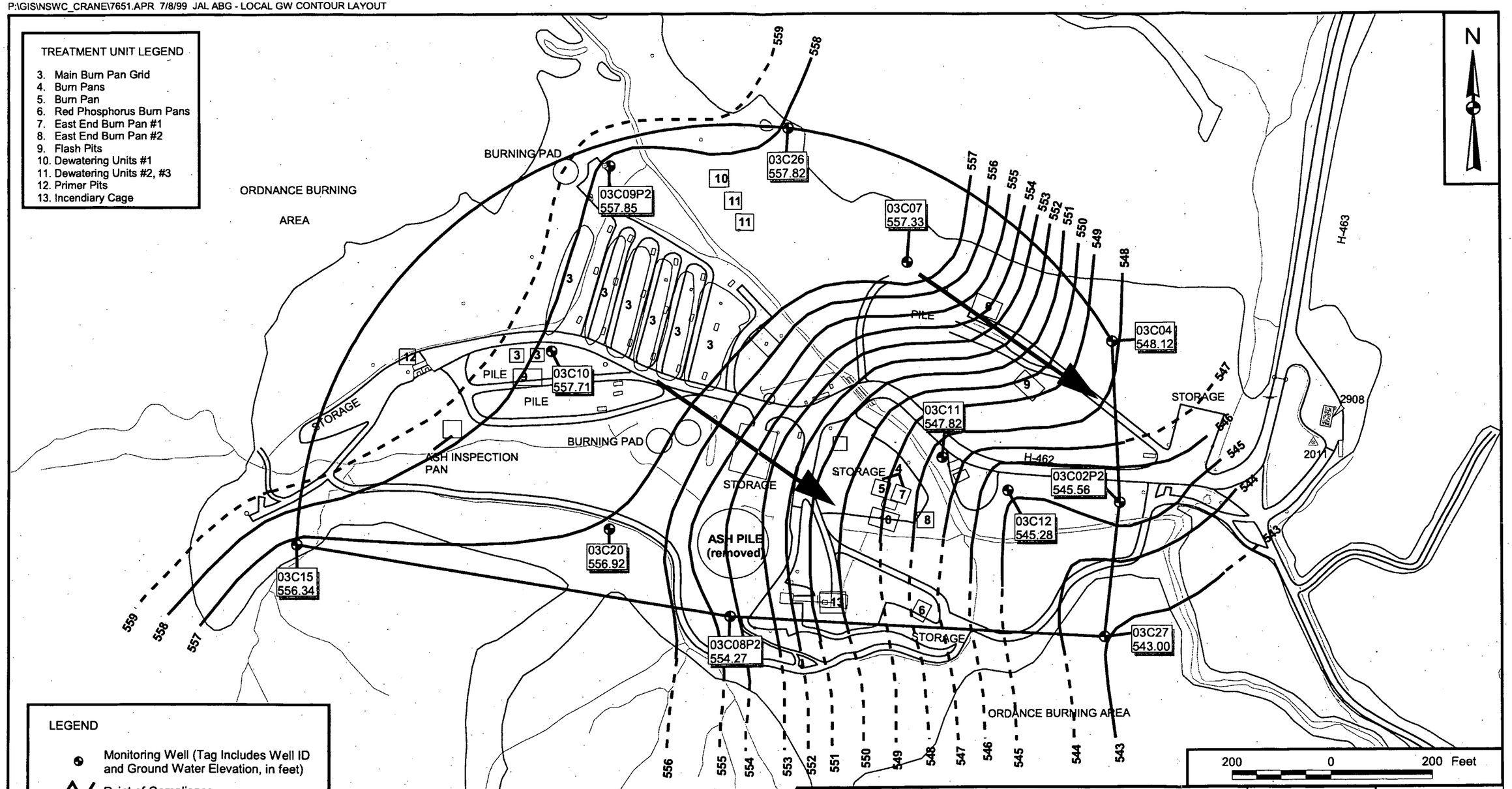
AMMUNITION BURNING GROUNDS
GROUND WATER/SURFACE WATER/SPRING WATER MONITORING POINTS
MONITORING EVENT NO. 3
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

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

P:\GIS\NSWC_CRANE\7651.APR 7/8/99 JAL ABG - LOCAL GW CONTOUR LAYOUT



NOTES:
1. Water level measurements taken on May 18, 1999.
2. Figure does not include upgradient well 03C17 or compliance wells 03C25 and 03C30.
3. Contour interval is one (1) foot.

DRAWN BY S. TABLER	DATE 10/20/98	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7651 / OWNER NUMBER CTO 0038
CHECKED BY S. NEIL	DATE 7/9/99	AMMUNITION BURNING GROUND LOCAL GROUNDWATER CONTOUR MAP BEECH CREEK AQUIFER 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 7/9/99 JAL REGIONAL GW CONTOUR LAYOUT

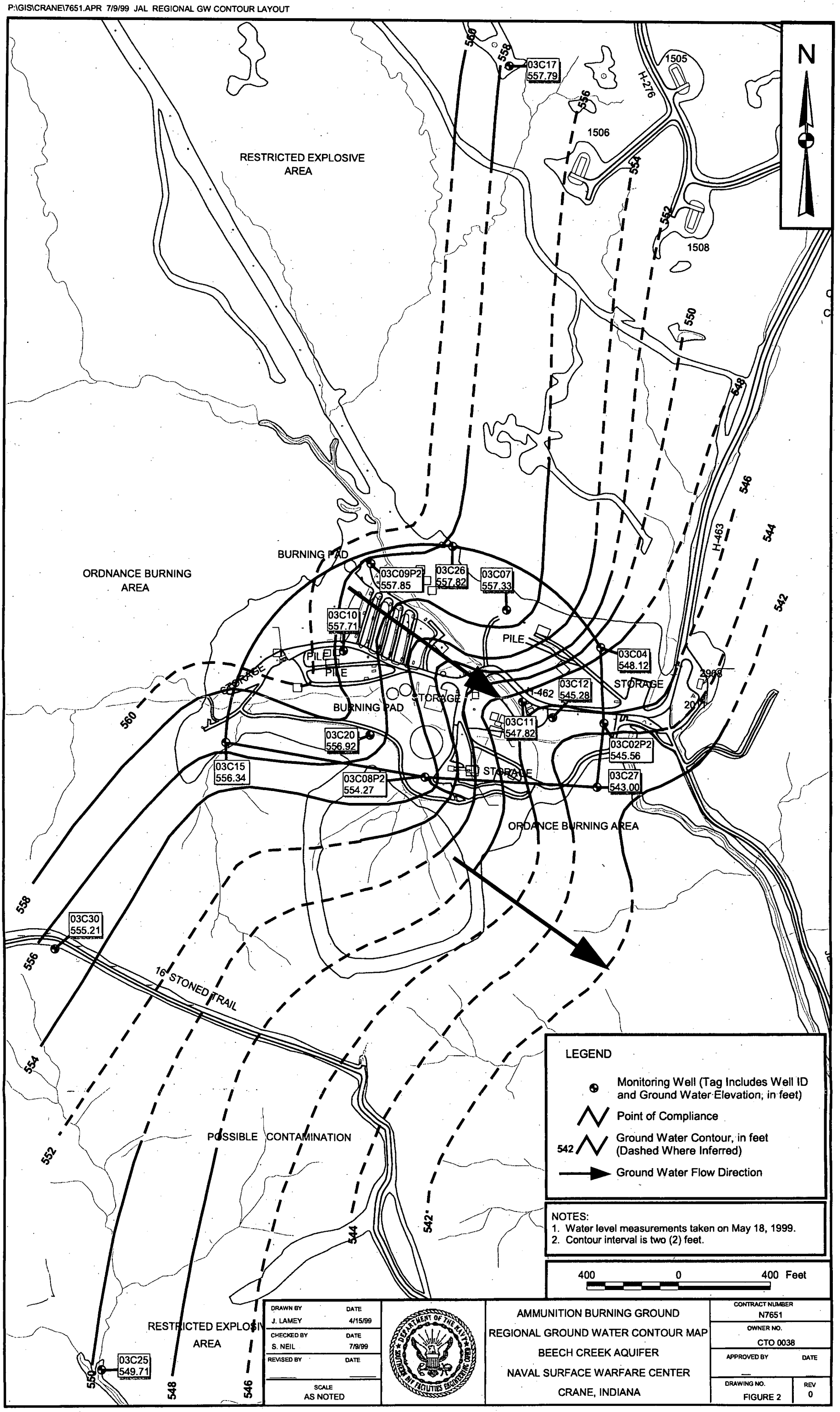
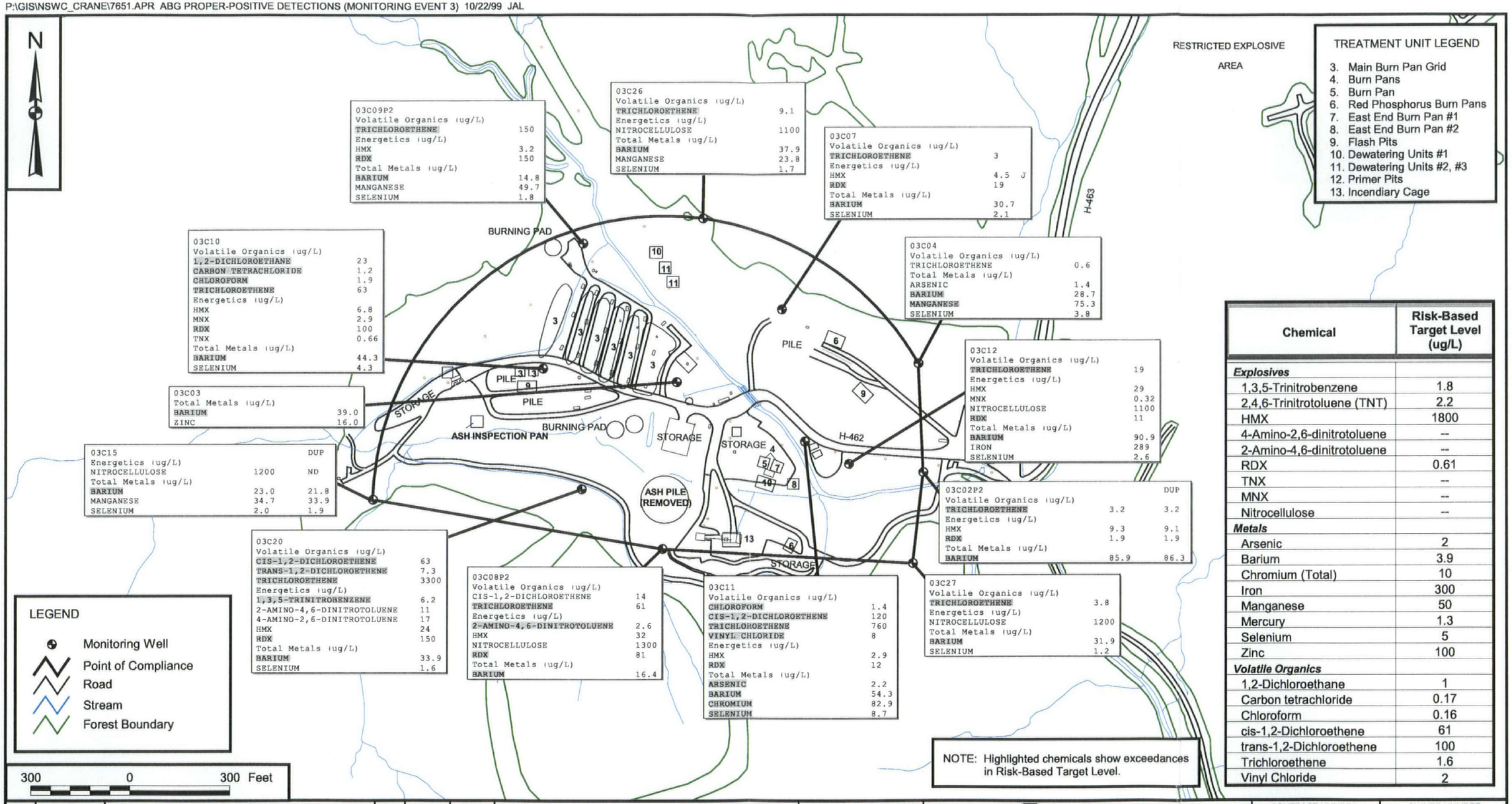


TABLE 2
SUMMARY OF PARAMETERS DETECTED AT LEAST ONCE
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

location	03B02	03B04	03C02P2	03C02P2	03C03	03C04	03C07	03C08P2	03C09P2	03C10	03C11	03C12	03C15	03C15	03C17	03C20	03C25	03C26	03C27	03C30	CREEK	CREEK	SPRING A	SPRING A	SPRING C
aquifer	ALLUVIUM	ALLUVIUM	BEECH CREEK	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					
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	AB022A99	AB042A99	AC02P22A99	AC02P22A99-D	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	AC152A99-D	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	ASPA2A99-D	ASPC2A99
sample	AB022A99	AB042A99	AC02P22A99	FD05199901	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	FD05239901	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	FD05209901	ASPC2A99
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
sample_dat	05/18/99	05/17/99	05/19/99	05/19/99	05/18/99	05/21/99	05/19/99	05/24/99	05/19/99	05/22/99	05/21/99	05/22/99	05/23/99	05/23/99	05/18/99	05/22/99	05/25/99	05/23/99	05/24/99	05/24/99	05/20/99	05/20/99	05/20/99	05/20/99	05/20/99
duplicate				AC02P22A99										AC152A99										ASPA2A99	
Volatile Organics (ug/L)																									
1,2-DICHLOROETHANE	0.5 U	0.5 U			0.5 U	0.5 U				23	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	0.3 UJ	0.3 UJ			0.3 UJ	0.3 U				1.2	0.3 U	0.3 U					0.3 U				0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ
CHLOROFORM	0.3 U	0.3 U			0.3 U	0.3 U				1.9	1.4	0.3 U					0.3 U				0.3 U	0.3 U	0.3 U	0.3 U	0.3 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	14	0.5 U	0.5 U	120	0.5 U	0.5 U	0.5 U	0.5 U	63	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	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
TRICHLOROETHENE	0.5 U	0.5 U	3.2	3.2	0.5 U	0.6	3	61	150	63	760	19	0.5 U	0.5 U	0.5 U	3300	0.5 U	9.1	3.8	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	8	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
Dissolved Gases (ug/L)																									
ETHANE	0.087	0.033			0.012	0.011				0.012	0.632	0.012					0.064				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
ETHENE	0.024	0.005 U			0.005 U	0.021				0.005 U	0.07	0.005 U					0.005 U				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
METHANE	9.715	8.027			5.308	7.51				1.352	5320	0.722					49.4				0.957	2.005	0.113	0.124	0.076
Energetics (ug/L)																									
1,3,5-TRINITROBENZENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	6.2	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2,4,6-TRINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.84	0.87	0.66 U
2-AMINO-4,6-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	2.6	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	11	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
4-AMINO-2,6-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	17	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.77	0.80	0.66 U
HMX	0.95 UJ	0.52 U	9.3	9.1	0.20 U	1 U	4.5 J	32	3.2	6.8	2.9	29	1.1 U	0.58 U	0.36 U	24	1 U	0.81 U	0.55 U	0.79 U	3.5	3.3	5.5	5.9	1.5
MNX	0.95 UJ	0.52 U			0.20 U	1 U				2.9	0.71 U	0.32	1.1 U				1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
NITROCELLULOSE	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1300	1000 U	1000 U	1000 U	1100	1200	1000 U	1000 U	1000 U	1400	1100	1200	1100	1000 U	1000 U	1000 U	1000 U	1000 U
RDX	0.95 UJ	0.52 U	1.9	1.9	0.20 U	1 U	19	81	150	100	12	11	1.1 U	0.58 U	0.36 U	150	1 U	0.81 U	0.55 U	0.79 U	3.6	3.1	6	6.6	1.9
TNX	0.95 UJ	0.52 U			0.20 U	1 U				0.66	0.71 U	0.30 U	1.1 U				1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
Total Metals (ug/L)																									
ARSENIC	7.7	5.4	1.1 U	1.1 U	1.1 U	1.4	1.1 U	1.1 U	1.1 U	1.1 U	2.2	1.1 U	1.1 U	1.1 U	2.3	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	82.2	83.9	85.9	86.3	39.0	28.7	30.7	16.4	14.8	44.3	54.3	90.9	23.0	21.8	11.7	33.9	1.1 U	37.9	31.9	69.1	65.8	64.9	73.1	72.3	45.4
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	82.9	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	5.6 U	5.6 U	5.6 U	5.6 U
IRON	12900	6850			111 U	111 U				111 U	111 U	289					158				111 U	111 U	138	177	206
MANGANESE	1240	1700	16.7 U	16.7 U	16.7 U	75.3	16.7 U	16.7 U	49.7	16.7 U	16.7 U	16.7 U	34.7	33.9	114	16.7 U	24.4	23.8	16.7 U	19.1	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	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	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20	0.20 U
SELENIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	3.8	2.1	1.1 U	1.8	4.3	8.7	2.6	2.0	1.9	1.4	1.6	1.1 U	1.7	1.2	2.3	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
ZINC	41.0	11.1 U	11.1 U	11.1 U	16.0	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	28.1 U	15.0	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	6.8	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	1.1 U	1.1 U	1.7	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	74.8	74.0	76.3	75.6	35.4	29.2	26.0	62.9	11.8	44.3	38.3	89.3	21.0	21.3	10.0	30.6	15.8	35.2	31.1	66.4	59.6	60.4	64.6	63.2	39.3
CADMIUM, FILTERED	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.6	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	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
CALCIUM, FILTERED	42100	23300	49000	46300	1110 U	139000	92200	119000	75900	92400	119000	97100	99300	104000	179000	89100	104000	91800	52500	54500	24400	22900	25000	24600	22700
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	5.6 U	99	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	5.6 U	5.6 U	5.6 U	5.6 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	2.2 U	2.6	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
MAGNESIUM, FILTERED	7430	3410	9480	9280	1110 U	191000	46600	39300	14600	11900	61400	7970	43700	44300	173000	29900	58200	49600	2830	33200	4430	4780	5870	6080	4140
MANGANESE, FILTERED	1260	1670	16.7 U	16.7 U	16.7 U	70.6	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	34.1	36.6	105	16.7 U	24.0	24.3	16.7 U	17.8	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U
POTASSIUM, FILTERED	1110 U	1110 U	2470	2470	1110 U	3010	4710	15200	1110 U	1110 U	165000	1900	1790	1620	2720	1720	2460	2210	1110 U	2690	1110 U	1190	1370	1370	1110 U
SELENIUM, FILTERED	1.1 U	1.1 U	1.1 U	1.2	1.1 U	2.4	1.7	1.1	1.7	2.8	7.2	1.2	1.1	1.1	1.2	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
SODIUM, FILTERED	9020	5200	34100	34300	207000	48800	22500	14400	4350	7070	209000	14400	25500	25400	101000	11700	60400	15700	5340	71100	2640	2860	3790	3970	2490
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	233 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	12.1	11.1 U
Miscellaneous (mg/L)																									
ALKALINITY (MG/L)	152	75.2	110		373	344	330	356	182	186	84	152	271		125.6	214	318	274	127	240	59.2	58	59	86.4	79.6
BICARBONATE ALKALINITY (MG/L)	152	75.2	110		373	344	330	356	182	186	84	152	271		125.6	214	318	274	127	240	59.2	58	59	86.4	79.6
CARBON DIOXIDE (MG/L)	92	62.4			75	208				98.8	2000 >	59.8					83.8				25	56	28.4	10.4	31.8
CHLORIDE	5 U	5 U	68	70	5 U	6	9	13	5	9	29	41	4	5	5 U	6	2	4	3	2	5 U	5 U	5 U	5 U	5 U
CYANIDE	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
DISSOLVED OXYGEN-HACH (MG/L)	0	0.49			0.74	1.8				3.01	5.02	6.88					0.3				9.22	9.48	9.76	9.98	10.56
DISSOLVED OXYGEN-METER (MG/L)	0.84	0.97	13.66		1.11	2.6	2.02	6.74	8.81	3.08	1.48	8.56	1.84		2.24	4.95	4.89	28.39	12.31	14.22	9.02	9.84	9.1		9.01
FERROUS IRON (MG/L)	3.3	3.3			0	0.04				0.01	0.01	0.01					0.15				0	0.01	0.01	0	0
NITRATE (MG/L)	0	0.02			0.01	0.124				1.739	0.928	2.407					0.129				0.054	0.064	0.086	0.28	0.337
NITRITE (MG/L)	0	0			0.001	0.006				0.001	0.012	0.003					0.001				0.006	0.006	0.004	0.001	0.003
OXIDATION REDUCTION POTENTIAL (MV)	-125.9	-81.5	142		54.1	-35.7	183.2	169	133.2	214.6	-110.8	194.2	-39.1		-52.4	168.1	-74.8	63.7	164.4	-69.7	129.4	123.3	153.7		124.9
PH ()	7.21	6.98	7.12		9.24	7.26	7.28	7.34	6.84	6.65	11.06	7.3	7.19		7	7.23	7.2	7.03	7.66	9.59	7.44	7.46	7.54		7.47
SPECIFIC CONDUCTIVITY (MS/CM)	0.343	0.198	0.494		0.901	1.657	0.846	0.875	0.492	0.506	2.106	0.62	0.781		2.19	0.6	0.981	0.71	0.283	0.557	0.156	0.157	0.168		0.14
SULFATE	27	16	28	28	88	830	98	130	49	64	980	61	170	170	1300	110	260	100	9	120	23	24	29	30	23
SULFIDE (MG/L)	0.03	0			0	0.02				0	0.38	0					0.06				0	0	0	0	0
TEMPERATURE (C)	12.5	12.8	13.2		15.7	18.05	18.3	16.4	16	16.3	18.2	17.4	13.6		14.5	14.9	12.7	17.4	12.5	14.22	13.6	12.9	12.6		12.2
TOTAL ORGANIC CARBON	1.5	1.1	2	2	1 U	1 U	1 U	1.4	1.1	1.4	10	1.3	1 U	1	1.2	1.6	1 U	1.3	1 U	1 U	1.6	1.9	1.5	1.6	1.4
TOTAL ORGANIC HALOGENS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.04	0.11	0.06	0.8	0.02 U	0.03	0.02 U	0.02 U	1.5	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
TURBIDITY (NTU)	8	6	7		3	5	4	1	9	0	240	5.8	1		1.2	1	0	1.3	2	0.7	5	5	8		7
WATER LEVEL (FT)	5.33	6.52	37.34		87.81	76.14	78.99	74.88	45.53	50.21	44.44	41.85	64.76		138.22	89.63	46.97	82.8	50.75	223.51					

P:\GIS\NSWC_CRANE\7651.APR ABG PROPER-POSITIVE DETECTIONS (MONITORING EVENT 3) 10/22/99 JAL



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

Chemical	Risk-Based Target Level (ug/L)
Explosives	
1,3,5-Trinitrobenzene	1.8
2,4,6-Trinitrotoluene (TNT)	2.2
HMX	1800
4-Amino-2,6-dinitrotoluene	--
2-Amino-4,6-dinitrotoluene	--
RDX	0.61
TNX	--
MNX	--
Nitrocellulose	--
Metals	
Arsenic	2
Barium	3.9
Chromium (Total)	10
Iron	300
Manganese	50
Mercury	1.3
Selenium	5
Zinc	100
Volatile Organics	
1,2-Dichloroethane	1
Carbon tetrachloride	0.17
Chloroform	0.16
cis-1,2-Dichloroethene	61
trans-1,2-Dichloroethene	100
Trichloroethene	1.6
Vinyl Chloride	2

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

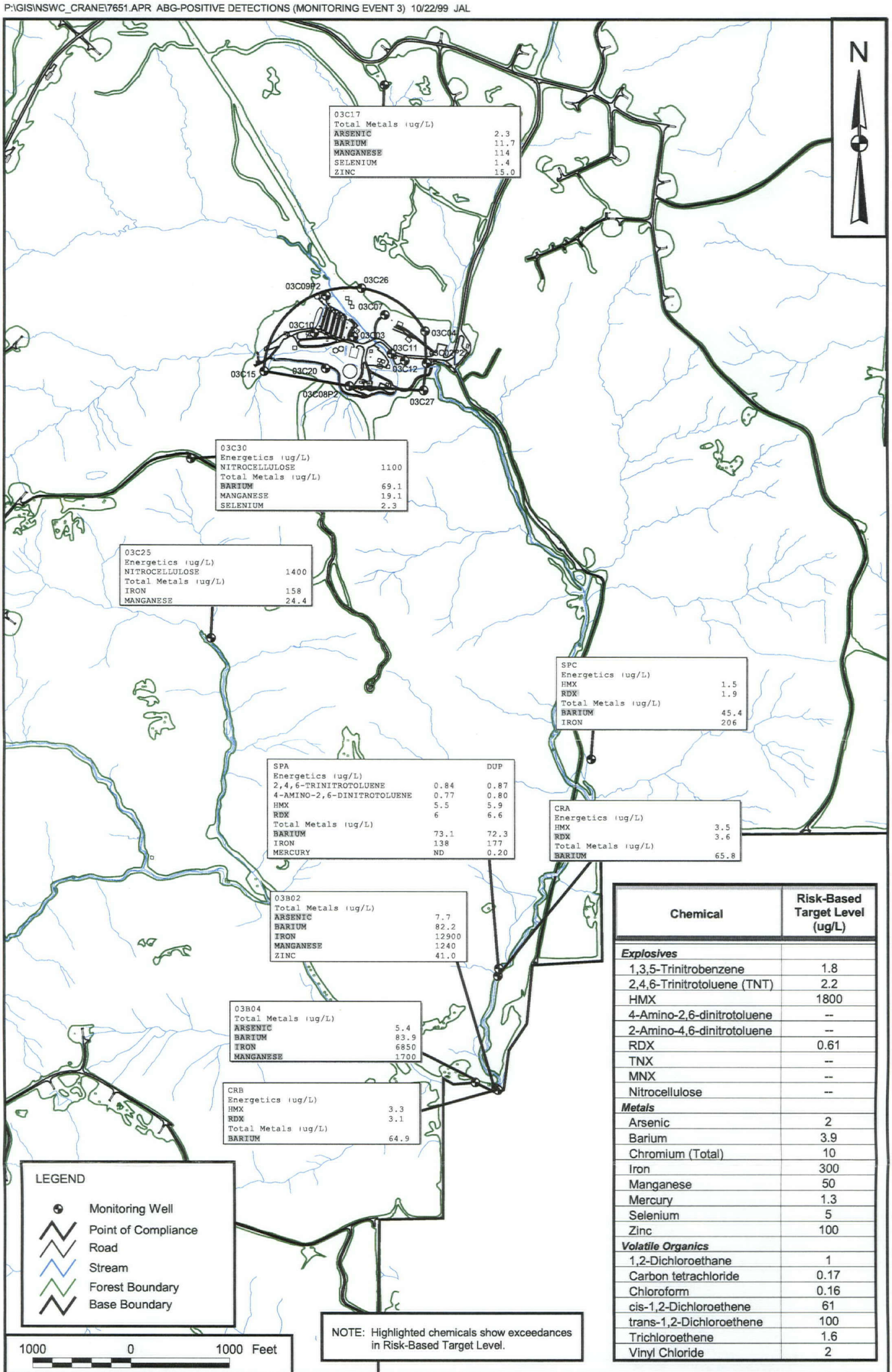
DRAWN BY J. LAMEY DATE 10/6/99
CHECKED BY DATE
COST/SCHEDULE-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

AMMUNITION BURNING GROUND PROPER
POSITIVE DETECTIONS - ORGANIC PARAMETERS AND TOTAL METALS
MONITORING EVENT 3
NSWC CRANE, INDIANA

CONTRACT NUMBER N7640
OWNER NUMBER
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3
REV 0

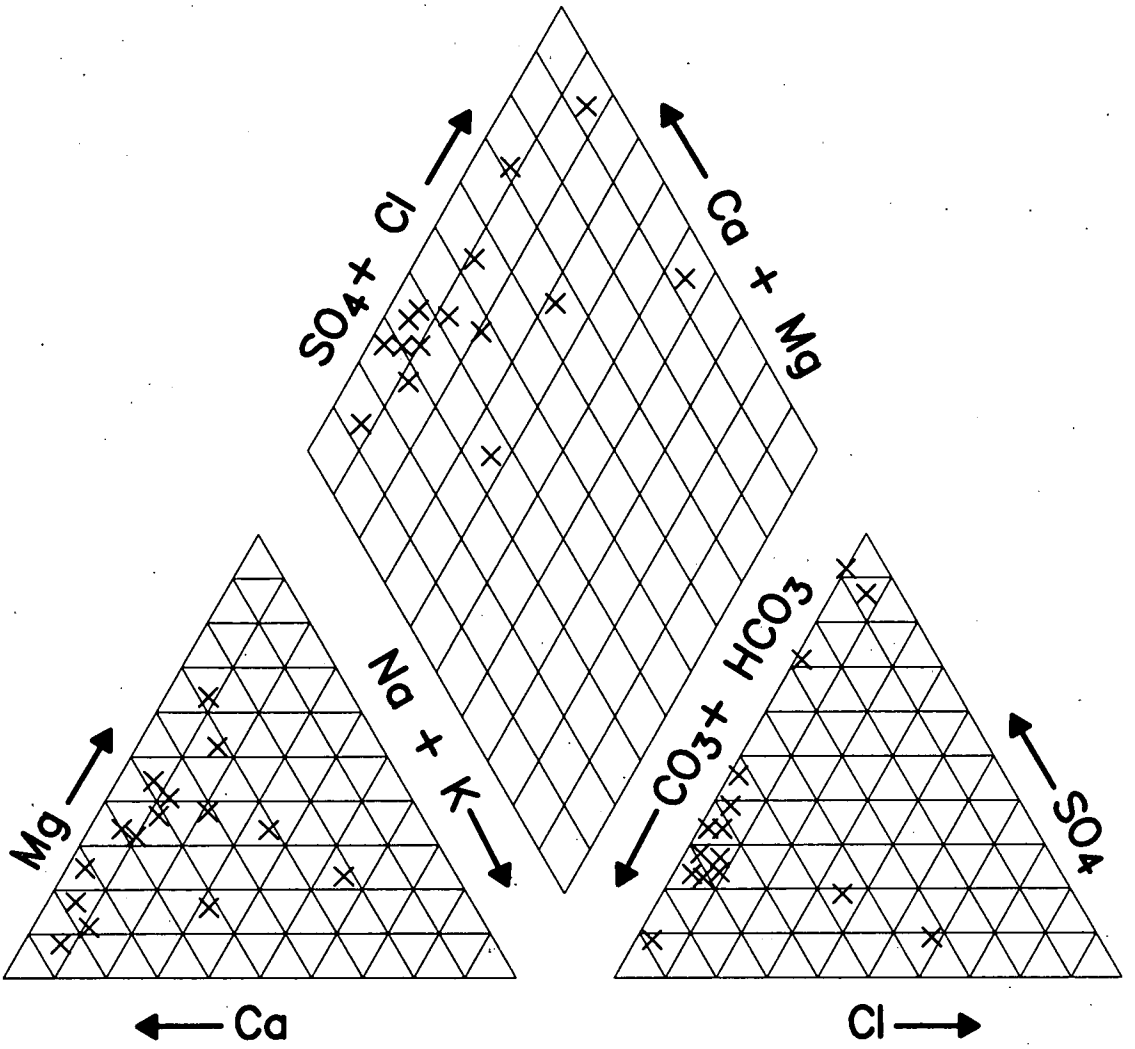
P:\GIS\NSWC_CRANE\7651.APR ABG-POSITIVE DETECTIONS (MONITORING EVENT 3) 10/22/99 JAL



Chemical	Risk-Based Target Level (ug/L)
Explosives	
1,3,5-Trinitrobenzene	1.8
2,4,6-Trinitrotoluene (TNT)	2.2
HMX	1800
4-Amino-2,6-dinitrotoluene	--
2-Amino-4,6-dinitrotoluene	--
RDX	0.61
TNX	--
MNX	--
Nitrocellulose	--
Metals	
Arsenic	2
Barium	3.9
Chromium (Total)	10
Iron	300
Manganese	50
Mercury	1.3
Selenium	5
Zinc	100
Volatile Organics	
1,2-Dichloroethane	1
Carbon tetrachloride	0.17
Chloroform	0.16
cis-1,2-Dichloroethene	61
trans-1,2-Dichloroethene	100
Trichloroethene	1.6
Vinyl Chloride	2

DRAWN BY J. LAMEY	DATE 10/6/99	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7640 / OWNER NUMBER —
CHECKED BY —	DATE —	AMMUNITION BURNING GROUND SURROUNDING AREAS POSITIVE DETECTIONS - ORGANIC PARAMETERS AND TOTAL METALS MONITORING EVENT 3 NSWC CRANE, INDIANA	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 / REV 0

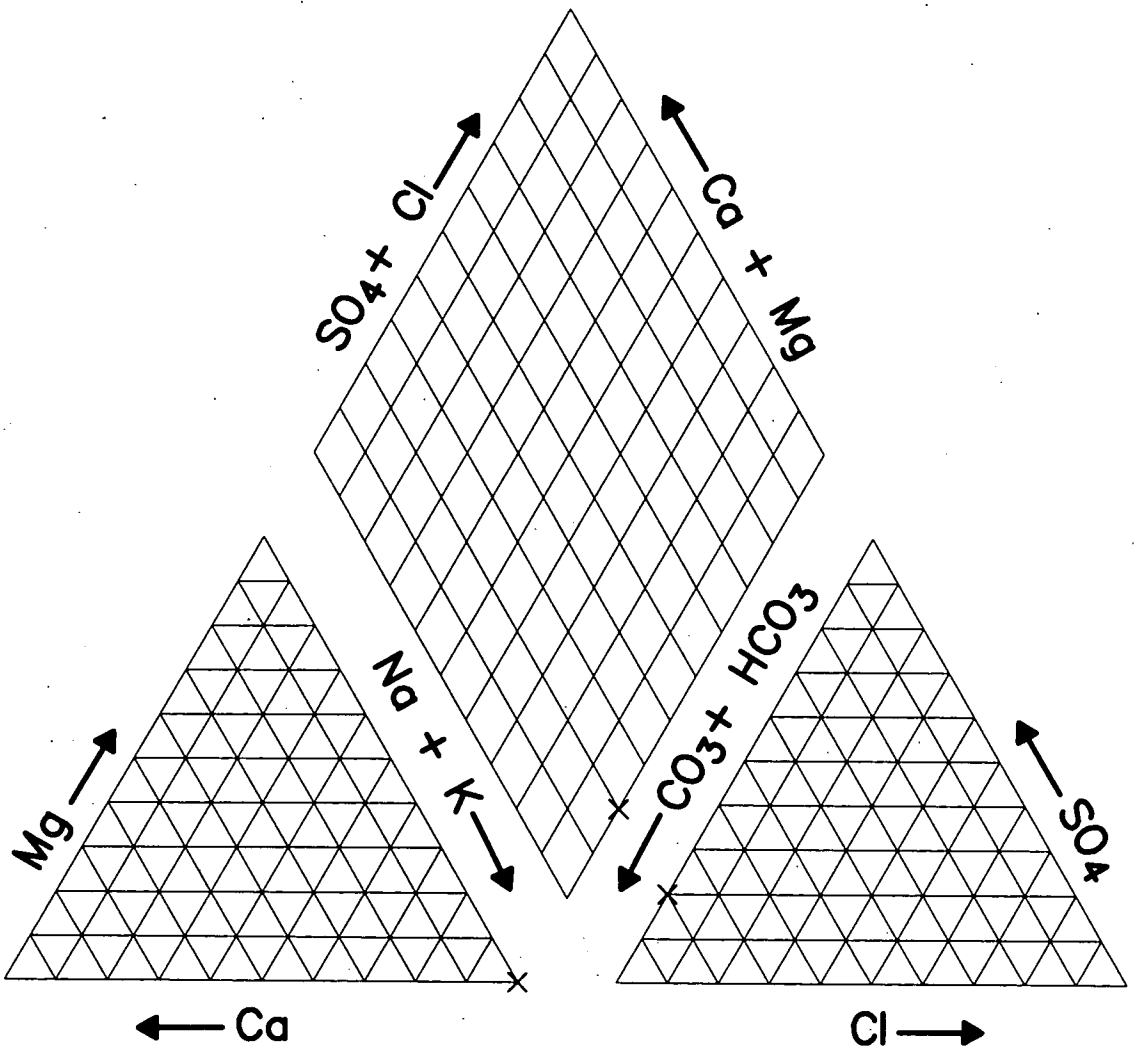
ACAD: 7651KD03.dwg 10/28/99 HJP



DRAWN BY HJP DATE 10/4/99		PIPER DIAGRAM OF WATER CHEMISTRY ANALYSIS BEECH CREEK AQUIFER WELLS AMMUNITION BURNING GROUNDS MAY 17–26, 1999 NSWC CRANE, INDIANA	CONTRACT NO. 7651
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED–AREA			APPROVED BY DATE
SCALE NOT TO SCALE			DRAWING NO. FIGURE 5 / REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

ACAD:7651KD04.dwg 10/28/99 HJP



DRAWN BY HJP DATE 10/7/99		PIPER DIAGRAM OF WATER CHEMISTRY ANALYSIS BEAVER BEND AQUIFER WELLS AMMUNITION BURNING GROUNDS MAY 17–26, 1999 NSWC CRANE, INDIANA	CONTRACT NO. 7651
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED–AREA			APPROVED BY DATE
SCALE NOT TO SCALE			DRAWING NO. FIGURE 6 / REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

ATTACHMENT 1

SUMMARY OF FIELD ACTIVITIES
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

NSWC CRANE, IN
CTO 38
SUMMARY OF FIELD ACTIVITIES
MAY 17, 1999 THROUGH MAY 26, 1999

The following is a summary of field activities conducted for RCRA Monitoring Event #3 from May 17, 1999 through May 26 1999, during one 10-day work shift, at the NSWC Crane facility, Crane, Indiana. RCRA Monitoring Event #3 sampling was completed for all monitoring points at the Ammunition Burning Grounds (ABG). Field chemical analysis was also completed, on-site, for all monitoring points. Monitoring Event #3 sampling was conducted following the May 1999 Field Sampling Plan (FSP).

Monitoring Point Sampling:
Monitoring Event #3 sampling was completed for all monitoring wells and surface water points (18 wells, 2 surface waters, and 2 spring waters) at the ABG. All samples to be analyzed at a fixed base laboratory were shipped, via over-night courier, to Laucks Testing Laboratory, Inc., and Microseeps, Inc. Field chemical analysis for various parameters (see FSP Table 4-2 and FSP Appendix D 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 the table below for a list of monitoring points and dates sampled.

- **TtNUS personnel on site:**
  Keith Simpson, Scott Neil, and Fred Ramser

- **Navy SDIV personnel on site:**
  E. P. Johns, May 25, 1999 (Observing low-flow sampling, field chemical analysis and sample handling and packaging)

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

The following table lists monitoring point sample dates and quality control (QC) samples taken.

SITE	MONITORING POINT	SAMPLE DATE	QC SAMPLES
ABG	3B02	5/18/99	
ABG	3B04	5/17/99	
ABG	3C02P2	5/19/99	DUPLICATE
ABG	3C03	5/18/99	
ABG	3C04	5/21-23/99	
ABG	3C07	5/19/99	
ABG	3C08P2	5/24/99	
ABG	3C09P2	5/19/99	
ABG	3C10	5/22/99	
ABG	3C11	5/21/99	
ABG	3C12	5/22/99	
ABG	3C15	5/23/99	DUP & MS/MSD
ABG	3C17	5/18/99	
ABG	3C20	5/22/99	
ABG	3C25	5/25/99	
ABG	3C26	5/23/99	
ABG	3C27	5/24/99	
ABG	3C30	5/24/99	
ABG	CRA	5/20/99	
ABG	CRB	5/20/99	
ABG	SPA	5/20/99	DUP & MS/MSD
ABG	SPC	5/20/99	

Note: An ambient blank (AB05199901) was taken at the ABG on 5/19/99.

ATTACHMENT 2

MONITORING WELL INSPECTION FORMS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION FORM

Well ID: 3-B02-86

Time: 1332 **Date:** 5.17.99 **Inspector's Name:** R. 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	✓		NEWER PAD
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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) R. 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: 3-B04-86

Time: 1337 **Date:** 5-17-99 **Inspector's Name:** R. 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	✓		NEWER PAD
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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) R. 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: 3-C2P2-86

Time: 1421 **Date:** 5-17-99 **Inspector's Name:** K. 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...	✓		I U TRANSDUCER IN WELL
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: 3.C3.86

Time: 1531 **Date:** 5.17.99 **Inspector's Name:** K. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. E. 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: 03-C04

Time: 0848 **Date:** 5-18-99 **Inspector's Name:** R. 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...	✓		
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: 03-C07

Time: 0855 **Date:** 5-18-99 **Inspector's Name:** R. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) R. E. 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: 3·CEP2·86

Time: 1502 **Date:** 5·17·99 **Inspector's Name:** K. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) Kirt E. 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: 3-C9P2-86

Time: 1526 **Date:** 1526 **Inspector's Name:** R. 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...	✓		IU TRANSDUCER IN WELL
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) R. 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: 3·C10·86

Time: 1523 **Date:** 5·17·99 **Inspector's Name:** K. 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...	✓		
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: 3.C1.86

Time: 1456 **Date:** 5.17.99 **Inspector's Name:** K. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. E. 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: 3.C12.86

Time: 1452 **Date:** 5.17.99 **Inspector's Name:** R. 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...	✓		1 4 TRANSDUCER IN WELL
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: 3.C15.86

Time: 1514 **Date:** 5.17.99 **Inspector's Name:** K. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. S. 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: 3 C17 86

Time: 1312 **Date:** 5.17.99 **Inspector's Name:** K. 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...	✓		
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: 3 · C20 · 86

Time: 1510 **Date:** 5·17·99 **Inspector's Name:** K. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. E. Simpson

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

NSWC Crane
Field Form
Revision: 0
January 1999

3-C25-86

MONITORING WELL INSPECTION FORM

Well ID: ~~3-C25~~

Time: 1400 **Date:** 5.17.99 **Inspector's Name:** K. 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...	✓		
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: 03-C26~~8~~KS

Time: 0900 **Date:** 5.19.99 **Inspector's Name:** K. 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...	✓		
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

3.C27.86

Well ID: 3 Q7.86

Time: 1427 **Date:** 5.17.99 **Inspector's Name:** K. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. S. 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: 3-C30-86

Time: 1258 **Date:** 5-17-99 **Inspector's Name:** K. 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...	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) K. S. Simpson

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

ATTACHMENT 3

WATER LEVEL MEASUREMENT FORMS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

NSWC Crane
Field Form
Revision: 0
January 1999

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: SUNNY 83°F

Project No.: CTO 38 7651
Personnel: K. SIMPSON, F. RAMSER
Measuring Device: M SCOPE
Remarks: NYS 0001

Well ID	Date	Time	Water Level *	Thickness of Free Product *	PID Reading ppm RP	PID Reading ppm BZ	Comments
3-C30-86	5-17-99	1258	223.46	—	248	0	
3-C17-86		1312	138.09	—	0	0	
3-B02-86		1332	5.91	—	262	0	
3-B04-86		1337	6.71	—	213	0	
3-C25-86		1400	46.85	—	137	0	
3-C2P2-86		1421	37.44	—	0	0	
3-C27-86		1427	60.76	—	120	0	
3-C12-86		1452	41.83	—	0	0	
3-C11-86		1456	44.38	—	197	0	
3-C8P2-86		1502	74.76	—	206	0	
3-C20-86		1510	89.49	—	235	0	
3-C15-86		1514	64.61	—	159	0	

* All measurements to the nearest 0.01 foot

Signature(s): K. S. Simpson 5-17-99

HEAVY RAIN OVERNIGHT
REDO ALL WL 5-18-99

NSWC Crane
Field Form
Revision: 0
January 1999

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: SUNNY 83°F

Project No.: CTO 38 7651
Personnel: K. SIMPSON, F. RAMSER
Measuring Device: M SCOPE
Remarks: NUS 0001

Well ID	Date	Time	Water Level *	Thickness of Free Product *	PID Reading ppm RP	PID Reading ppm BZ	Comments
3-C10-86	5-17-99	1523	50.08	—	170	0	
3-C9P2-86	↓	1526	45.38	—	0	0	
3-C3-86	↓	1531	87.78	—	110	0	
	5-18-99						

* All measurements to the nearest 0.01 foot

Signature(s): K. S. Simpson

HEAVY RAIN OVERNITE
REDO ALL WL ON 5-18-99

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: RAIN 65°F

Project No.: CTO 38 7651
Personnel: K. SIMPSON, F. RAMSER
Measuring Device: HERON NY 10818
Remarks:

Well ID	Date	Time	Water Level *	Thickness of Free Product *	PID Reading ppm RP	PID Reading ppm BZ	Comments
03-C04	5.18.99	0848	76.14	—	0	0	
03-C07		0855	78.99	—	0	0	
03-C26		0900	82.80	—	1.3	0	
03-C2P2		0907	37.34	—	0	0	
03-C27		0910	60.75	—	0.9	0	
03-C12		0917	41.85	—	0	0	
03-C11		0920	44.44	—	0	0	
03-C8P2		0925	74.88	—	0.5	0	
03-C20		0930	89.63	—	0.3	0	
03-C15		0947	64.76	—	0.6	0	
03-C10		1000	50.21	—	2.7	0	
03-C9P2		1006	45.53	—	0.2	0	

* All measurements to the nearest 0.01 foot

Signature(s): [illegible]

NSWC Crane
Field Form
Revision: 0
January 1999

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: RAIN 65°F

Project No.: CTO 38 7651
Personnel: K. SIMPSON, FRED RAMSER
Measuring Device: HERON NU10818
Remarks:

Well ID	Date	Time	Water Level *	Thickness of Free Product *	PID Reading ppm RP	PID Reading ppm BZ	Comments
03-C03	5.18.99	0840	87.81	—	0	0	PRIOR TO SCOTT START SAMPLING
03-B02		1025	5.33	—	0	0	
03-B04		1030	6.52	—	0.6	0	SAMPLED 5.17.99 6.71 ON 5.17.99
03-C25		1054	46.97	—	0	0	
03-C17		1129	138.22	—	0	0	
03-C30		1140	223.51	—	0	0	

* All measurements to the nearest 0.01 foot

Signature(s): [illegible]

5.18.99

		WL	
03-C14	0936	85.31	
03-C21	0942	85.34	
03-C01	0955	115.24	NOT ON LIST

TO SCOTT NEIL

ATTACHMENT 4

LOW FLOW PURGE DATA FORMS/GROUND WATER SAMPLE LOG FORMS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AB022A99
Sample Location: 03B02
Sampled By: J. NAIL
C.O.C. No.:

SAMPLING DATA:

Date: 5/18/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1835 End: 2000	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.21	0.343	12.5	8	0.84	-125.9	None

PURGE DATA:

Date: 5/18/99	Total Well Depth (TD): 18.6 FT.	End Purge (hrs): 1920
Method: Dedicated Bladder Pump	Static Water Level (WL): 5.35 FT	Total Purge Time (min): 95
Well Casing: 2" PVC	Start Purge (hrs) SN ~~1545~~ 1645	Total Vol. Purged (gal): 3.2 gallons
One Casing Volume(gal): 2.2 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1835
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1838
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1842
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1846
Explosives (Subsets A~~&~~ B) SN	4°C/Dark	(2) 1000 mL Amber Glass	1854, 1901
Explosives (~~Subsets B~~) Nitrate & Pic. Acid	4°C/Dark SN	~~(2) 500 mL~~ Amber Glass (3) 1000 mL	SN ~~1901~~ 1909, 1917, 1925
Total Metals (Subsets A & B) & D	HNO_3/4°C	(1) 1000 mL Polyethylene	1933
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000 mL	1940
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1946
Chloride & Sulfate	4°C SN	(1) ~~500 mL~~ Polyethylene 1000 mL	1947
Total Phosphorus	H_2SO_4/4°C SN	(1) ~~500 mL~~ Polyethylene 1000 mL	1955
Dissolved Phosphorus	H_2SO_4/4°C/Filtered SN	(1) ~~500 mL~~ Polyethylene 1000 mL	2002
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	2009
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		

OBSERVATIONS / NOTES:

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

Reaction of sample to preservative: Cyanide turned bluish-green.

Sulfide @ well head = 0.03 mg/L
CH4Mets @ well head = 0.4 mg/L D.O.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): [signature]

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: ABG - 03B02
DATE: 5/18/99

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
1645 ~~1545~~	5.35							→	Start purging
1650 ~~1550~~	5.46	128	7.15	0.651	467	1.66	13.8	-107.0	Water is brown.
1700	5.48	128	7.21	0.366	204	0.67	13.1	-138.4	" " light brown.
1710	5.51	128	7.24	0.363	110	1.02	12.9	-138.7	Water is clearing.
1720	5.52	128	7.23	0.359	50	0.77	12.8	-135.8	
1730	5.54	128	7.26	0.353	34	6.50	12.8	-139.6	
1740	5.54	128	7.24	0.352	32	1.33	12.9	-137.1	
1750	5.54	128	7.25	0.348	16	9.51	12.7	-136.6	
1800	5.54	128	7.24	0.346	10	0.70	12.5	-143.5	
1805	5.56	128	7.23	0.345	12	0.88	12.5	-131.2	
1810	5.55	128	7.21	0.345	8	0.98	12.5	-130.1	
1815	5.55	128	7.23	0.344	7	0.85	12.5	-133.8	
1820	5.56	128	7.21	0.343	8	0.84	12.5	-125.9	End purging. Purged extra volume due to unstable parameters.

SIGNATURE(S): Scott W. Neil

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AB042A99
Sample Location: 03A04
Sampled By: S. NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 5/17/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1646 End: 1820	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	6.98	0.198	12.8	6	0.97	-81.5	None

PURGE DATA:

Date: 5/17/99	Total Well Depth (TD): 16.80 FT	End Purge (hrs): 1640
Method: Dedicated Bladder Pump	Static Water Level (WL): 6.74 FT	Total Purge Time (min): 80
Well Casing: 2" PVC	Start Purge (hrs): 1520	Total Vol. Purged (gal): 4.3 gallons
One Casing Volume(gal): 1.6 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1646
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1650
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1653
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1700
Explosives (Subsets A)	4°C/Dark	(3) ~~2~~ 1000 mL Amber Glass	1706, 1712, 1717
Explosives (Subsets B)	4°C/Dark	(SW) (2) ~~500~~ mL Amber Glass (D) 1000 mL	1723, 1728
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1736
Cyanide	NaOH/4°C	(SW) (1) ~~500 mL~~ Polyethylene 1000 mL	1743
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1750
Chloride & Sulfate	4°C	(SW) (1) ~~500 mL~~ Polyethylene 1000 mL	1753
Total Phosphorus	H_2SO_4/4°C	(SW) (1) ~~500 mL~~ Polyethylene 1000 mL	1759
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(SW) (1) ~~500 mL~~ Polyethylene 1000 mL	1806
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1812
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1820

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 213 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: CN^- turned light brown.

Sulfide @ well head = 0.00 mg/L

QA Samples Collected:

MS/MSD: /
Duplicate ID No.: /

Signature(s): Scott W. Neil

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: N7651 / CC038

WELL ID.: ABG - 03B04
DATE: 5/17/99

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
1520	6.74							→	Begin purging
1525	6.81	120	6.88	0.466	468	6.95	15.2	-30.9	water is yellowish - brown.
1530	6.81	144	6.88	0.196	183	5.56	14.1	-49.2	Clearing
1540	6.81	144	6.89	0.201	38	6.89	14.5	-59.3	Clear
1550	6.83	144	6.91	0.189	27	3.10	14.1	-65.1	↓
1600	6.81	144	6.95	0.191	140	1.81	13.9	-73.8	Cleaned turbidity probe
1610	6.82	180	6.97	0.192	8	1.75	13.7	-69.6	Clear
1620	6.82	180	6.97	0.194	7	1.15	12.9	-76.4	
1625	6.82	180	6.97	0.196	6	1.22	12.8	-77.9	
1630	6.83	180	6.97	0.195	6	0.91	12.9	-78.6	
1635	6.82	180	6.98	0.197	5	0.92	13.0	-80.8	
1640	6.82	180	6.98	0.198	6	0.97	12.8	-81.5	↓ End purging

SIGNATURE(S): Scott W. Neil

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC02P22AG9
Sample Location: ARG-03C02P2
Sampled By: S. NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 5/19/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1618 End: 1810	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.12	0.494	13.2	7	13.66	142.0	None

PURGE DATA:

Date: 5/19/99	Total Well Depth (TD): 50.9 FT	End Purge (hrs): 1610
Method: Dedicated Bladder Pump	Static Water Level (WL): 37.35 FT.	Total Purge Time (min): 80
Well Casing: 2" PVC	Start Purge (hrs): 1450	Total Vol. Purged (gal): 3.6 gallons
One Casing Volume(gal): 2.2 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1618
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1621
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1634, 1644, 1655
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1704
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1715
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1724
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1726
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1739
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene 1000mL	1749
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1759
Field test	Alkalinity, see SOP 7		1810

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 2.4 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

~~Explosive~~ Explosive activities taking place during purging. (SN)

Indiana University transducer in well.

Reaction of sample to preservative: None.

Titrets for Alkalinity = 138 mg/L
Titrets for CO_2 = 109 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	FD05199901

Signature(s): Scott W. Neil

LOW FLOW PURGE DATA FORM

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

WELL ID.: 03C02P2 (ABG)
DATE: 5/19/99

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	37.35	—							Begin purging
1500	37.36	161	7.04	0.603	23	11.56	14.9	79.2	
1510	37.35	170	6.99	0.506	11	12.35	14.0	116.9	
1520	37.35	170	7.04	0.501	8	14.15	13.8	105.2	
1530	37.35	170	7.09	0.498	8	13.21	13.5	99.9	
1540	37.35	170	7.12	0.495	7	11.99	13.4	128.9	
1550	37.35	170	7.10	0.495	7	13.60	13.2	141.6	
1600	37.36	170	7.09	0.495	9	13.41	13.2	143.4	
1610	37.36	170	7.12	0.494	7	13.66	13.2	142.0	End purging

SIGNATURE(S): Scott W. [illegible]

PAGE 2 **OF** ___

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC032A99
Sample Location: 03C03
Sampled By: S. NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 5/18/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1230 End: 1348	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	9.24	0.901	15.7	3	1.11	54.1	None

PURGE DATA:

Date: 5/18/99	Total Well Depth (TD): 152.7 FT.	End Purge (hrs): 1226
Method: Dedicated Bladder Pump	Static Water Level (WL): 87.81 FT.	Total Purge Time (min): 196 min (222 min @ well)
Well Casing: 2" PVC	Start Purge (hrs): 0844	Total Vol. Purged (gal): 10.6 gallons
One Casing Volume(gal): 10.6 gal		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1230
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1234
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1237
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1241
Explosives (Subsets A+B) SN	4°C/Dark	(2) 1000 mL Amber Glass	1246, 1251
Explosives ~~(Subsets B)~~ Picric Acid + Nitro.	4°C/Dark SN	(2) ~~500 mL~~ Amber Glass (3) 1000 mL	1256, 1302, 1308
Total Metals (Subsets A & B) + D	HNO_3/4°C	(1) 1000 mL Polyethylene	1312
Cyanide	NaOH/4°C SN	(1) ~~500 mL~~ Polyethylene 1000 mL	1318
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1323
Chloride & Sulfate	4°C SN	(1) ~~500 mL~~ Polyethylene 1000 mL	1325
Total Phosphorus	H_2SO_4/4°C SN	(1) ~~500 mL~~ Polyethylene 1000 mL	1331
Dissolved Phosphorus	H_2SO_4/4°C/Filtered SN	(1) ~~500 mL~~ Polyethylene 1000 mL	1337
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1342
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1348

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 120 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

Titrets @ well head
CO_2 = 100 mg/L
ALK = 92 mg/L

Chemets @ well head = 1.1 mg/L
Sulfide @ well head = 0.00 mg/L

QA Samples Collected:

MS/MSD | Duplicate ID No.:

Signature(s): [signature]

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651/C00 38
WELL ID.: 03C03 (ABG)
DATE: 5/18/99

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	
0844	87.81							→	Begin purging.	665
0849	87.82	133	9.33	1.056	31	3.25	14.9	144.1	Increase flow rate.	1600
0859	87.84	160	9.32	0.904	14	1.59	15.0	125.5	Increase flow rate.	
0909	87.84	184	9.30	0.898	17	2.16	14.8	122.3		
0919	87.83	184	9.30	0.897	5	2.10	15.0	110.9		
0929	87.83	184	9.31	0.894	9	2.18	15.0	105.8	Increase flow rate.	5520
0939	87.84	225 ~~205~~	9.31	0.894	28	2.41	14.8	103.7	Decrease flow rate-higher turbidity.	2250 60035
0949	87.84	209	9.31	0.899	6	1.26	14.7	99.4		
0959	87.84	209	9.31	0.900	2	2.16	15.0	92.3		
1009	87.84	209	9.30	0.903	4	2.76	15.2	84.7	Increase flow rate.	16305
1019	87.84	225	9.28	0.895	3	0.79	14.9	81.5		
1029	87.84	225	9.29	0.898	5	1.08	14.9	80.3		
1039	87.84	225	9.29	0.899	6	1.05	15.1	75.3		
1049	87.85	225	9.28	0.902	2	1.17	15.4	63.8		
1059	87.85	225	9.28	0.898	2	1.11	15.5	61.1		
1105								→	Purging stopped due to burning near well.	
1131	~~87.84~~							→	Restart purging.	27555.
1141	87.85	229	9.28	0.910	4	2.26	15.6	117.8		
1151	87.86	229	9.26	0.902	4	1.43	15.6	99.5		
1201	87.86	229	9.26	0.901	3	1.60	15.7	83.1		
1211	87.86	229	9.25	0.901	3	1.21	15.8	70.9		
1221	87.86	229	9.25	0.898	2	1.14	15.6	56.9		
1226	87.86	229	9.24	0.901	3	1.11	15.7	54.1	End of purging.	

SIGNATURE(S): Scott W. [illegible]

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC042A99
Sample Location: 03C04
Sampled By: FLR
C.O.C. No.:

SAMPLING DATA:

Date: 5-21 thru 5-23-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 946 End: 1720	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.26	1.657	18.05	5.0	2.60	-35.7	NONE

PURGE DATA:

Date: 5-21-99	Total Well Depth (TD): 86.6'	End Purge (hrs): 0945
Method: Dedicated Bladder Pump	Static Water Level (WL): 76.14'	Total Purge Time (min): 54 min
Well Casing: 2" PVC	Start Purge (hrs): 856	Total Vol. Purged (gal): ~3.2 l
One Casing Volume(gal): (6.2 l)		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials		0845 5-22-99
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials		0855 5-22-99
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene		1020 5-21-99
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	500 ml	0915 5-22-99
Explosives (Subsets A) + B	4°C/Dark	(2) 1000 mL Amber Glass		0940, 0955 1010 5-22-99
Explosives (Subsets B) PICRICACID + NC	4°C/Dark	(2) 500 mL Amber Glass		1030 (5-22-99) 1740 5-22
Total Metals (Subsets A & B) + D	HNO_3/4°C	(1) 1000 mL Polyethylene	500 ml	1750 5-22-99
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	600 ml	1810 5-22-99
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass		1815 5-22-99
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	300 ml	1100 5-21-99
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	300 ml	1640 5-23-99
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	300 ml	1700 5-23-99
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	500 ml	1720 5-23-99
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		500 ml	1000 5-21-99

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = >2000 * (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

* HIGH HUMIDITY

5-22-99 SWL = 77.16
5-22-99 SAMPLED DRY WL BELOW 79.9'

1ST DISCH. VOL = ~80 ml
2ND " " = 160 ml
3rd " = 120 ml
AVE = 120 ml

5-22-99 1700 HR WL = 78.5

5-23-99 1630 HR WL = 78.2

Reaction of sample to preservative: NONE
0915 HRS
SULFIDE TEST @ WELL RESULTS 0.00 mg/l

QA Samples Collected:

MS/MSD —
Duplicate ID No.: —

Signature(s): JWanser

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.: AC042A99 (SAMPLE ID) 03C04 (LOC)
DATE: 5-21-99

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
853	76.14								STATIC WATER LEVEL
8:25	77.67	60ml	7.27	1.732	18.7	3.00	18.22	-49.4	
935	78.00	"	7.26	1.657	16.1	2.68	17.97	-43.8	
945	78.55	"	7.26	1.657	5.0	2.60	18.05	-35.7	
946		BEGIN TO FILL NA CONTAINERS							
1100		FINNISH FILLING, NA, SULFIDE AND CHLORIDE & SULPHATE							WL @ 79.31

SIGNATURE(S): Fred M Ramser

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC072A99
Sample Location: 03C07
Sampled By: PWR
C.O.C. No.:

SAMPLING DATA:

Date: 5-19-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1430 End: 1737	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.28	0.846	18.32	4.0	2.02	183.2	NONE

PURGE DATA:

Date: 5-19-99	Total Well Depth (TD): 102.1'	End Purge (hrs): 1325
Method: Dedicated Bladder Pump	Static Water Level (WL): 79.13	Total Purge Time (min): 245
Well Casing: 2" PVC	Start Purge (hrs): 0920	Total Vol. Purged (gal): ~14.7 l
One Casing Volume(gal): 3.6		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1425
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1428
Explosives (Subset A) + NC	4°C/Dark	(3) 1000 mL Amber Glass	1511, ~~1436~~, ~~1442~~, 1455
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	~~1515~~ 1545
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1602
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1605
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1621
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1637
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1658
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1721
Field test	Alkalinity, see SOP 7		1737

1528

OBSERVATIONS / NOTES:

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

1) START PUMP @ 0920 w/FLOW = 140

BLADDER VOL = ~~165~~ 155 ml

Reaction of sample to preservative: NONE

2) ESTABLISHED FLOW @ 62 ml/min @ 0925
LOWERED FLOW TO 60 ml/min @ 0943

3) 13.5 l per casing vol
~225 min > @ 1305 HRS
WILL REACH 1 CASE VOL

QA Samples Collected:

MS/MSD — Duplicate ID No.:

Signature(s): Fred M Ramser

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651
WELL ID.: 03C007
DATE: 5-19-99

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
0915	79.13	—	—	—	—	—	—	—	STATIC WATER LEVEL
0945	79.50	60ml/	7.33	1.038	111.2	5.01	16.79	193	
0955	79.50	"	7.31	0.904	144.4*	6.53	16.60	150.7	*TURB VALUE HIGHER THAN EXPECTED
1005	79.53	"	7.32	0.966	2.4	4.89	16.74	162.2	CLEANED TURB PROB/W DI AND WIPE
1015	79.50	"	7.32	0.913	2.0	4.33	17.06	160.5	CLEAN.
1025	79.52	"	7.31	0.907	2.1	4.47	17.27	182.2	
1035	79.50	"	7.31	0.891	2.0	3.53	17.43	189.0	
1045	79.50	"	7.31	0.882	1.5	3.58	17.40	184.2	
1055	79.50	"	7.30	0.878	1.4	3.51	17.26	190.9	
1105	79.50	"	7.31	0.872	1.4	3.56	17.40	176.9	
1115	79.50	"	7.30	0.865	1.4	3.45	17.26	182.9	
1125	79.49	"	7.30	0.862	1.4	3.40	17.26	185.6	
1135	79.49	"	7.30	0.861	1.4	4.00	17.48	185.7	
1145	79.45	"	7.31	0.839	2.0	3.76	17.52	181.2	
1155	79.45	"	7.31	0.843	2.0	4.00	17.62	186.6	
1205	79.43	"	7.31	0.825	2.0	3.78	17.68	185.8	
1215	79.43	"	7.31	0.834	1.8	4.12	17.69	179.9	
1225	79.43	"	7.31	0.816	1.7	4.02	17.75	183.9	
1235	79.43	"	7.31	0.808	1.6	3.89	17.82	185.3	
1245	79.42	"	7.29	0.819	1.6	3.44	18.01	189.4	
1255	79.42	"	7.30	0.789	4.0	2.98	17.97	185.2	EXCESS BUBBLES IN LINE REMOVED
1305	79.42	"	7.29	0.852	4.0	2.41	18.25	188.0	
1315	79.43	"	7.28	0.849	4.0	1.98	18.04	187.6	
1325	79.43		7.28	0.846	4.0	2.02	18.32	183.2	
1410	START COLLECTING SAMPLE(S) (FILLING CONTAINERS)								
1737	FINNISH COLLECTING SAMPLES)								

SIGNATURE(S): Fred U Ramer

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC08P22A99
Sample Location: ABG-03C08P2
Sampled By: S. NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 5/24/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1710 End: 1845	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.34	0.875	16.4	1	6.74	169.0	None

PURGE DATA:

Date: 5/24/99	Total Well Depth (TD): 103.5 FT.	End Purge (hrs): 1705
Method: Dedicated Bladder Pump	Static Water Level (WL): 74.61 FT	Total Purge Time (min): 240 *
Well Casing: 2" PVC	Start Purge (hrs): 1305	Total Vol. Purged (gal): 3.5 gallons **
One Casing Volume(gal): 4.7 gal		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1710
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass (500 mL)	1711
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1739, 1718, 1729,
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1749 ~~1724~~
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene (1000 mL)	1800
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1809
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene (1000 mL)	1810
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene (1000 mL)	1818
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene (1000 mL)	1827
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1835
Field test	Alkalinity, see SOP 7		

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0.5 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Titrets at wellhead:
CO_2 = 23 mg/L
Alkalinity = 215 mg/L

Reaction of sample to preservative:

* Purged well for 4 hours. ** Total volume purged is less than one casing volume; FSP states sampling should begin after 4 hours of purging, if (SN) although parameters / volume have not been satisfied.

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): [signature]

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651 / CTO 38
WELL ID.: 03C08P2 (ABG)
DATE: 3/24/99

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		
1305	74.61		7.51						Begin purging		
1315	74.93	70	7.45	1.660	37	7.93	16.1	159.5	Decrease flow rate.	700	
1325	75.13	60	7.45	1.092	1	7.21	15.7	153.3	Decrease flow rate.	600	
1335	75.16	56	7.43	0.951	0	7.11	16.2	152.2	water is clear.		
1345	75.20	56	7.44	0.941	0	6.45	15.8	153.0			
1355	75.24	56	7.45	0.929	3	7.22	16.4	156.6			
1405	75.31	56	7.44	0.922	0	7.52	16.0	158.6	Decrease flow rate.	2240	3540
1415	75.32	53	7.42	0.915	1	7.26	16.2	158.2	water is clear.		
1425	75.34	53	7.40	0.910	1	7.49	16.3	158.7			
1435	75.34	53	7.39	0.902	0	7.09	15.7	160.9			
1445	75.34	53	7.38	0.900	5	7.43	15.7	160.9			
1455	75.34	53	7.39	0.912	2	7.93	16.6	158.7			
1505	75.34	53	7.38	0.901	0	7.67	16.0	160.6			
1515	75.32	53	7.38	0.893	2	7.74	16.1	163.5			
1525	75.33	53	7.37	0.893	2	7.92	15.8	162.4			
1535	75.33	53	7.37	0.890	0	8.21	15.8	162.1			
1545	75.33	53	7.37	0.877	0	7.89	17.5	163.9			
1555	75.33	53	7.38	0.879	2	8.21	17.6	164.0			
1605	75.34	53	7.36	0.873	1	7.41	17.4	163.8			
1615	75.34	53	7.35	0.869	1	7.32	17.0	161.5			
1625	75.33	53	7.35	0.867	0	7.57	17.3	164.5			
1635	75.33	53	7.33	0.861	0	7.12	16.5	166.5			
1645	75.33	53	7.33	0.864	2	7.19	16.6	166.8			
1655	75.33	53	7.32	0.863	0	7.08	16.4	165.8			
1705	75.33	53	7.34	0.875	1	6.74	16.4	169.0	End purging after ~~FSP~~ per FSP.		

SIGNATURE(S): Scott A. Reid

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC09P22A99
Sample Location: ABG-03C09P2
Sampled By: S. NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 5/19/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1100 End: 1212	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	6.84	0.492	16.0	9	8.81	133.2	None

PURGE DATA:

Date: 5/19/99	Total Well Depth (TD): 74.4 Ft.	End Purge (hrs): 1255
Method: Dedicated Bladder Pump	Static Water Level (WL): 45.66 Ft.	Total Purge Time (min): 120
Well Casing: 2" PVC	Start Purge (hrs): 0855	Total Vol. Purged (gal): 5.3 gallons
One Casing Volume(gal): 4.7 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1100
TOX	H_2SO_4/4°C (SN)	(1) ~~1000 mL~~ Amber Glass 500mL	1103
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1107, 1114, 1121
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1127
Cyanide	NaOH/4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000mL	1134
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1144
Chloride & Sulfate	4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000mL	1145
Total Phosphorus	H_2SO_4/4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000mL	1151
Dissolved Phosphorus	H_2SO_4/4°C/Filtered (SN)	(1) ~~500 mL~~ Polyethylene 1000mL	1158
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1204
Field test	Alkalinity, see SOP 7		

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0.2 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

Indiana University transducer in well.
Titrets @ well head for Alkalinity = 114 mg/L

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 / CTO 38
WELL ID.: 03C09P2 - ABG
DATE: 5/19/99

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	
0855	~~46~~ (IN) 45.66							→	Start purging	
0900	45.67	143	6.90	0.771	23	8.19	15.3	158.9	Increase flow rate.	715
0905	45.68	182	6.89	0.525	39	7.84	14.9	157.4		
0915	45.68	182	6.89	0.517	47	7.67	15.0	146.4		
0925	45.68	182	6.87	0.508	51	7.30	15.0	165.9		
0935	45.68	182	6.87	0.506	38	7.80	15.1	175.7		
0945	45.68	182	6.86	0.500	34	7.39	15.3	158.5		
0955	45.68	182	6.85	0.496	24	7.10	15.3	170.6		
1005	45.68	182	6.86	0.494	25	7.67	15.4	156.5		
1015	45.68	182	6.85	0.493	17	8.41	15.6	138.2	Decrease flowrate	13650
1025	45.68	147	6.85	0.491	12	8.68	15.9	130.1		
1035	45.68	147	6.85	0.491	11	8.77	16.3	120.5		
1040	45.68	147	6.84	0.491	10	8.72	15.9	127.4		
1045	45.68	147	6.83	0.496	7	8.83	16.0	128.4		
1050	45.68	147	6.82	0.492	9	8.63	15.9	155.6		5580
1055	45.68	147	6.84	0.492	9	8.81	16.0	133.2	End purging.	

SIGNATURE(S): Scott W. Neil

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC102A99
Sample Location: ABG-03C10
Sampled By: S. Neil
C.O.C. No.:

SAMPLING DATA:

Date: 5/22/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1200 End: 1327	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	6.65	0.506	16.3	0	3.08	214.6	None

PURGE DATA:

Date: 5/22/99	Total Well Depth (TD): 79.1 FT.	End Purge (hrs): 1155
Method: Dedicated Bladder Pump	Static Water Level (WL): 50.03 FT.	Total Purge Time (min): 190
Well Casing: 2" PVC	Start Purge (hrs): 0845	Total Vol. Purged (gal): 8.6 gallons - unstable turbidity readings
One Casing Volume(gal): 4.7 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1200
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1202
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1205
TOX	H_2SO_4/4°C (SN)	(1) ~~1000 mL~~ Amber Glass 500mL	1209
Explosives (Subsets A & B) (SN)	4°C/Dark	(2) 1000 mL Amber Glass	1214, 1220
Explosives (~~Subsets B~~) Nitro. + Pic. Acid	4°C/Dark (SN)	(~~2~~) ~~500 mL~~ Amber Glass (3) 1000 mL	1226, 1232, 1238
Total Metals (Subsets A & ~~B~~ D (SN)	HNO_3/4°C	(1) 1000 mL Polyethylene	1245
Cyanide	NaOH/4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000 mL	1251
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1257
Chloride & Sulfate	4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000 mL	1258
Total Phosphorus	H_2SO_4/4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000 mL	1305
Dissolved Phosphorus	H_2SO_4/4°C/Filtered (SN)	(1) ~~500 mL~~ Polyethylene 1000 mL	1314
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1320
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1327

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 2.7 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

Moderate rain showers begin at beginning of sampling (1200). Rain showers end @ 1212.

Sulfide at well head = 0.00 mg/L @ 1235
CHEMets DO @ wellhead = 2.7 mg/L @ 1320
Titrets at wellhead: CO_2 = 22 mg/L @ 1323
Alkalinity = 91 mg/L @ 1329

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.: 03C10 (ABG)
DATE: 5/22/99

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
0845	50.05								Begin purging. (Moderate rain
0855	50.08	168	6.63	0.734	7	4.45	15.8	202.2	water is clear showers)
0905	50.08	168	6.60	0.521	10	3.68	15.7	218.7	↓
0915	50.08	168	6.60	0.510	6	3.72	15.6	224.2	Increase flow.
0925	50.10	210	6.60	0.501	18	3.50	15.6	217.0	Decrease flow
0935	50.10	183	6.61	0.504	65	3.73	15.8	215.4	Decrease flow.
0945	50.09	168	6.61	0.507	61	4.09	16.1	220.1	Light sediment in cup.
0955	50.09	168	6.62	0.505	320	3.70	16.0	220.1	(Rain ends)
1005	50.10	168	6.63	0.504	131	3.97	16.0	221.0	↓
1015	50.10	168	6.63	0.505	249	4.15	16.0	224.6	Cleaned turbidity probe
1025	50.11	168	6.64	0.503	2	3.76	16.0	224.2	Sediment in cup.
1035	50.10	168	6.64	0.503	197	4.10	16.1	222.5	
1045	50.10	168	6.64	0.502	53	4.31	16.2	219.8	
1055	50.11	168	6.64	0.501	416	3.92	16.0	222.2	Cleaned turbidity probe
1105	50.11	168	6.64	0.501	57	3.83	15.9	224.3	
1115	50.11	168	6.65	0.500	404	3.32	16.1	222.8	Cleaned turbidity probe
1125	50.12	168	6.65	0.503	0	3.02	16.3	225.2	
1135	50.12	168	6.64	0.504	39	2.94	16.4	219.9	
1145	50.11	168	6.65	0.505	5	2.88	16.3	219.0	
1150	50.12	168	6.65	0.504	3	3.05	16.2	216.4	
1155	50.12	168	6.65	0.506	0	3.08	16.3	214.6	End purging.

SIGNATURE(S): Scott L. Neil

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC112A99
Sample Location: ABG - 03C11
Sampled By: S. Neil
C.O.C. No.:

SAMPLING DATA:

Date: 5/21/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1303 End: 1438	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	~~Clear~~ Cloudy	11.06	2.106	18.2	240	1.48	-110.8	None

PURGE DATA:

Date: 5/21/99	Total Well Depth (TD): 60.9 FT	End Purge (hrs): 1258
Method: Dedicated Bladder Pump	Static Water Level (WL): 44.39 FT	Total Purge Time (min): 240
Well Casing: 2" PVC	Start Purge (hrs): 0858	Total Vol. Purged (gal): 9.2 gallons
One Casing Volume(gal): 2.7 gal		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1303
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1305
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1307
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1309
Explosives (Subsets A & B)	4°C/Dark	(2) 1000 mL Amber Glass	1311, 1319
Explosives ~~(Subsets B)~~ Nitro + Pic Acid	4°C/Dark	(2) 500 mL Amber Glass	1326, 1332, 1340
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1347
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1353
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1400
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1402
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1410
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1420
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1428
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1438

OBSERVATIONS / NOTES:

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

Sulfide at wellhead = 0.38 mg/L
Chlorides at wellhead = 3 mg/L
Titrets for Alkalinity = 247 mg/L
Titrets for CO_2 = unreadable

Reaction of sample to preservative: None

Army Corps of Engineers filled in a 4" well (≈ 12 FT from 03C11) with grout from 1023 to 1039.

Water is cloudy/gray - parameters have not stabilized after 4 hours of purging - sampled per FSP.
Explosive activities ongoing during sampling

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott M. 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.: 03C11 (ABG)
DATE: 5/21/99

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	
0858	44.39								Begin purging	
0903	44.75	107	7.17	2.479	331	18.97	16.6	163.2	Decrease flow rate. Knock bubbles from cell.	575
0908	44.80	94	7.16	2.055	1	9.96	16.5	172.1		
0918	44.85	94	7.17	1.989	2	7.84	16.4	102.5		
0928	44.88	94	7.21	1.836	1	7.15	16.5	26.9		
0938	44.92	94	7.27	1.811	4	8.74	16.6	0.8		
0948	44.97	94	7.30	1.787	6	7.25	16.8	-15.2	Sun higher in the sky causing elevated	
0958	44.98	94	7.31	1.782	5	7.50	17.0	-22.8	temperature readings.	
1008	45.00	94	7.33	1.773	7	7.84	17.6	-31.5		
1018	45.03	94	7.33	1.769	3	6.59	17.6	-35.3		
1028	44.02	94	7.33	1.769	3	6.24	18.3	-37.0	Army Corps of Eng. abandoned a 4"	
1033	43.10	94	7.48	1.693	4	5.62	17.8	-61.0	well ≈ 12 feet from 03C11 -	8930
1038	41.90	124	7.55	1.674	6	4.78	16.9	75.3	began pouring grout into the	Increase flow.
1043	41.25	124	7.35	1.764	2	5.73	17.0	-53.7	hole at 1023.	Increase flow.
1048	41.23	149	7.23	1.829	5	5.77	16.9	-25.8		2418
1053	41.29	149	7.31	1.864	2	5.88	16.9	-13.1		
1058	41.28	149	7.51	1.922	44	5.85	16.8	-8.4		
1103	41.34	149	8.53	2.136	171	5.80	16.8	-22.9	Water is gray & cloudy.	
1108	42.80	149	11.46	2.748	258	4.77	17.5	-69.8	Decrease flow rate.	7450
1118	43.31	124	11.38	2.634	212	4.11	17.5	-67.1		
1128	43.37	124	10.85	1.182	182	5.97	18.0	-49.4		
1133	43.39	124	10.86	2.156	137	5.07	17.8	-54.9	Decrease flow rate.	3720
1138	43.80	107	10.95	2.161	140	5.03	17.8	-61.4		
1143	43.84	107	10.99	2.143	56	4.83	17.9	-63.0		
1148	43.85	107	11.00	2.140	97	4.22	17.9	-66.5	Cleaned turbidity probe due to	
1153	43.85	107	11.03	2.144	51	4.60	18.0	-63.7	cloudy water.	
1158	43.84	107	11.04	2.139	64	3.83	18.1	-69.3		

SIGNATURE(S): Scott W. Neo

PAGE 2 **OF** 3

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.: 03C11 (ABG)
DATE: 5/21/99

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
1208	43.90	107	11.03	2.127	88	3.33	17.9	-75.4	water is cloudy/gray.
1218	43.92	107	11.03	2.124	76	3.23	18.2	-78.2	
1228	43.96	107	11.01	2.109	58	2.65	18.0	-85.9	
1238	43.97	107	10.49	2.068	123	2.08	18.4	-92.6	
1248	44.00	107	10.95	2.068	138	1.75	18.2	-101.0	
1258	44.03	107	11.06	2.106	240	1.48	18.2	-110.8	End purging. Begin sampling after 4 hours of purging per FSP.

11770

SIGNATURE(S): Scott A. [illegible]

PAGE 3 **OF** 3

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC122A99
Sample Location: Ø3C12
Sampled By: K. SIMPSON, F. RAMSER
C.O.C. No.:

SAMPLING DATA:

Date: 5-22-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1255 End: 1637	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.30	0.620	17.4	5.8	8.56	194.2	NONE

PURGE DATA:

Date: 5-22-99	Total Well Depth (TD): 53.2	End Purge (hrs): 1250
Method: Dedicated Bladder Pump	Static Water Level (WL): 41.84	Total Purge Time (min): 110
Well Casing: 2" PVC	Start Purge (hrs): 1100	Total Vol. Purged (gal): ~8.8 l
One Casing Volume(gal): ~6.9 l		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1305
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1310
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1315
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass 500 ml	1325
Explosives (Subsets A) + B	4°C/Dark	(3) ~~(2)~~ 1000 mL Amber Glass	1345, 1355, ~~1410~~
Explosives (Subsets B) PICRIC ACID + NC	4°C/Dark	(3) ~~(2) 500 mL~~ Amber Glass	1410, 1430, 1445
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1515
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1 l	1525
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1530
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene 1 l	1545
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene 1 l	1602
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene 1 l	1622
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1637
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1500

OBSERVATIONS / NOTES:

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

BLADDER VOL = 140
DISCHARGE = 50 sec
REFILL = 50 sec
1) Q = 84 ml/min @ 1107 HRS
2) ADJ Q TO 80 ml/min @ 1140 HRS

Reaction of sample to preservative: NONE
SULFIDE = 0.00 AT FIELD/WELL HEAD.
AT WELL ~~HELL~~ HEAD DO = ~7 mg/l (CHEMets®)

WES WORKING ON WELL PAD (5.21.99) THIS WELL HAS A SHORT STICK-UP <1'. WES DUG AROUND WELL ≈ 3' Ø & ≈ 2' DEEP. "WORK IN PROGRESS". NO AFFECT ON SAMPLE

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser
K. E. Simpson

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.: 03C12
DATE: 5-22-98

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
1052	41.84	—	—	—	—	—	—	—	STATIC WATER LEVEL
1120	41.93	84	7.31	1.11	43.0	6.44	17.03	199.4	
1130	~~29~~ 42.0	84	7.32	0.721	8.8	6.86	16.97	172.0	
1140	42.6	80	7.33	0.687	3.9	7.23	16.9	173.7	
1150	42.13	↓	7.33	0.662	3.5	7.72	16.5	188.9	
1200	42.17		7.33	0.651	3	8.15	16.6	184.9	
1210	42.21		7.32	0.644	3	7.94	16.5	193.4	
1220	42.19		7.33	0.636	2	8.46	16.7	185.7	
1230	42.18		7.34	0.635	2	8.41	16.9	188.2	
1240	42.18		7.31	0.628	6.2	8.64	17.19	192.6	
1250	42.18	↓	7.30	0.620	5.8	8.56	17.42	199.2	

SIGNATURE(S): Fred M Rancer
K. S. Simpson

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC152A99
Sample Location: ABG-03C15
Sampled By: S. Neil
C.O.C. No.:

SAMPLING DATA:

Date: 5/23/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1000 End: 1207	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.19	0.781	13.6	1	1.84	-39.1	None

PURGE DATA:

Date: 5/23/99	Total Well Depth (TD): 102.6 FT.	End Purge (hrs): 0955
Method: Dedicated Bladder Pump	Static Water Level (WL): 64.59 FT.	Total Purge Time (min): 110
Well Casing: 2" PVC	Start Purge (hrs): 0805	Total Vol. Purged (gal): 67 gallons
One Casing Volume(gal): 6.1 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1000
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass 500mL	1003
Explosives (Subset A) + Nitrocellulose	4°C/Dark	(3) 1000 mL Amber Glass	1016, 1040
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1050
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1103
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1115
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1118
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1126
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene 1000mL	1142
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1155
Field test	Alkalinity, see SOP 7		1207

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 0.6 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: None

Titrets at wellhead:

Alkalinity = 79 mg/L @ 1155
CO_2 = 14.5 mg/L @ 1207

QA Samples Collected:

MS/MSD	Duplicate ID No.:	Signature(s):
yes	FD05239901	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.: 03C15 (ABG)
DATE: 5/23/99

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
0805	64.59								Begin purging.
0815	64.61	203	7.18	0.754	65	0.81	13.4	-33.0	
0825	64.61	203	7.15	0.787	8	0.88	13.3	-38.4	
0835	64.61	203	7.15	0.802	6	1.45	13.5	-37.0	
0845	64.61	203	7.16	0.799	5	1.54	13.6	-35.3	
0855	64.61	203	7.17	0.798	7	1.48	13.8	-37.7	
0905	64.61	203	7.17	0.801	6	1.59	13.7	-37.7	Increase flow rate.
0915	64.61	260	7.18	0.788	0	4.56	13.6	-41.3	
0925	64.61	260	7.18	0.786	3	3.99	13.6	-40.9	
0935	64.61	260	7.18	0.785	3	3.32	13.6	-40.9	
0945	64.61	260	7.19	0.783	1	1.72	13.6	-34.8	
0950	64.61	260	7.19	0.783	1	1.80	13.6	-40.3	
0955	64.61	260	7.19	0.781	1	1.84	13.6	-39.1	End purging.

SIGNATURE(S): Scott W. Stein

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC172A99
Sample Location: Ø3C17
Sampled By: FWR
C.O.C. No.:

SAMPLING DATA:

Date: 5-18-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1458 End: 1544	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.00	2.19	14.47	1.2	2.24	-52.4	NONE

PURGE DATA:

Date: 5-18-99	Total Well Depth (TD): 151.7	End Purge (hrs): ~~15~~ 1454
Method: Dedicated Bladder Pump	Static Water Level (WL): 138.23	Total Purge Time (min): 64 MIN
Well Casing: 2" PVC	Start Purge (hrs): 1350	Total Vol. Purged (gal): ~2.5
One Casing Volume(gal): ~2.1		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1500
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass 500 ml	1503
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1507, 1512, 1515
Total Metals (Subset A) + D	HNO_3/4°C	(1) 1000 mL Polyethylene	1520
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1525
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1530
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1535
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1538
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1540
Dissolved Metals (Subsets A & C) + D	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1544
Field test	Alkalinity, see SOP 7		

OBSERVATIONS / NOTES:

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

BLADDER VOL = 140 ml

Reaction of sample to preservative: NONE

QA Samples Collected:

MS/MSD —
Duplicate ID No.: —

Signature(s): [illegible]

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.: 03C17 ABG
DATE: 5-18-99

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
~~1343~~	138.23	—	—	—	—	—	—	—	STATIC WATER LEVEL
1357	138.28	159	7.01	2.47	1.9	2.42	14.53	-65.2	
1407	138.28	190	7.01	2.44	2.0	1.55	14.92	-77.3	
1414	138.28	215	7.00	2.32	1.4	2.26	14.80	-72.7	
1424	138.29	215	7.01	2.21	1.3	1.09	14.84	-62.2	
1434	138.30	215	7.01	2.19	1.3	1.23	14.71	-57.1	
1439	138.30	215	7.00	2.19	1.2	1.06	14.65	-55.0	
1444	138.30	215	7.00	2.19	1.2	2.00	14.67	-54.2	
1449	138.30	215	7.00	2.19	1.3	2.15	14.45	-52.8	
1454	138.30	215	7.00	2.19	1.2	2.24	14.47	-52.4	
	START SAMPLING AT			1458					
	FINISH SAMPLE COLLECTION				1544				

SIGNATURE(S): [illegible]

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC202499
Sample Location: AGG-03C20
Sampled By: S. NEIL
C.O.C. No.:

SAMPLING DATA:

Date: 5/22/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1805 End: 1855	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.23	0.600	14.9	1	4.95	168.1	None

PURGE DATA:

Date: 5/22/99	Total Well Depth (TD): 121.7 Ft.	End Purge (hrs): 1800
Method: Dedicated Bladder Pump	Static Water Level (WL): 89.49 Ft	Total Purge Time (min): 110
Well Casing: 2" PVC	Start Purge (hrs): 1610	Total Vol. Purged (gal): 5.3 gallons
One Casing Volume(gal): 5.3 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1805
TOX	H_2SO_4/4°C (SN)	(1) ~~1000 mL~~ Amber Glass 500mL	1806
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1810, 1815, 1820
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1825
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1830
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1834
Chloride & Sulfate	4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000mL	1835
Total Phosphorus	H_2SO_4/4°C (SN)	(1) ~~500 mL~~ Polyethylene 1000mL	1839
Dissolved Phosphorus	H_2SO_4/4°C/Filtered (SN)	(1) ~~500 mL~~ Polyethylene 1000mL	1845
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered (SN)	(1) 1000 mL Polyethylene	1850
Field test	Alkalinity, see SOP 7		1855

OBSERVATIONS / NOTES:

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

Reaction of sample to preservative:

~~Fe~~ (SN) Titrets at wellhead:

Alkalinity = 120 mg/L
CO_2 = 35 mg/L

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 / CTO 38
WELL ID.: 03C20 (ABG)
DATE: 3/22/99

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
1610	89.49								Begin Purging.
1615	89.57	130	7.45	1.977	150	6.76	18.6	153.3	water is clear
1620	89.57	130	7.33	0.860	221	4.94	16.4	161.8	Increase flow rate. 1300
1630	89.59	156	7.27	0.617	0	5.24	15.9	158.0	Cleaned turb. probe. 1500
1640	89.63	195	7.24	0.610	4	5.02	15.4	158.4	Increased flow rate.
1650	89.62	195	7.23	0.605	4	4.93	15.4	163.8	water is clear
1700	89.63	195	7.22	0.601	6	6.30	15.4	162.9	
1710	89.63	195	7.21	0.602	10	5.92	15.3	165.1	
1720	89.63	195	7.22	0.600	6	5.33	15.0	159.6	
1730	89.63	195	7.22	0.600	5	5.26	15.1	161.1	
1740	89.63	195	7.22	0.601	0	5.03	15.1	164.8	
1750	89.63	195	7.22	0.600	2	5.33	15.0	166.7	
1800	89.63	195	7.23	0.600	1	4.95	14.9	168.1	End purging.

SIGNATURE(S): [illegible]

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC252A99
Sample Location: ABG-03C25
Sampled By: S. NEIL / F. RAMSEY
C.O.C. No.:

SAMPLING DATA:

Date: 5-25-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1045 End: 1156	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.20	0.981	12.69	0.1	4.86	-74.8	SULFUR

PURGE DATA:

Date: 5/25/99	Total Well Depth (TD): 74.0 FT.	End Purge (hrs): ~~09~~ 1045
Method: Dedicated Bladder Pump	Static Water Level (WL): 46.81 FT.	Total Purge Time (min): 100
Well Casing: 2" PVC	Start Purge (hrs): 0905	Total Vol. Purged (gal): 4.5 gallons
One Casing Volume(gal): 4.4 gal.		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1045
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1050
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1051
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass (500 mL)	1052
Explosives (Subsets A+B) KS	4°C/Dark	(2) 1000 mL Amber Glass	1055, 1103, ~~1107~~ FOR
Explosives ~~(Subsets B)~~ PICRIC ACID + NC	4°C/Dark KS	~~(2) 500~~ mL Amber Glass 3 1000 ML	1109, 1116, 1121
Total Metals (Subsets A & B) + D	HNO_3/4°C	(1) 1000 mL Polyethylene	1127
Cyanide	NaOH/4°C KS	(1) ~~500~~ mL Polyethylene 1000 ML	1133
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1135
Chloride & Sulfate	4°C	(1) ~~500~~ mL Polyethylene 1000 ML	1138
Total Phosphorus	H_2SO_4/4°C	(1) ~~500~~ mL Polyethylene 1000 ML	1143
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500~~ mL Polyethylene 1000 ML	1152
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1156
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		

OBSERVATIONS / NOTES:

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

CASING VOL = 16.6 l Q = 156 ml/min
TIME = 1.77 HRS.

Reaction of sample to preservative: None

Citrichs for DO @ well head = 0.3 mg/L

BLADDER VOL = 130
DISCHARGE = 25
REFILL = 25
∴ Q = 156

SULFIDE TEST DONE AT WELL RESULTS 0.10 mg/l

Titrichs @ well head:
CO_2 = 20 mg/L
Alkalinity = 180 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Fred W Ramsey, 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.: 03C25 (ABG)
DATE: 5/25/99

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
0905	46.81								Begin purging.
0915	46.88	130	7.30	1.605	1.1	1.82	12.55	-39.8	
0920	46.89	141	7.27	1.005	1.2	1.07	12.49	-66.8	INCREASE Q TO 141
0925	46.89	141	7.27	0.975	4.9	2.04	12.49	-74.8	
0935	46.93	156	7.27	0.962	4.5	2.55	12.57	-79.8	INCREASE Q TO 156
0945	46.94		7.25	0.963	1.7	3.59	12.53	-78.6	
0955	46.94	156	7.23	0.975	0.5	3.01	12.49	-78.3	
1005	46.95	195	7.22	0.973	0.0	4.17	12.59	-76.7	INCREASE Q TO 195
1015	46.97	195	7.22	0.980	0.0	3.10	12.60	-76.9	
1025	46.99	195	7.20	0.982	0.0	3.18	12.60	-76.9	
1035	46.99	195	7.21	0.981	5.1	4.55	12.64	-76.6	
1040	46.99	195	7.21	0.984	0.1	4.43	12.67	-75.	
1045	47.00	195	7.20	0.981	0.1	4.86	12.69	-74.8	
	BEGIN TO	FILL CONTAINERS							

SIGNATURE(S): Scott W. Neo

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC262A99
Sample Location: 03C26
Sampled By: PWR
C.O.C. No.:

SAMPLING DATA:

Date: 5-23-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1235 End:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	7.03	0.710	17.40	~~1740~~ 1.3	28.39	637	NONE

PURGE DATA:

Date: 5-23-99	Total Well Depth (TD): 107.8	End Purge (hrs): 1230
Method: Dedicated Bladder Pump	Static Water Level (WL): 82.70	Total Purge Time (min): ~~240 min~~ 245 min
Well Casing: 2" PVC	Start Purge (hrs): 0825	Total Vol. Purged (gal): ~132 l
One Casing Volume(gal): 154 l		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1235
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass (500 ml)	1251
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1310, 1330, 1353
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1411
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene (1000 ml)	1427
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1428
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene (1000 ml)	1448
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene (1000 ml)	1512
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene (1000 ml)	1545
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1620
Field test	Alkalinity, see SOP 7		

OBSERVATIONS / NOTES:

PID reading in PVC riser pipe = 1.3 (ppm)
PID reading in Breathing Zone = 0.0 (ppm)

Reaction of sample to preservative: NONE

BLADDER VOL = 165 ml
DISCHARGE = 80
REFILL = 80
∴ Q = 62 ml/min
0835 HRS

ADJ Q: 0900 HRS
DIS = 85
REFILL = 85
∴ Q = 58 ml

ADJ Q: 1000 HRS
DIS = 90
REFILL = 90
∴ Q = 55 ml/min

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramer

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651
WELL ID.: ABG 03C26
DATE: 5-23-99

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
0823	82.70	—	—	—	—	—	—	—	STATIC WATER LEVEL
0835	83.04	62ml	—	—	—	—	—	—	START PURGING
0845	83.17	62ml	7.06	0.919	86.6	26.41	15.34	0.9	
0855	83.24	62ml	7.03	0.757	5.8	23.01	15.53	8.5	SLOW FLOW RATE TO 58
0905	83.28	58ml	7.04	0.737	12.9	24.88	15.81	18.1	
0915	83.30		7.05	0.719	15.4	23.19	15.8	16.6	
0925	83.31		7.05	0.718	10.6	36.05	16.05	33.6	
0935	83.32		7.05	0.716	8.9	39.04	16.22	32.1	
0945	83.33		7.05	0.714	2.9	36.53	16.25	46.1	
0955	83.38	58ml	7.05	0.712	42.1	38.00	16.27	51.2	REDUCED FLOWRATE TO 55ml/min
1005	83.39	55ml	7.05	0.715	36.7	38.71	16.44	44.1	
1015	83.38		7.05	0.715	18.1	34.21	16.71	44.8	
1025	83.36		7.05	0.712	8.9	40.53	16.98	41.5	
1035	83.37		7.05	0.714	90.1	40.28	16.93	63.1	
1045	83.37		7.04	0.709	1.5	40.52	16.77	61.5	
1055	83.37		7.04	0.711	3.9	40.98	16.46	61.1	
1105	83.37		7.05	0.700	2.1	40.32	16.96	50.4	
1115	83.35		7.05	0.715	7.1	40.07	17.10	60.4	
1125	83.36		7.04	0.713	3.7	39.93	17.48	67.4	
1135	83.36		7.05	0.711	1.5	39.36	17.68	58.8	
1145	83.36		7.05	0.712	10.7	39.56	17.54	56.1	
1155	83.36		7.04	0.711	26.1	33.90	17.55	61.2	
1205	83.36		7.04	0.709	1.2	29.86	17.54	58.3	
1215	83.36		7.04	0.710	1.9	28.19	17.39	64.6	
1225	83.36	55ml	7.04	0.710	14.2	26.09	17.76	56.4	*DO READINGS QUESTIONABLE
1230	83.36	55ml	7.03	0.710	1.3	28.39	17.40	63.7	4HRS PURGE COMPLETED

SIGNATURE(S): Fred W Ramsey

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC272499
Sample Location: ABG-03C27
Sampled By: S. Nill
C.O.C. No.:

SAMPLING DATA:

Date: 5/24/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1025 End: 1038	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	Clear	7.66	0.283	12.5	2	12.31	164.4	None

PURGE DATA:

Date: 5/24/99	Total Well Depth (TD): 75.0 FT.	End Purge (hrs): 1020
Method: Dedicated Bladder Pump	Static Water Level (WL): 60.71 FT.	Total Purge Time (min): 90
Well Casing: 2" PVC	Start Purge (hrs): 0850	Total Vol. Purged (gal): 2.4 gallons
One Casing Volume(gal): 2.3 gal		

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subset B)	HCl/4°C	(3) 40 mL Glass Vials	1025
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass (500 mL)	1026
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1032, 1046, 1104
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1120
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene (1000 mL)	1133
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1145
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene (1000 mL)	1146
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene (1000 mL)	1200
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene (1000 mL)	1212
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1225
Field test	Alkalinity, see SOP 7		

OBSERVATIONS / NOTES:

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

Titrets @ wellhead:
CO_2 = < 10 mg/L
Alkalinity = 78 mg/L

Reaction of sample to preservative: None

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): Scott Nill

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.: 03C27 (ABG)
DATE: 5/24/99

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
0850	60.71							→	Begin purging.
0855	60.77	105	7.58	1.810	2	10.17	12.5	58.9	
0900	60.79	105	7.61	0.657	2	10.17	12.2	101.1	
0910	60.83	105	7.62	0.333	6	10.20	12.0	114.4	Decrease flow rate.
0920	60.88	102	7.65	0.334	3	11.28	12.1	134.7	Decrease flow rate.
0930	60.90	93	7.66	0.303	5	10.12	12.1	145.0	
0940	60.92	84	7.65	0.296	6	10.82	12.3	150.8	
0950	60.94	84	7.66	0.295	5	12.18	12.4	158.2	
1000	60.95	84	7.66	0.290	6	11.82	12.4	157.5	
1010	60.98	84	7.66	0.286	3	12.98	12.4	164.3	Decrease flow rate.
1020	~~60.~~ 61.00	70	7.66	0.283	2	12.31	12.5	164.4	End purging.

2100
1020
930
5:10
3360

SIGNATURE(S): Scott W. Dod

PAGE 2 **OF** 2

GROUND WATER SAMPLE LOG FORM

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

Sample ID No.: AC302A99
Sample Location: ABG 03C30
Sampled By: FMR
C.O.C. No.:

SAMPLING DATA:

Date: 5-24-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1200 End: 1519	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Dedicated Bladder Pump	CLEAR	9.59	0.557	14.22	0.7	14.22	-89.7	NONE

PURGE DATA:

Date: 5-24-99	Total Well Depth (TD): 263.5	End Purge (hrs): 1200
Method: Dedicated Bladder Pump	Static Water Level (WL): 223.22	Total Purge Time (min): 240
Well Casing: 2" PVC	Start Purge (hrs): 0800	Total Vol. Purged (gal): 11.3 l
One Casing Volume(gal): 24.7 l		

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 500 ml	1215
Explosives (Subset A)	4°C/Dark	(3) 1000 mL Amber Glass	1235, 1253, 1315
Total Metals (Subset A)	HNO_3/4°C	(1) 1000 mL Polyethylene	1332
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1350
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	~~14~~ 1353
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1415
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1437
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1500
Dissolved Metals (Subsets A & C)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1519
Field test	Alkalinity, see SOP 7		

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

BLADDER VOL = 140 ml
DISCHARGE @ 80
REFILL @ 80
∴ Q = 52.5 ml/min

0830 HR REDUCE Q TO 50 ml/min

0840 HR REDUCE Q TO 47 ml/min

QA Samples Collected:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramsdr

NSWC Crane
Field Form
Revision: 0
January 1999

LOW FLOW PURGE DATA FORM

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: 7651
WELL ID.: ABG 03C30
DATE: 5-24-99

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
0755	223.22	—	—	—	—	—	—	—	STATIC WATER LEVEL
0800		52.5	—	—	—	—	—	—	
0830	223.93	52.5	8.42	1.042	4.9	45.60	13.11	71.7	ADJ. FLOW TO 50
0840	224.93	50.0	9.86	0.616	10.4	38.28	13.05	19.2	REDUCE FLOW TO 47
0850	224.95	47.0	11.54	0.877	2.1	40.15	13.14	-20.4	
0900	225.14	47.0	11.81	1.147	2.1	25.61	13.12	-126.6	*DO READINGS QUESTIONABLE
0910	225.34	47.0	11.84	1.174	1.1	38.15	13.15	-164.1	
0920	225.42	47.0	11.77	1.092	1.1	25.51	13.17	-115.0	
0930	225.52	47.0	11.72	1.087	1.1	24.04	13.32	-142.8	
0940	225.60		11.59	0.947	0.7	24.05	13.55	-112.7	
0950	225.72		11.45	0.875	0.5	13.96	13.57	-108.2	
1000	225.78		11.31	0.805	0.5	20.51	13.64	-109.3	
1010	225.83		11.05	0.726	1.0	13.88	13.65	-98.7	
1020	225.89		10.73	0.651	0.9	44.80	13.68	-97.4	
1030	225.92		10.35	0.597	0.6	26.45	13.66	-116.1	
1040	225.98		10.00	0.571	0.8	26.40	13.82	-92.2	
1050	226.02		9.80	0.565	1.1	44.24	13.95	-89.0	
1100	226.05		9.66	0.561	0.9	44.24	14.07	-87.8	
1110	226.09		9.65	0.560	1.1	26.51	14.09	-89.2	
~~1100~~	~~(1HR PURGE). BEGIN TO FILL CONTAINERS.~~								
1120	226.09		9.61	0.560	0.7	26.40	14.10	-89.1	
1130	226.15		9.60	0.559	0.9	24.09	14.09	-98.5	
1140	226.21		9.59	0.559	1.1	44.14	14.12	-89.5	
1150	226.29		9.59	0.558	1.0	21.98	14.10	-89.6	
1200	226.29		9.59	0.557	0.7	14.22	14.09	-89.7	
	(1HR PURGE)	BEGIN	TO FILL	CONTAINERS					

SIGNATURE(S): Fred W Ramser

PAGE 2 **OF** 2

ATTACHMENT 5

SURFACE WATER SAMPLE LOG FORMS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

SURFACE WATER SAMPLE LOG FORM

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

Sample ID No.: ACRB2A99
Sample Location: ABG - Creek @ Boundary
Sampled By: F. Ramser/S. Neil
C.O.C. No.:

▮ Stream
▯ Spring

SAMPLING DATA:

Date: 5/20/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 0830 End: 0858	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Depth: 10 inches								
Method: Direct Fill	Clear	7.46	0.157	12.9	5	9.84	123.3	None

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	0830
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	0831
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	0832
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass 500mL	0833
Explosives (Subsets A & B	4°C/Dark	(2) 1000 mL Amber Glass	0835, 0837
Explosives (~~Subsets B~~) Nitro & Pic Acid	4°C/Dark	~~(2) 500 mL~~ Amber Glass (3) 1000mL	0840, 0843, 0845
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	0847
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	0848
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	0850
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene 1000mL	0851
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	0853
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene 1000mL	0854
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	0856
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		0858

OBSERVATIONS / NOTES:

Reaction of sample to preservative: None

Estimated Flow Rate: 550 gpm

Comments:

Titrets for DO @ creek = 9 mg/L
Sulfide @ creek = 0.00 mg/L
Titrets @ creek:
Alkalinity = 14 mg/L
CO_2 = 100 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): F. Ramser
Scott W. Neil

SURFACE WATER SAMPLE LOG FORM

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

▮ Stream
▯ Spring

Sample ID No.: A CRA2A99
Sample Location: Creek Below Spring A
Sampled By: F. Ramsey / S. Neil
C.O.C. No.:

SAMPLING DATA:

Date: 5/20/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1023 End: 1036	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Depth: 8 inches	Clear	7.44	0.156	13.6	5	9.02	129.4	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	1023
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1024
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1025
TOX	H_2SO_4/4°C	(1) 1000 mL Amber Glass	1026
Explosives (Subsets A)+B	4°C/Dark	(2) 1000 mL Amber Glass	1027
Explosives (Subsets B) PICRIC + NC	4°C/Dark	(2) 500 mL Amber Glass	1028
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1029
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	1030
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1031
Chloride & Sulfate	4°C	(1) 500 mL Polyethylene	1032
Total Phosphorus	H_2SO_4/4°C	(1) 500 mL Polyethylene	1033
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) 500 mL Polyethylene	1034
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1035
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1036

OBSERVATIONS / NOTES:

Reaction of sample to preservative: None

Estimated Flow Rate: 300 gpm

Comments:

CHEMets DO @ creek = 9.0 mg/L
Sulfide @ creek = 0.00 mg/L
Titrets @ creek:
Alkalinity = 20 mg/L
CO_2 = 97 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): F. Ramsey, Scott W. Neil

SURFACE WATER SAMPLE LOG FORM

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

☐ Stream
■ Spring

Sample ID No.: ASPA2A99
Sample Location: SPRINGA
Sampled By: F. Ramser/S. Neil
C.O.C. No.:

SAMPLING DATA:

Date: 5/20/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time-Start: 1331 End: 1430	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Depth: 10 inches	Clear	7.54	0.168	12.6	8	9.10	153.7	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	1331
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1335
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1340
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass 500mL	1345
Explosives (Subsets A & B)	4°C/Dark	(2) 1000 mL Amber Glass	1352, 1354
Explosives (~~Subsets B~~) Nitrocell + Pic. Acid	4°C/Dark	(~~2~~) ~~500 mL~~ Amber Glass 3 1000mL	1359, 1401, 1402
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1405
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1408
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1412
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1418
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1422
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene 1000mL	1424
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1428
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1430

OBSERVATIONS / NOTES:

Reaction of sample to preservative: None

Estimated Flow Rate: 250 gpm

Comments:

Citrets @ spring A = 9.0 mg/L for DO

Sulfide @ Spring A = 0.00 mg/L

Titrets @ Spring A:

Alkalinity = 27 mg/L

CO_2 = 102 mg/L

QA Samples Collected:

MS/MSD	Duplicate ID No.:
yes	FD05209901

Signature(s): F. Ramser
Scott A. Neil

SURFACE WATER SAMPLE LOG FORM

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

☐ Stream
■ Spring

Sample ID No.: ASPC2A99
Sample Location: SPRING C
Sampled By: F. Ramser / S. Neil
C.O.C. No.:

SAMPLING DATA:

Date: 5/20/99
Time-Start: 1750 End: 1820
Depth: 5 inches
Method: Direct Fill

Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Clear	7.47	0.140	12.2	7	9.01	124.9	None

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Time Collected
Volatiles (Subsets B&C)	HCl/4°C	(3) 40 mL Glass Vials	1750
Dissolved Methane/Ethane/Ethene	4°C/Dark	(2) 40 mL Amber Glass Vials	1753
Sulfide	4°C/Zn($C_2H_3O_2$),NaOH	(1) 500 mL Polyethylene	1755
TOX	H_2SO_4/4°C	(1) ~~1000 mL~~ Amber Glass 500mL	1757
Explosives (Subsets A & B	4°C/Dark	(2) 1000 mL Amber Glass	1804, 1802
Explosives ~~(Subsets B)~~ Nitrocell + Pic. Acid	4°C/Dark	~~(2) 500 mL~~ Amber Glass 3 1000 mL	1806, 1805, 1807
Total Metals (Subsets A & B)	HNO_3/4°C	(1) 1000 mL Polyethylene	1808
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1809
TOC	H_2SO_4/4°C	(1) 125 mL Amber Glass	1810
Chloride & Sulfate	4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1812
Total Phosphorus	H_2SO_4/4°C	(1) ~~500 mL~~ Polyethylene 1000mL	1813
Dissolved Phosphorus	H_2SO_4/4°C/Filtered	(1) ~~500 mL~~ Polyethylene 1000mL	1814
Dissolved Metals (Subsets A, C & D)	HNO_3/4°C/Filtered	(1) 1000 mL Polyethylene	1815
Natural Attenuation (field test)	Various Parameters & Containers, see SOP 7		1820

OBSERVATIONS / NOTES:

Reaction of sample to preservative:

Estimated Flow Rate: 175 gpm

Comments:

CHEMETS DO @ Spring = 10mg/L
Sulfide at Spring = 0.00mg/L
Titrets @ spring:
Alkalinity = 57mg/L
CO_2 = ~~57mg/L~~ 114mg/L (SW)

QA Samples Collected:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): [signature]
Scott W. Neil

ATTACHMENT 6

FIELD CHEMICAL ANALYTICAL LOG FORMS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC CRANE, IN

Sampled By: K. SIMPSON

Sample ID No.: A B04 2A 99

Sample Location: ABG 03B04

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP =
Date: 5.17.99							
Time: 1646							
Method: BLADDER PUMP	Clear	6.98	0.198	12.8	6	0.97	-81.5

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst KES Analysis Time: 1745

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
49	x 0.01	= 0.49 mg/L
	x 0.02	=

Notes: DO = 0.49 mg/L

Chemetrics not done at well head due to severe T-Storm w/ hail.

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst KES Analysis Time: 1755

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 & 188	x 0.4	= 75.2 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	75.2 mg/L

Notes:

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst KES Analysis Time: 1818

	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	=
312	x 0.2	= 62.4
	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, IN

Sample ID No.: A B04 2A 99

Sample Location: ABG 03B04

Sampled By: K. SIMPSON

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1855

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes: Sulfide @ well head = 0.00 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1900

Program No.: 33

Concentration: 3.30 LIMIT mg/L Filtered: ☐

Notes: Concentration higher than what meter can read.

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1925

Program No.: 60

Concentration: 0.000 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1950

Program No.: 55

Concentration: 0.02 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

Sample ID No.: AC032A99

Sample Location: ABG-03C03

Duplicate: ☐

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Date: 5/18/99							
Time: 1230	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	
Method: Ded. Bladder Pump	Clear	9.24	0.901	15.7	3	1.11	54.1

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1444

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
74	x 0.01	= 0.74 mg/L
	x 0.02	=

Notes: Chemets at wellhead = 1.1 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1452

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 & 373	x 1.0	= 373 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	373 mg/L

Notes: Titrets at wellhead = 92 mg/L

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1501

	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	=
75	x 1.0	= 75 mg/L
	x 2.0	=

Notes: Titrets at well head = 104 mg/L

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

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AC032A99

Sample Location: ABG-03C03

Sampled By: S. Neil

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1508

Program No.: 93

Concentration: 0.00 mg/L

Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1514

Program No.: 33

Concentration: 0.00 mg/L

Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1521

Program No.: 60

Concentration: 0.001 mg/L

Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter

Analyst: SWN

Analysis Time: 1544

Program No.: 55

Concentration: 0.01 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: CTO 38 7651

Sampled By: K. SIMPSON

Sample ID No.: ~~03~~ RS AC172A99

Sample Location: 03C17

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP
Date: 5-18-99							
Time: 1458							
Method: BLADDER PUMP	CLEAR	7.00	2.19	14.5	1.2	2.24	-52.4

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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: 1650

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 & 314	x 0.4	= 125.6 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	mg/L

Notes:

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

Carbon Dioxide:

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: CTO 38 NSWC CRANE

Sampled By: SCOTT NEIL

Sample ID No.: A B022A99

Sample Location: 03B02

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	
Date: 5.18.99							ORP =
Time: 1835							-125.9
Method: BLADDER PUMP	CLEAR	7.21	0.343	12.5	8	0.84	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst KES Analysis Time: 1935

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
	x 0.02	=

Notes: CHEMETS @ WELL HEAD = 0.4 mg/L D.O.

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst KES Analysis Time: 1940

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 & 380	x 0.4	= 152 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	152 mg/L

Notes:

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst KES Analysis Time: 2012

	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	=
460	x 0.2	= 92 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.: AB022A99

Sample Location: 03B02

Sampled By: SCOTT NEIL

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1940

Program No.: 93

Concentration: 0.03 mg/L Filtered: ☐

Notes: AT WELL HEAD

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 2012

Program No.: 33

Concentration: 3.30 + mg/L Filtered: ☐

Notes: 3.30 = LIMIT OF METER

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 2025

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: 2041

Program No.: 55

Concentration: 0 mg/L

Nitrite Interference Treatment: ☐ NA

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

Sample ID No.: AC09P22A99

Sample Location: ABG-03C09P2

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP
Date: 5/19/99							
Time: 1100							
Method: Ded. Bladder Pump	Clear	6.84	0.492	16.0	9	8.81	133.2

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: 1246

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 & 182	x 1.0	= 182 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	182 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

KES

Project Site Name: NSWC CRANE

Sampled By: FRED RAMSER

Sample ID No.: AC072A99

Sample Location: 03C07

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP
Date: 5.19.99							183.2
Time: 1410							
Method: BLADDER PUMP	CLEAR	7.28	0.846	18.3	4.0	2.02	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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: 1815

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 & 165	x 2.0	= 330
☐	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	330 mg/L

Notes:

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

Carbon Dioxide:

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: S. NEIL

Sample ID No.: AC02P22A99

Sample Location: ABG-03C02P2

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 5-19-99						
Time: 1810						
Method: BLADDER PUMP	CLEAR	7.12	0.494	13.2	7	13.66

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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 _____ Analysis Time: 1910

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 & 55	x 2.0	= 110
☐	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	110 mg/L

Notes: TITRETS AT WELL HEAD = 138mg/L

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

Carbon Dioxide:

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: S. NEIL

Sample ID No.: AC02P22A99

Sample Location: ABG -03C02P2

Duplicate: ☒

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 5-19-99						
Time: 1810						
Method: BLADDER PUMP	CLEAR	7.12	0.494	13.2	7	13.66

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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 _____ Analysis Time: 1855

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 & 57	x 2.0	= 114
☐	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	114 mg/L

Notes: ~~PH TITRETS~~ TITRETS AT WELL HEAD = 138 mg/L

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

Carbon Dioxide:

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 + Fred Ramser

Sample ID No.: ACRB2A99

Sample Location: ABG - Creek at Boundary

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP mV
Date: 5/20/99							
Time: 0830							
Method: Direct Fill	Clear	7.46	0.157	12.9	5	9.84	123.3

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst: SWN Analysis Time: 1305

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	=
474	x 0.02	= 9.48 mg/L

Notes: Chlorets at creek = 9 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst: SWN Analysis Time: 1314

Range Used:	Range	Sample Vol.	Cartridge	Multiplier	Titration Count	Multiplier	Concentration
☒	10-40 mg/L	100 ml	0.1600 N	0.1	0 & 580	x 0.1	= 58.0 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	58.0 mg/L

Notes: Titrets at creek = 14 mg/L

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst: SWN Analysis Time: 1322

	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	=
56	x 1.0	= 56 mg/L
	x 2.0	=

Notes: Titrets at creek = 100 mg/L

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

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Fred Ramser + Scott Neil

Sample ID No.: ACRB2A99

Sample Location: Creek at Boundary

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

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

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes: Sulfide at creek = 0.00 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1338

Program No.: 33

Concentration: 0.01 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1345

Program No.: 60

Concentration: 0.006 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1409

Program No.: 55

Concentration: 0.064 mg/L (0.07 - 0.006)

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: Fred Ramser + Scott Neil

Sample ID No.: ACRA2A99

Sample Location: Creek Below Spring A

Duplicate: ☐

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Date: 5/20/99							
Time: 1023	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	mV
Method: Direct Fill	Clear	7.44	0.156	13.6	5	9.02	129.4

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1450

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	=
461	x 0.02	= ~~9.22mg~~ SN 9.22 mg/L

Notes: CHEMets at creek = 9 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1518

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 & 148	x 0.4	= 59.2 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	59.2 mg/L

Notes: Titrets at creek = 20 mg/L

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1524

	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	=
125	x 0.2	= 25 mg/L
	x 1.0	=
	x 2.0	=

Notes: Titrets at creek = 97 mg/L

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

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: ACRA2A99

Sample Location: Creek Below Spring A

Sampled By: Fred Ramser + Scott Nell

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1531

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1543

Program No.: 33

Concentration: 0.00 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1549

Program No.: 60

Concentration: 0.006 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1625

Program No.: 55

Concentration: 0.054 mg/L (0.06 - 0.006)

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: Fred Ramser + Scott Neil

Sample ID No.: ASPA2A99

Sample Location: Spring A (ABG)

Duplicate: ☒ (SN)

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP mV
Date: 5/20/99							
Time: 1331							
Method: Direct Fill	Clear	7.54	0.168	12.6	8	9.10	153.7

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1458

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	=
488	x 0.02	= 9.76 mg/L

Notes: CH4 Mets at creek/spring = 9 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1819

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 & 59	x 1.0	= 59 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	59 mg/L

Notes: Alkalinity at spring = 27 mg/L

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1827

	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	=
142	x 0.2	= 28.4 mg/L
	x 1.0	=
	x 2.0	=

Notes: CO2 at spring = 102 mg/L

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

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: ASPA2A94

Sample Location: Spring A (ABG)

Sampled By: Fred Ramser + Scott Neil

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

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

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1820

Program No.: 33

Concentration: 0.01 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1839

Program No.: 60

Concentration: 0.004 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

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

Program No.: 55

Concentration: 0.086 mg/L (0.09 - 0.004)

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: Fred Ramser + Scott Neil

Sample ID No.: FD0520990 1

Sample Location: Spring A (ABG)

Duplicate: ☑ of ASPA2A99

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP mV
Date: 5/20/99							
Time: 0000							
Method: Direct Fill	—	—	—	—	—	—	—

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1506

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	=
499	x 0.02	= 9.98 mg/L

Notes: Chemets at Spring A = 9 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1841

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 & 216	x 0.4	= 86.4 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	86.4 mg/L

Notes:

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1847

	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	=
52	x 0.2	= 10.4 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.: FD05209901

Sample Location: Spring A (ABG)

Sampled By: Fred Ramser + Scott Neil

Duplicate: ☒ of ASPA2A99

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1930

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes: Sulfide at Spring A = 0.00 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1939

Program No.: 33

Concentration: 0.00 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 2052

Program No.: 60

Concentration: 0.001 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 2055

Program No.: 55

Concentration: 0.28 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: Fred Ramser

Sample ID No.: ASPC2A99

Sample Location: Spring C (ABC)

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP mV
Date: 5/20/99							
Time: 1750							
Method: Direct Fill	Clear	7.47	0.140	12.2	7	~~124.9~~ 9.01	124.9

SAMPLE COLLECTION/ANALYSIS INFORMATION: SW

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1812

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
~~528~~ SW	x 0.01	=
528	x 0.02	= 10.56 mg/L

Notes: CHEMets at Spring C = 10 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: ~~1819~~ 1914 SW

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 & 199	x 0.4	= 79.6 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	79.6 mg/L

Notes: Alkalinity at spring = 57 mg/L

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1919

	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	=
159	x 0.2	= 31.8 mg/L
	x 1.0	=
	x 2.0	=

Notes: CO_2 at spring = 114 mg/L

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

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: ASPC2A99

Sample Location: Spring C (ABG)

Sampled By: Fred Ramser

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 2024

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes: Sulfide at spring = 0.00mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 2032

Program No.: 33

Concentration: 0.00 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1940

Program No.: 60

Concentration: 0.003 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1958

Program No.: 55

Concentration: 0.337 mg/L (0.34 - 0.003)

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.: AC112A99

Sample Location: 03C11 (ABG

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP (mV)
Date: 5/21/99							
Time: 1303							
Method: Ded. Bladder Pump	Cloudy	11.06	2.106	18.2	240	1.48	-110.8

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst: SWN Analysis Time: 1620

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
5.02	x 0.01	= 5.02 mg/L
	x 0.02	=

Notes: Chlorets at wellhead = 3 mg/L Water was cloudy.

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst: SWN Analysis Time: 1631

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	56 & 28	x 1.0	= 84 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	mg/L	mg/L	mg/L

Notes: Titrets at ~~alkalin~~ SD wellhead for alkalinity = 247 mg/L

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

Carbon Dioxide:

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

	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	=
>1000	x 2.0	= >2000 mg/L

Notes: Titrets at wellhead for CO_2 = unreadable

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.: AC112A99

Sample Location: 03C11 - ABG

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1658

Program No.: 93

Concentration: 0.38 mg/L Filtered: ☒

Notes: Sulfide at wellhead = 0.38 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1715

Program No.: 33

Concentration: 0.01 mg/L Filtered: ☒

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1721

Program No.: 60

Concentration: 0.012 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1745

Program No.: 55

Concentration: 0.928 mg/L (0.94 - 0.012)

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: FURAMSER

Sample ID No.: AC042A99

Sample Location: 03C04

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)
Date: 5-21-99						
Time: 1000						
Method: BLADDER PUMP	CLR	7.26	1.657	18.05	5.0	2.60

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst FUR Analysis Time: 1200

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	=
90	x 0.02	= 1.80

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst FUR Analysis Time: 1220

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 & 172	x 2.0	= 344
☐	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	344 mg/L

Notes:

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst FUR Analysis Time: 1232

	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	=
208	x 1.0	= 208
	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.: AC042A99

Sample Location: 03C01

Sampled By: FRED W RAMSER

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst FWR Analysis Time: 1445

Program No.: 93

Concentration: 0.02 mg/L Filtered: ☐

Notes: SULFIDE @ WELL HEAD = 0.00

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst FWR Analysis Time: 1500

Program No.: 33

Concentration: 0.04 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst FWR Analysis Time: 1525

Program No.: 60

Concentration: 0.006 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst FWR Analysis Time: 1610

Program No.: 55

Concentration: ~~0.13~~ FWR 0.124 mg/L (0.13 - 0.006)

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.: AC102A99

Sample Location: ABG-03C10

Duplicate: ☐

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Date: 5/22/99							
Time: 1200	(Visual)	(SU)	(mS/cm)	(°C)	(NTU)	(Meter, mg/l)	(mV)
Method: Ded. Bladder Pump	Clear	6.65	0.506	16.3	0	3.08	214.6

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1419

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
301	x 0.01	= 3.01 mg/L
	x 0.02	=

Notes: Chemets @ wellhead = 2.7 mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1426

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 ~~465~~ (SA) & 465	x 0.4	= 186 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	186 mg/L

Notes: Alkalinity at wellhead (Tibretts) = 91 mg/L

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1433

	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	=
494	x 0.2	= 98.8 mg/L
	x 1.0	=
	x 2.0	=

Notes: CO_2 at wellhead (tibretts) = 22 mg/L

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

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sample ID No.: AC102A99

Sample Location: ABG - 03C10

Sampled By: Scott Neil

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1410

Program No.: 93

Concentration: 0.00 mg/L Filtered: ☐

Notes: Sulfide at wellhead = 0.00 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1416

Program No.: 33

Concentration: 0.01 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1423

Program No.: 60

Concentration: 0.001 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1442

Program No.: 55 2.43 w/o pretreatment

Concentration: 1.739 mg/L (1.74 - 0.001)

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 CTO 38

Sampled By: F. RAMSER & K. SIMPSON

Sample ID No.: AC122A99

Sample Location: ABG 03C12

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP
Date: 5-22-99							
Time: 1500							
Method: DED. BLADDER PUMP	CLEAR	7.30	0.620	17.4	5.8	8.56	194.2

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1519

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	=
344	x 0.02	= 6.88 mg/L

Notes:

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1524

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 & 152	x 1.0	= 152 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	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 SWN Analysis Time: 1530

	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	=
299	x 0.2	= 59.8 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 CTO 38

Sampled By: F. RAMSER & K. SIMPSON

Sample ID No.:

Sample Location: ABG 03C12

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1405

Program No.: 93

Concentration: 0 mg/L @ WELL HEAD = 0.00 mg/l Filtered: ☐

Notes:

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1540

Program No.: 33

Concentration: 0.01 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1546

Program No.: 60

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

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst KES Analysis Time: 1606

Program No.: 55

Concentration: 2.407 mg/L (2.41 - 0.003)

PRETREATMENT 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

Sample ID No.: AC202A99

Sample Location: AB3C20

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP
Date: 5-22-99							
Time: 1855							
Method: BLADDER PUMP	CLEAR	7.23	0.600	14.9	1	4.95	168.1

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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 FUR Analysis Time: 1920

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 & 107	x 2.0	= 214
☐	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	214 mg/L

Notes: ALK @ WELL HEAD = 120 mg/L USING TITRETS

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

Carbon Dioxide:

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 CTO 38

Sampled By: SCOTT NEIL

Sample ID No.: AC152A99

Sample Location: 03C15

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP (mV)
Date: 5-23-99							
Time: 1016							
Method: DED. BLADDER PUMP	CLEAR	7.19	0.781	13.6	1	1.84	-39.1

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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: 1225

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 & 271	x 1.0	= 271 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	271 mg/L

Notes: RAN DUP SEE PG# A 47

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

Carbon Dioxide:

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 CTO 38

Sampled By: SCOTT NEIL

Sample ID No.: AC152A99

Sample Location:

Duplicate: ☒

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP (mV)
Date: 5-23-99							
Time: 1016							
Method: DED. BLADDER PUMP	CLEAR	7.19	0.781	13.6	1	1.84	-39.1

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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: 1233

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 & 263	x 1.0	= 263 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	263 mg/L

Notes:

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

Carbon Dioxide:

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
CTO 38
Sampled By: F. RAMSER

Sample ID No.: AC262A99
Sample Location: 03C26
Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP
Date: 5-23-99							
Time: 1310							
Method: DED. BLADDER PUMP	CLEAR	7.03	0.710	17.40	1.3	28.39	63.7

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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: 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	0 & 274	x 1.0	= 274 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	274 mg/L

Notes:

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

Carbon Dioxide:

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, IN

Sampled By: S. NEIL

Sample ID No.: AC272A99

Sample Location: ABG 03C27

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP (mV)
Date: 5-24-99							
Time: 1025							
Method: BLADDER PUMP	Clear	7.66	0.283	12.5	2	12.31	164.4

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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 FWR Analysis Time: 1705

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 & 127	x 1.0	= 127
☐	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	127 mg/L

Notes:

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

Carbon Dioxide:

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, IN

Sampled By: FRED W. RAMSER

Sample ID No.: AC302A99

Sample Location: ABG 03C30

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP mV
Date: 5-24-99							
Time: 1519							
Method: BLADDER PUMP	CLEAR	9.54	0.557	14.22	0.7	14.22	-89.7

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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 FUR Analysis Time: 1645

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 & 120	x 2.0	= 240
☐	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	240 mg/L

Notes:

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

Carbon Dioxide:

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.: AC08P22A99

Sample Location: ABG-03C08P2

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP (MV)
Date: 5/21/99							
Time: 1710							
Method: Ded. Bladder Pump	Clear	7.34	0.875	16.4	1	6.74	169.0

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

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: 1900

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 & 356	x 1.0	= 356 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	356 mg/L

Notes: Titrets at wellhead = 215 mg/L

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

Carbon Dioxide:

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.: AC252A99

Sample Location: ABG-03C25

Sampled By: Fred Ramser / Scott Neil

Duplicate: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Sulfide:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1347

Program No.: 93

Concentration: 0.06 mg/L Filtered: ☐

Notes: Sulfide at wellhead = 0.10 mg/L

Ferrous Iron:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1400

Program No.: 33

Concentration: 0.15 mg/L Filtered: ☐

Notes:

Nitrite:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1408

Program No.: 60

Concentration: 0.001 mg/L Reagent Blank Correction: ☐

Standard Solution: ☐ Results:

Notes:

Nitrate:

Equipment: HACH DR-850 Colorimeter Analyst SWN Analysis Time: 1429

Program No.: 55

Concentration: 0.129 mg/L (0.13-0.001)

Nitrite Interference Treatment: ☒

Standard Solution: ☐ Results: Reagent Blank Correction: ☐

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

Notes: 1

NOTE: Sulphur odor evident from purge / sample water.

FIELD CHEMICAL ANALYTICAL LOG FORM

Project Site Name: NSWC Crane

Sampled By: Fred Ramser / Scott Neil

Sample ID No.: AC252A99

Sample Location: AEG-03C25

Duplicate: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (Meter, mg/l)	ORP (mV)
Date: 5/25/99							
Time: 1045							
Method: Ded. Bladder Pump	Clear	7.20	0.481	12.7	0	4.86	-74.8

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment: HACH Digital Titrator OX-DT Analyst SWN Analysis Time: 1325

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	= 0.3mg/L
	x 0.02	=

Notes: CHEMets @ wellhead = 0.3mg/L

Alkalinity:

Equipment: HACH Digital Titrator AL-DT Analyst SWN Analysis Time: 1334

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 & 318	x 1.0	= 318 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	318 mg/L

Notes: Alkalinity at wellhead with Titrets = 180mg/L

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

Carbon Dioxide:

Equipment: HACH Digital Titrator CA-DT Analyst SWN Analysis Time: 1342

	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	=
419	x 0.2	= 83.8mg/L
	x 1.0	=
	x 2.0	=

Notes: CO_2 at wellhead with Titrets = 20mg/L

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

ATTACHMENT 7

COPIES OF CHAIN-OF-CUSTODY RECORDS PREPARED BY TETRA TECH NUS, INC. MONITORING EVENT NO. 3 (MAY 17-26, 1999)

(ORIGINALS AVAILABLE IN NSWC CRANE GROUND WATER MONITORING INFORMATION REPOSITORY)

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0056

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 GTO 38

SAMPLERS (SIGNATURE): Greg Wagner, Kit 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
5.24	1235	AC302A99	1						A													A979	
	1253		1						A													A980	
	1315		1						A													A981	
	1215		1				X															A986	
	1437		1																X			A989	
	1350		1								X											A985	
	1332		1							A,D												A983	
	1415		1													X		X				A988	
	1353		1												X							A987	
	1500	AC302A99-F	1																X			A990	
	1519		1							A,C,D												A984	
	1032	AC272A99	1						A													A964	
	1046		1						A													A965	
	1104		1						A													A966	
	1120		1							A,D												A968	
	1133		1								X											A970	
	1146		1													X		X				A973	
	1200		1																X			A974	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Kit S. Simpson	5.25.99 1015 ~~1030~~ KS	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413736

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A170, A171, A172, A173

REMARKS:

SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0058

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

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
5.24	1225	AC272A99-F	1							A,C,D												A969	
↓	1145	AC272A99	1												X							A972	
↓	1809	AC08P22A99	1												X							A757	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] / S. Simpson	5.25.99 1015	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME
[redacted]			[redacted]	

AIR BILL NO.: 810431413736

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A170, A171, A172, A173

REMARKS:

SHIPPED TO CAUCK'S TCS [redacted] LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0059

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

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
5-24	1212	AC272A99-F	1																X			A975	
	1026	AC272A99	1				X															A971	
	1718	AC08P22A99	1						A													A749	
	1729		1						A													A750	
	1739		1						A													A751	
	1810		1													X		X				A758	
	1818		1																X			A759	
	1800		1								X											A755	
	1711		1				X															A756	
	1749		1							A,D												A753	
	1827	AC08P22A99-F	1																X			A760	
	1835		1							A,C,D												A754	
5-25	1103	AC252A99	1						A,B													A932	
	1055		1						A,B													A931	
	1133		1								X											A939	
	1138		1													X		X				A943	
	1051		1			X																A942	
	1135		1												X							A941	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	5-25-99 1815	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413736

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A174, A175, A176, A177

REMARKS:

SHIPPED TO LAUCK'S TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0060

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

SAMPLERS (SIGNATURE): [illegible] / 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
5-25	1109	AC252A99	1						A,B													A933	
↓	1116	↓	1						A,B													A936	
	1121		1						A,B													A935	
	1052		1				X															A940	
	1143		1																X			A944	
	1127	↓	1							A,B,D												A937	
	1152	AC252A99-F	1																X			A945	
↓	1156	↓	1							A,C,D												A938	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	5-25-99 1815	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME
[redacted]			[redacted]	

AIR BILL NO.: 81043/413736

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A178, A179, A180, A181

REMARKS:

SHIPPED TO CAUCKS T[redacted]NG CAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0061

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

SAMPLERS (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
5.24	0710	TB052499 01	2	B																		A1206, A1207	
↓	1025	AC272A99	3	B																		A961, A962, A963	
	1205	AC302A99	3	B																		A976, A977	A978
↓	1710	AC08P22A99	3	B																		A746, A747	A748
5.25	0720	TB052599 01	2	B, C																		A1225 A1193	
↓	1045	AC252A99	3	B, C																		A926 A927	A928

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
	5.25.99 1815	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413736

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A182, A183

REMARKS:

SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0055

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

SAMPLERS (SIGNATURE): Fred Wheaton, Tim 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
5.22	0855	AC042A99	2		X																	A714, A715	
5.22	1202	AC102A99	2		X																	A779, A780	
5.22	1310	AC122A99	2		X																	A819, A820	
5.25	1050	AC252A99	2		X																	A929, A930	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Tim S. Simpson	5.25.99 1830 1815	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413780

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A184, A185

REMARKS: SHIPPED TO MICROSEEPS

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0045

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

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
5.21	1100	AC04-2A99	1													X		X				A728	
5.22	0940	↓	1						A,B													A716	
↓	1010	↓	1						A,B													A717	
↓	1030	↓	1						A,B													A718	
↓	1740	↓	1						A,B													A720	
↓	0915	↓	1				X															A725	
↓	1750	↓	1							A,B,D												A722	
↓	1810	↓	1								X											A724	
↓	1815	↓	1												X							A726	
5.23	1640	↓	1																X			A729	
↓	1700	AC04-2A99-F	1																X			A730	
↓	1720	↓	1							A,C,D												A723	
5.22	1815	AC202A99	1						A													A914	
↓	1820	↓	1						A													A916	
↓	1810	↓	1						A													A915	
↓	1825	↓	1							A,D												A918	
↓	1834	↓	1												X							A922	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible]	5.24.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A144, A145, A146, A147

REMARKS:

SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0045

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651 CTO 38

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
5.22	1830	AC202A99	1								X											A920	
↓	1835	↓	1													X		X				A923	
↓	1839	↓	1																X			A924	
↓	1845	AC202A99-F	1																X			A925	
↓	1850	↓	1							A,C,D												A919	
5.21	1309	AC112A99	1				X															A810	
↓	1311	↓	1						A,B													A801	
↓	1319	↓	1						A,B													A802	
↓	1326	↓	1						A,B													A803	
↓	1340	↓	1						A,B													A806	
↓	1400	↓	1												X							A811	
↓	1332	↓	1						A,B													A805	
↓	1347	↓	1							A,B,D												A807	
↓	1402	↓	1													X		X				A813	
↓	1307	↓	1			X																A812	
↓	1353	↓	1								X											A809	
↓	1410	↓	1																X			A814	
↓	1420	AC112A99-F	1																X			A915	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S Simpson	5-24-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME
[redacted]			[redacted]	

AIR BILL NO.: 81043141379 1

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A148, A149, A150, A151

REMARKS:

SHIPPED TO LAUCKS TA[redacted]S LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0048

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
5-22	1622	AC122A99-F	1																X			A835	
↓	1637	↓	1							A,C,D												A828	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simps	5-24-99 1600	FED EX		
RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB °C

COOLER CUSTODY SEAL NOS: A152, A153, A154, A155

REMARKS: SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0047

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
5.21	1428	AC112A99·F	1							A,C,D												A806	
5.22	1214	AC102A99	1						A,B													A781	
	1220		1						A,B													A782	
	1226		1						A,B													A783	
	1232		1						A,B													A785	
	1238		1						A,B													A786	
	1209		1				X															A790	
	1257		1												X							A791	
	1205		1			X																A792	
	1245		1							A,B,D												A787	
	1251		1								X											A789	
	1258		1													X		X				A793	
	1305		1																X			A794	
	1314	AC102A99·F	1																X			A795	
	1320		1							A,C,D												A788	
	1806	AC202A99	1				X															A921	
	1325	AC122A99	1				X															A830	
	1530		1												X							A831	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible]	5.24.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A152, A153, A154, A155

REMARKS:

SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0049

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
5.22.99	1345	AC122A99	1						A,B													A821	
	1355		1						A,B													A822	
	1410		1						A,B													A826	
	1430		1						A,B													A823	
	1445		1						A,B													A825	
	1315		1			X																A832	
	1515		1							A,B,D												A827	
	1525		1								X											A829	
	1545		1													X		X				A833	
	1602		1																X			A834	
5.23	1428	AC262A99	1												X							A957	
	1251		1				X															A956	
	1411		1							A,D												A953	
	1427		1								X											A955	
	1448		1													X		X				A958	
	1512		1																X			A959	
	1545	AC262A99-F	1																X			A960	
	1620		1							A,C,D												A954	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible]	5.24.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A156, A157, A158, A159

REMARKS: SHIPPED TO CAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0050

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
5-23	1353	AC262A99	1						A													A951	
↓	0000	FD0523990F	1																X			A895	
	0000	FD0523990F	1												X							A892	
	1115	AC152A99	3												X							A847, A862, A877	MS/MSD
↓	1142	AC152A99.F	3																X			A890, A865, A880	↓

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	5-24-99 1600	FED EX		
RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A156, A157, A158, A159

REMARKS: SHIPPED TO LAUCKS [illegible]TING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0052

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 9038

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
5-23	1310	AC262A99	1						A													A949	
↓	1330	↓	1						A													A950	
	0000	FD0523990I	1				X															A891	
	0000		3						A													A884, A885	A886
	0000	↓	4							A,D	X					X		X	X			A888, A890, A893, A894	
	0000	FD0523990I-F	1							A,C,D												A889	
	1155	AC152A99-F	3							A,C,D												A844, A859	A874 MS/MSD
	1003	AC152A99	3				X															A846, A861,	A876 ↓
	1118	↓	3													X		X				A848, A863	A878
↓	1126	↓	3																X			A849, A864	A879 ↓

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	5-24-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A160, A161, A162, A163

REMARKS: SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0053

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651 CTO 38

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
5-23	1016	AC152A99	3						A													A839, A840, A969	
↓	1016	↓	3						A													A870, A854, A855	
	1040		3						A													A941, A856, A871	
	1003		3								X											A845, A860, A875	
↓	1050	↓	3							A,D												A843, A858, A873	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	5-24-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A164, A165, A166, A167

REMARKS:

SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0054

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 GT038

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
5.21	0720	TB052199 01	2	A,B,C																		A1221, A1222	
5.21	1303	AC112A99	3	B,C																		A796, A797	A798
5.22	0845	AC042A99	3	B,C																		A711, A712	A713
↓	1200	AC102A99	3	B,C																		A776, A777	A778
	1305	AC122A99	3	B,C																		A816, A817	A818
↓	1805	AC202A99	3	B																		A911, A912	A913
5.23	0700	TB052399 01	2	A,B																		A1223, A1224	
↓	0000	FD052399 01	3	B																		A881, A882	A883 (DUP OF AC152A99 MS/MSD)
	1000	AC152A99	3	B																		A836, A837	A838
	1000	AC152A99	3	B																		A851, A852	A853
	1000	AC152A99	3	B																		A866, A867	A868
↓	1235	AC262A99	3	B																		A946, A947	A948

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	5.24.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413791

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A168 A169

REMARKS: SHIPPED TO UNCLES TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0044

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
5.17	1650	AB042A99	2		A																	A644, A645	
5.18	1234	AC032A99	2		A																	A694, A695	
↓	1838	AB022A99	2		A																	A624, A625	
5.19	1340	AB05199901	2		A																	A1174, A1175	
5.20	0000	FD05209901	2		A																	A1094, A1095	
↓	0831	ACRB2A99	2		A																	A1014, A1015	
	1024	ACRA2A99	2		A																	A994, A995	
	1335	ASPA2A99	2		A																	A1074, A1075	
↓	1753	ASPC2A99	2		A																	A1114, A1115	
5.21	1305	AC112A99	2		A																	A799, A800	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible]	5.21.99 1830	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413940

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A142, A143

REMARKS: SHIPPED TO MICROS[illegible]S

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

SAMPLE POINT ASPA2A99
ALSO RUN MS/MSD
& THIS POINT WAS DUPED
FD0520990 1

0043

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651 CTO 38

SAMPLERS (SIGNATURE): Fred Ramsey, Tim 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
5.19	1605	AC072A99	1												X							A742	
↓	1724	AC02P22A99	1												X							A672	
5.20	0858	ACRB2A99.F	1							A,C,D												A1023	
5.19	0705	TB0519990 2	2	B																		A1191, A1192	
	0000	FD0519990 1	3	B																		A676, A677,	A678 AC02P22A99
	1425	AC072A99	3	B																		A731, A732,	A733
↓	1618	AC02P22A99	3	B																		A661, A662,	A663
5.20	0715	TB0520990 1	2	B,C																		A1152, A1153	
	0000	FD0520990 1	3	B,C																		A1091, A1092,	A1093 ASPA2A99
	0830	ACRB2A99	3	B,C																		A1011, A1012	A1013
	1331	ASPA2A99	9~~3~~	B,C																		A1031, A1032,	A1073 MS/MSD KS
	1023	ACRA2A99	9~~3~~ KS	B,C	3																	A991, A992,	A993 ~~MS/MSD~~
	1750	ASPC2A99	3	B,C																		A1033, A1053,	A1051, A1052, A1071, A1072
																						A1111, A1112,	A1113

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
Tim S. Simpson	5.21.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413817

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A140, A141

REMARKS:

SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

SAMPLERS (SIGNATURE): [illegible] / 7E/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
5.19	1428	AC072A99	1				X															A741	
↓	1545	↓	1							A,D												A738	
↓	1602	↓	1								X											A740	
↓	1658	AC072A99-F	1																X			A745	
↓	1721	↓	1							A,C,D												A739	
5.20	0835	ACRB2A99	1						A,B													A1016	
↓	0837	↓	1						A,B													A1017	
↓	0840	↓	1						A,B													A1018	
↓	0843	↓	1						A,B													A1020	
↓	0845	↓	1						A,B													A1021	
↓	0832	↓	1			X																A1027	
↓	0833	↓	1				X															A1025	
↓	0847	↓	1							A,B,D												A1022	
↓	0848	↓	1								X											A1024	
↓	0850	↓	1												X							A1026	
↓	0851	↓	1													X		X				A1028	
↓	0853	↓	1																X			A1029	
↓	0856	ACRB2A99-F	1																X			A1030	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
7E/S Simpson	5.21.99 1600	FED EX		
RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413817

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A136, A137, A138, A139

REMARKS:

SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0041

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
5.19	0000	FD05199901	3						A													A679, A680,	A681
	0000		1				X															A686	
	0000		1							A, D												A683	
	0000		1																X			A689	
	0000		1								X											A685	
	0000		1												X							A687	
	0000	FD05199901 F	1							A, C, D												A684	
	0000		1																X			A690	
	1739	AC028 22A99	1																X			A674	
5.20	0000	FD05209901	1								X											A1104	
	1810	ASPC2A99	1												X							A1126	
5.19	1455	AC072A99	1						A													A734	
	1511		1						A													A735	
	1528		1						A													A736	
	1637		1																X			A744	
	1621		1													X		X				A743	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	5.21.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413817

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A132, A133, A134, A135

REMARKS: SHIPPED TO LAYCK'S TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

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
5.20	0000	FD0520990 1-F	1							A,C,D												A1103	
↓	0000	↓	1																X			A1110	
↓	0000	FD0520990 1	3				X		A,B						X							A1105, A1106,	A1099
↓	0000	↓	1						A,B													A1098	
5.19	1749	AC02P22A99-F	1																X			A675	
↓	1810	↓	1							A,C,D												A669	
↓	1704	AC02P22A99	1							A,D												A668	
↓	1715	↓	1								X											A670	
↓	1726	↓	1													X		X				A673	
↓	1634	↓	1						A													A665	
↓	1644	↓	1						A													A664	
↓	1655	↓	1						A													A666	
↓	1621	↓	1				X															A671	
5.20	0000	FD0520990 1	1							A,B,D												A1102	
5.21	1020	AC042A99	1			X																A727	
5.19	0000	FD0519990 1	1													X		X				A688	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	5.21.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413817

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A128, A129, A130, A131

REMARKS:

SHIPPED TO LAUCKS [illegible]TING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0039

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
5.20	1027	ACRA2A99	2						A,B													A996, A997	
	1028		3						A,B													A998, A999, A1000	
	1025		1			X																A1007	
	1026		1				X															A1005	
	1029		1							A,B,D												A1002	
	1030		1								X											A1004	
	1031		1												X							A1006	
	1032		1													X		X				A1008	
	1033		1																X			A1009	
	1034	ACRA2A99-F	1																X			A1010	
	0000	FD052099 01	2						A,B													A1097, A1100	
	0000		1													X		X				A688	
	0000		1			X																A1107	
	0000		1																X			A1109	
	0000		1						A,B													A1096	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
7/1 S. Simpson	5.21.99 1600	FED · EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413817

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A124, A125, A126, A127

REMARKS: SHIPPED TO LAYCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0038

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
5-20	1424	ASPA2A99-F	3																X			A1050, A1070,	A1090
	1428	↓	3							A,C,D												A1043, A1063,	A1083
	1802	ASPC2A99	1						A,B													A1116	
	1804		1						A,B													A1117	
	1805		1						A,B													A1118	
	1806		1						A,B													A1120	
	1807		1						A,B													A1121	
	1755		1			X																A1127	
	1757		1				X															A1125	
	1808		1							A,B,D												A1122	
	1809		1								X											A1124	
	1812		1													X		X				A1128	
	1813	↓	1																X			A1129	
	1814	ASPC2A99-F	1																X			A1130	
↓	1815	↓	1							A,C,D												A1123	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	5-21-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8104314-3817

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A116, A121, A122, A123

REMARKS: SHIPPED TO CAUCK'S [illegible]TING LAB

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 Neu

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
5.20	1401	ASPA2A99	3						A,B													A1039, A1059, A1079	MS/MSD
	1402		3						A,B													A1040, A1060, A1080	
	1408		3								X											A1044, A1064, A1084	
	1412		3												X							A1046, A1066, A1086	
	1345		3				X															A1045, A1065, A1085	
	1340		3.			X																A1047, A1067, A1087	
	1035	ACRA2A99.F	1							A,C,D												A1003	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
J. S. Simpson	5.21.99 1600	FED EX		
RECEIVED BY (SIGNATURE):	**RELINQUISHED BY (SIGNATURE):**	**DATE/TIME**	**RECEIVED FOR LAB BY (SIGNATURE):**	**DATE/TIME**

AIR BILL NO.: 810431413817

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A117, A118, A119, A120

REMARKS: SHIPPED TO CAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0031

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

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
5-20-99	1352	ASPA2A99	3						A,B													A1036, A1056, A1076	MS/MSD
↓	1354	↓	3						A,B													A1037, A1057, A1077	
	1359		3						A,B													A1038, A1058, A1078	
	1422		3																X			A1049, A1069, A1089	
	1418		3													X		X				A1048, A1068, A1088	
↓	1405	↓	3							A,B,D												A1042, A1062, A1082	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	5-21-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413 ~~840~~ 817 KS

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A112, A113, A114, A115

REMARKS: SHIPPED TO ~~AMERICAN~~ LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0035

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
5.18	1507	AC172A99	1						A													A900	
	1512		1						A													A901	
	1515		1						A													A999	
	1503		1				X															A906	
	1520		1							A,D												A903	
	1525		1								X											A905	
	1530		1												X							A907	
	1535		1													X		X				A908	
	1538		1																X			A909	
	1540	AC172A99-F	1																X			A910	
	1544		1							A,C,D												A904	
	1251	AC032A99	1						A,B													A697	
	1256		1						A,B													A698	
	1302		1						A,B													A700	
	1308		1						A,B													A701	
	1237		1			X																A707	
	1325		1													X		X				A708	
	1241		1			X	X															A705	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[signature]	5.19.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 8104 3141 3839

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A100, A101, A102, A103

REMARKS: SHIPPED TO LAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0034

CHAIN OF CUSTODY RECORD

NSWC CRANE, INDIANA

PROJECT NO.: 7651 CTO 38

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
5-18	1954	AB022A99	1						A,B													A626	
	1901		1						A,B													A627	
	1909		1						A,B													A628	
	1917		1						A,B													A630	
	1925		1						A,B													A631	
	1842		1			X																A637	
	1940		1								X											A634	
	1846		1				X															A635	
	1955		1																X			A639	
	2002	AB022A99-F	1																X			A640	
	1933	AB022A99	1							A,B,D												A632	
	2009	AB022A99-F	1							A,C,D												A633	
	1947	AB022A99	1													X		X				A638	
	1946		1												X							A636	
5-17	1723	AB042A99	1						A,B													A650	
	1736		1							A,B,D												A652	
	1759		1																X			A659	
	1743		1								X											A654	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	5-19-99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME
[illegible]			[illegible]	

AIR BILL NO.: 810431413839

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A92, A93 A94 A95

REMARKS:
SHIPPED TO LAUCKS T[illegible]TING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

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
5.17	1706	AB042A99	1						A,B													A646	
↓	1712	↓	1						A,B													A647	
	1717		1						A,B													A648	
	1728		1						A,B													A651	
	1700	↓	1				X															A655	
	1806	AB042A99·F	1																X			A660	
	1812	↓	1							A,C,D												A653	
	1753	AB042A99	1													X		X				A658	
	1653	↓	1			X																A657	
↓	1750	↓	1												X							A656	
5.18	1337	AC032A99·F	1																X			A710	
↓	1342	↓	1							A,C,D												A703	
	1312	AC032A99	1							A,B,D												A702	
	1246	↓	1						A,B													A696	
	1331		1																X			A709	
	1319		1								X											A704	
↓	1323	↓	1												X							A706	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
K. S. Simpson	5.19.99 1600	FED EX		
RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413839

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A96, A97, A98 A99

REMARKS: SHIPPED TO CAUCKS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

0036

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
5.19.99	1107	AC09P22A99	1						A													A764	
	1114		1						A													A765	
	1121		1						A													A766	
	1103		1				X															A771	
	1127		1							A,D												A768	
	1134		1								X											A770	
	1144		1												X							A772	
	1145		1													X		X				A773	
	1151		1																X			A774	
	1158	AC09P22A99.F	1																X			A775	
	1204		1							A,C,D												A769	
	1345	AB051999 01	1				X															A1185	
	1354		1						A,B													A1177	
	1402		1							A,B,D												A1182	
	1409		1													X		X				A1188	
	1358		1						A,B													A1180	
	1412		1																X			A1189	
	1405		1								X											A1184	

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible]	5.19.99 1600	FED EX		

RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413939

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ___ °C

COOLER CUSTODY SEAL NOS: A104, A105, A106, A107

REMARKS:
SHIPPED TO CAUCUS TESTING LAB

TETRA TECH NUS, INC.
661 Andersen Drive • Pittsburgh, PA 15220

NSWC CRANE, INDIANA

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7651 CTO 38

SAMPLERS (SIGNATURE): [illegible] 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
5.17	1300	TB05179901	2	B,C																		A1131, A1132	TRIP BLANK
↓	1646	AB042A99	3	B,C																		A641, A642, A643	
5.18	0710	TB05189901	2	B,C																		A1133, A1151	
	1310	TB05189902	2	B																		A1287, A1286	
	1230	AC032A99	3	B,C																		A691, A692, A693	
	1500	AC172A99	3	B																		A896, A897, A898	
↓	1935	AB022A99	3	B,C																		A621, A622, A623	
5.19	0700	TB05199901	2	B,C																		A1288, A1289	
	1100	AC09P22A99	3	B																		A761, A762, A763	
	1332	AB05199901	3	B,C																		A1171, A1172, A1173	(AMBIENT BLANK
	1347	↓	1					A,B														A1181	↓
	1352		1					A,B														A1176	
	1356		1					A,B														A1178	
	1334		1			X																A1187	
	1407	↓	1												X							A1186	
	1414	AB05199901-F	1																X			A1190	
↓	1416	↓	1							A,C,D												A1183	↓

RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME
[illegible] S. Simpson	5.19.99 1600	FED EX		
RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME	RECEIVED FOR LAB BY (SIGNATURE):	DATE/TIME

AIR BILL NO.: 810431413839

TEMP. BLANK: AT SHIPMENT 4 °C AT LAB ____ °C

COOLER CUSTODY SEAL NOS: A108, A109, A110, A111

REMARKS: SHIPPED TO LAUCKS TESTING LAB

ATTACHMENT 8

EQUIPMENT CALIBRATION LOGS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

NSWC Crane
Field Form
Revison: 0
January 1999

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : 6820 SONDE W/610-D

PROJECT NAME : NSWC Crane

SERIAL NUMBER: 98K1154 / 217714

PROJECT NUMBER : 7651

MANUFACTURER : YSI

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED*	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
5-17-99	MANUFACTURES		PROCEDURES:	TWO PT. pH CAL			*pH 7.0 BUFFER (QED)
				TWO pT. TURB CAL			- EXP DATE 11/13/2000
				ONE PT FOR ORP,	DO		- LOT No. 81113
				SP. COND			*pH 4.0 BUFFER QED
					FLR		- EXP DATE 10/21/2000
5.19.99	CHECKED ALL		PARAMETERS		TSP		- LOT No. 81021
5.20.99	CHECKED	ALL	PARAMETERS		TSP		* COND STANDARD
5-21-99	CHECKED	ALL	PARAMETERS		FLR		- EXP DATE 1-12-2001
5.22.99	CHECKED	ALL	PARAMETERS		TSP	CAL. DO	- 718 mg
5.23.99	CHECKED	ALL	PARAMETERS		TSP		* YSI TURB. STD 6073
5.24.99	"	"	"		SWR		100 NTU OPENED 3/6/99
5.25-99	"	"	"		SWR		* AMCO AEPA-1 TURB. STD
							0.0 NTU
							* YSI 3682 ZOBELL SOL
							LOT # 9900771 EXP 4/1
							LOT # 9980060 EXP 2/1

Instrument Rented From: QED

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : 6820 SONDE w/610-D

PROJECT NAME : NSWC Crane

SERIAL NUMBER: 98J1342 / 217711

PROJECT NUMBER : 7651

MANUFACTURER : YSI

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED *	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
5-17-99			MANUFACTURES	PROCEDURES: TWO PT. PH CAL			*pH 7.0 BUFFER (QED)
				: TWO PT TURB. CAL			- EXP DATE 11/13/2000
				ONE PT FOR			-LOT NO. 81113
				ORP, DO, SP COND.			*pH 4.0 BUFFER QED
						FLR	- EXP. DATE 10/21/2000
5.18.99	CHECKED/CAL. AS		NEEDED	ALL PARAMETERS		TRSP	-LOT NO. 81021
5.19.99		SAME				TRSP	*CONDUCTIVITY STANDARD
5.20.99		SAME				TRSP	- EXP DATE 1-12-2001
5.21.99		SAME	+ CAL	DO		TRSP	-71803
5.22.99		SAME				TRSP	* YSI TURB STD. 6073
5.23.99		SAME				TRSP	100 NTU OPENED 3/10/99
5-24-99		"				SWR	*AMCO AEPA-1 TURB. STD.
5-25-99		"					0.0 NTU
							* YSI 3682 ZOBELL SOL.
							LOT # 9900571 EXP 4/1
							LOT # 99B0060 EXP 2/1

Instrument Rented From: QED

NSWC Crane
Field Form
Revison: 0
January 1999

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : PHOTOVAC 2020 PID PROJECT NAME : NSWC Crane

SERIAL NUMBER: ED HF 348 PROJECT NUMBER : 7651

MANUFACTURER : PE PHOTOVAC

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
5-17-99	100 ppm	ISOBUTYLENE	AUTO	NONE	100ppm	JLR	
		AIR 100ppm	CAL.				
5-18-99	"	"	"	"	"	JLR	
5.19.99	"	"	"	"	"	RSP	
5-21-99	"	"	"	"	"	SWN	
5/22/99	"	"	"	"	"	SWN	
5.23.99	"	"	"	"	"	RSP	
5/24/99	"	"	"	"	"	SWN	
5/25/99	"	"	"	"	"	SWN	

Instrument Rented From: US ENV. RENTAL CORP.

ATTACHMENT 9

FIELD NOTEBOOK PAGES
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

TITLE NSWC CRANE **PROJECT** 7651

MONDAY 5.17.99 **BOOK** 2397

Work continued from Page WEATHER: SUNNY 68-85°F @ 1535 STORM

0700 KEITH SIMPSON, SCOTT NEIL & FRED RAMSER ON SITE. FR PICKED-UP 10 DAY PASS.
- SUNDAY PM WAS TRAVEL TO SITE.
MOVING SHIPPED IN SUPPLIES FROM BLD. 3260 & 41 TO TRAILER

1000 KS & FR CALIBRATE YSI METERS (2) FR CAL. PID. SN WORKING ON BOTTLE SETS
LOAD TRUCKS WITH SUPPLIES.

1230 KS & ~~SN~~ KS FR TO ABG SITE WIDE WATER LEVELS. COMPLETE 15 OF

1530 THE 18 WELLS @ 1531 HAD TO LEAVE AREA DUE TO BURNING WILL COMPLETE WATER LEVELS 5.18.99 AM

1535 THUNDER STORM WITH HAIL RAIN LASTING ≈ 20 MIN.
SN @ WELL 3.B04 PURGING & SAMPLING FR ALSO @ 3B04 "TRAINING".

1720 KS RETURN TO TRAILER RUN CHEM. FIELD TEST.

1855 SN & FR RETURN FROM SAMPLING COMPLETE CHEM FIELD TEST.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE K. S. Simpson DATE 5.17.99

WITNESS DATE

TITLE NSWC CRANE 5.17.99

PROJECT NO. 7651

BOOK 2397

Work continued from Page 79

RAIN STARTING UP AGAIN AT 1755
HEAVY RAIN WITH T STORMS.
WILL REDO WATER LEVELS 5.18.99
IF IT IS NOT RAINING
CLEAN EQUIPMENT AND UN-LOAD
TRUCKS
2010 COMPLETE FIELD CHEM TEST
DEPART TRAILER FOR HOTEL

— DAILY SUMMARY —
ON SITE: T. NUS
S. NEIL, K. SIMPSON & F. RAMSEUR
WATER LEVELS/INSPECTIONS STARTED
1 WELL SAMPLED
SEE ALSO: FIELD NOTES &
LOG BOOKS 1309, 2426

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson

WITNESS

DATE 5.17.99

DATE

TITLE NSWC CRANE TUESDAY 5.18.99

PROJECT NO. 7651

BOOK 2397

Work continued from Page WEATHER: RAIN OVERNITE
OVERCAST DAMP 63°F RAIN ON/OFF

0700 FR, KS & SN @ TRAILER PREP FOR
SAMPLING CAL. PID & YSI's
CALLED RALPH B. WE WILL REDO
ALL ABG WATER LEVELS
HIGH HUMITY & RAIN PID READING
QUESTIONABLE BETWEEN 0 & 300 PPM
0805 KS & FR TO PHONE CENTER START
PAPER WORK FOR ADDITIONAL PHONE
LINE NEED TO STOP BACK AND
SEE PAULA.
0840 KS & FR TO ABG RE-START W/L's
1145 COMPLETE WATER LEVELS.
STOPPED AT PHONE CENTER, TALKED
WITH PAULA FOR 2ND PHONE LINE ON
BASE. (BLD. 2693) OUR NEW PHONE
NUMBER S/B 812 854 6221
1200 LUNCH / GAS / ICE / TRAILER
1230 @ TRAILER LOAD TRUCK
FR & KS SET UP @ 03C17
KS & FR RETURN TO TRAILER
RUN FIELD CHEM TEST
FR & SN TO 03B02, KS WORKING
ON PAPER WORK

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 82

SIGNATURE K. S. Simpson

WITNESS

DATE 5.18.99

DATE

TITLE NSWC CRANE
5.18.99

PROJECT NO. 7651
BOOK 2397

Work continued from Page 81

1950 FR & SN RETURN FROM SAMPLING
UNLOAD & CLEAN EQUIPMENT
2040 FR & SN DEPART SITE
KS COMPLETES CHEM. FIELD TEST
2105 AND DEPARTS SITE.

— DAILY SUMMARY —
ON SITE TT NUS
S. NEIL, K. SIMPSON & F. RAMSER
3 WELLS SAMPLED
SITE WIDE WATER LEVELS COMPLETED
SEE ALSO FIELD NOTES & LOG
BOOKS 2426, 1309, 2456

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS
DATE 5.18.99
DATE

TITLE NSWC CRANE

PROJECT NO. 7651
BOOK 2397

Work continued from Page

ROUND 3 ABG SAMPLING (MAY 99)

MONITORING POINT	SAMPLE DATE	QA	COMMENTS
03B02	5.18.99	—	
03B04	5.17.99	—	
03C02P2	5.19.99	DUP	
03C04	5.21-22-23 99	—	
03C03	5.18.99	—	
03C07	5.19.99	—	
03C08P2	5.24.99		
03C09P2	5.19.99	—	
03C10	5.22.99	—	
03C11	5.21.99	—	
03C12	5.22.99	—	
03C15	5.23.99	DUP & MS/MSD	
03C17	5.18.99	—	
03C20	5.22.99	—	
03C25	5.25.99	—	E.P. JOHNS ON SITE
03C26	5.23.99	~~DUP~~ KS	
03C27	5.24.99	—	
03C30	5.24.99	—	
CR A	5.20.99	—	
CR B	↓	—	
SP A		MS/MSD DUP	
SP C		—	

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS
DATE 5.25.99
DATE

TITLE NSWC CRANE
WEDNESDAY 5.19.99

PROJECT NO. 7651
BOOK 2397

Work continued from Page

WEATHER: NICE SUNNY 65-80°F

0700 KS ON SITE PREP FOR SAMPLING
0710 BASE PHONE CO. @ TRAILER TO HOOK-UP 2ND PHONE LINE
0720 SN & FR ON SITE PREP FOR SAMPLING
0800 FR & SN TO ABG
KS PACKING SAMPLES FOR SHIPMENT
1135 TO BLD 41 FOR BOTTLE PICK-UP THEN BLD 3260
KS RETURN TO TRAILER LOAD
1250 BOTTLES TO ABG FOR AMBIENT BLANK - AB 051999 01 —
SAMPLED ON WEST SIDE OF BREAK ROOM (OUTSIDE) BLD 2908
THIS IS AS CLOSE AS YOU CAN GET WHEN THEY BURN.
BURN STARTED AT 1330
START SAMPLING @ 1332
WIND FROM WEST TO EAST (FROM BURN PANS TO BREAK ROOM)
GOOD CONDITIONS FOR A AMBIENT BLANK. NO ODOR NOTED FROM BURN FILLED ALL BOTTLES FROM 5 GAL DI CUBE, DISSOLVED WERE TRANSFERED TO TRAILER FOR FREEZING

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS

DATE 5.19.99
DATE

TITLE NSWC CRANE
5.19.99

PROJECT NO. 7651
BOOK 2397

Work continued from Page

1400 RETURN TO TRAILER PACK FOR FED EX. PICK-UP @ 1545
5 COOLERS TO LAUCKS TESTING
MARING-UP BOTTLE SETS FOR SP/CR SAMPLING 5.20.99
PREP FOR CTO 49 (SWL) SAMPLING
1835 FR & SN RETURN FROM SAMPLING
RUN CHEM FIELD TEST (NA)
CAL. & CLEAN EQUIPMENT
PREP. EQUIPMENT FOR 5.20.99
1940 DEPART SITE FOR HOTEL

— DAILY SUMMARY —
ON SITE T+M'S:
S. NEIL, K. SIMPSON, F. RAMSER
3 WELLS SAMPLED, 1 DUP
1 AMBIENT BLANK
SEE ALSO FIELD NOTES & LOG BOOK NUMBERS: 2426, 2456, 1309

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS

DATE 5.19.99
DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

FRIDAY 5-21-99 **BOOK** 2397

Work continued from Page WEATHER: NICE, SUNNY 65-70 °F

5-20-99 WORKING ON CTO 48
LOG BOOK #2449

0700 KS, SN & FR ON SITE PREP FOR SAMPLING. FR TO ABG WELL 03C04
SN PAPER WORK, KS PACKING SAMPLES FOR SHIPMENT

0850 ORDERED 500 TAGS FROM LAB SAFETY FOR MONDAY REF. # A424705

1530 FED EX AT TRAILER PICK-UP 9 COOLERS TO LAUCK TESTING LAB
PACKING FOR MICROSEEPS WILL DRIVE COOLER TO FED EX
SN RUN CHEM. FIELD TEST
FR CALIBRATING YSI & PID FOR 5-22-99
KS WORK ON PAPER WORK
CALLED BOTH LAB TO LET THEM KNOW THAT THEY WILL RECEIVE FED EX SAT.

1830 DEPART SITE FOR HOTEL

VOID

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE WITNESS [signature] DATE 5-21-99 DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

SATURDAY 5-21-99 **BOOK** 2397

Work continued from Page WEATHER: STORM OVERNITE, 65-70 °F

0710 ON SITE KS, SN & FR PREP FOR SAMPLING AT ABG
POWER IS OUT AT TRAILER, THE BASE HAS POWER OUTAGES FROM THE STORM AND IS WORKING ON THEM.

0820 SN & FR TO ABG GW SAMPLING
KS PAPER WORK, CLEANING TRAILER
TO BASE SERVICE STATION GAS/ICE

1100 TO ABG RELIEVED FR SO HE COULD EAT LUNCH @ MW 03C12
FR, SN & KS CONTINUE SAMPLING @ ABG.
SN TO TRAILER; RUNNING CHEM. TEST
KS & FR COMPLETE 03C12 TO TRAILER & RUN CHEM. FIELD TEST
FR & SN @ ABG GW SAMPLING

1815 KS TO SAM'S CLUB & OFFICE MAX FOR SUPPLIES, TO HOTEL

VOID

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE WITNESS [signature] DATE 5-22-99 DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

SUNDAY 5.23.99 **BOOK** 2397

Work continued from Page WEATHER: NICE SUNNY 65-78°F

0705 KS, SN & FR ON SITE
LOAD TRUCKS.
0745 SN & FR TO ABG FOR GW
SAMPLING. KS PAPER WORK @ TRAILER
KS TO ABG AND ASSIST SN & FR
WORKING WITH SN @ WELL 3C15
1240 RETURN TO TRAILER. STORE
SAMPLE & RUN FIELD CHEM. TEST
SN & FR CONTINUE TO SAMPLE
GW @ ABG
1430 RAIN STARTING ≈ 2:30 PM CONTINUING
THROUGHT-OUT THE WORK DAY.
1640 KS @ TRAILER PREP FOR SAMPLE
SHIPMENT ON 5.24.99
1730 FR & SN RETURN TO TRAILER
CLEAN EQ, TRAILER & PAPERWORK
1820 DEPART SITE TO HOTEL

VOID

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 5.23.99

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7651

MONDAY 5-24-99 **BOOK** 2397

Work continued from Page WEATHER: COOL, SUNNY 56-68°F

0700 ON SITE KS, SN & FR. PREP FOR
SAMPLING AT ABG
SN & FR TO ABG KS PACKING
SAMPLES FOR SHIPMENT.
ORDERED ON CYL. OF NITROGEN
TO BASE GAS STATION FOR GAS/ICE
1010 NITROGEN DELIVERED
FED EX DELIVERED SAMPLE TAGS
1200 KS TAKES LUNCH AND TAGS TO
FR @ OBC30 & SN @ OBC27.
RETURN TO TRAILER CONTINUE
PACKING FOR FED EX.
PACKED 7 COOLERS TO LAUCKS
TESTING LAB FED EX.
1600 FR RETURN TO TRAILER RUNNING
FIELD CHEM TEST.
1800 FR DEPART SITE TO HOTEL
KS TO ABG CHECK ON SN AND
HELP WITH SAMPLING. (OBC09P2)
1850 KS & SN RETURN TO TRAILER, EMPTY
SUV RUN FIELD CHEM TEST
1925 DEPART SITE FOR HOTEL

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 5.24.99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

TUESDAY 5.25.99 BOOK 2397

Work continued from Page WEATHER SUNNY COOL 58-65°F

0705 KS, FR & SN ON SITE AT TRAILER CALIBRATING EQUIPMENT AND LOADING TRUCKS FOR GW SAMPLING @ 03C25

0720 E.P. JOHNS ON SITE TO 03C25 WITH SN, KS & FR FOR GW SAMPLING

0810 ALL 4 OF US WENT TO WELL 03C25 THE WELL IS IN A REMOTE LOCATION AND REQUIRES EQUIPMENT TO BE CARRIED IN ≈ 1/3 MILE.

1220 DEPART WELL 03C25 TO LUNCH TO TRAILER KS, SN & FR WITH E.P. JOHNS. RUNNING FIELD CHEM TEST, PACKING EQUIPMENT AND PACKING SAMPLES.

1530 E.P. JOHNS DEPARTS SITE KS SN & KS CONTINUE TO DEMOB TRAILER AND PACK EQUIPMENT FOR SHIPMENT.
TO FED EX 4 COOLERS TO LAUCKS & ONE TO MICROSEEPS

1810 RETURN TO HOTEL

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE K. S. Simpson DATE 5.25.99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7651

WED 5.26.99 BOOK 2397

Work continued from Page WEATHER: SUNNY 50-65°F

0720 KS, SN & FR @ TRAILER DEMOB EQUIPMENT PACK FOR FED EX GET NOTES, LOGBOOKS, PAPERWORK IN ORDER FOR RETURN TO PGH
5 49 "T", 21 KS SMALL "Q" & 2 REG. LEFT OUT SIDE FOR BOC GAS PICK UP TODAY < 12:00.
FR & SN TO BASE SERVICE STATION GAS FOR TRUCKS & BUG FOR LETTER STATING THAT THERE WERE NO ROOMS AVAILABLE FOR THIS SHIFT.

0930 DEPART BASE TO FED EX THEN AIRPORT / PGH / HOME.

END OF SHIFT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE K. S. Simpson DATE 5.26.99

WITNESS DATE

NSWC - CRANE, INDIANA

JOB # 7651 / CTO 38

Ground water Sampling @ the ABG

5/17 - 5/26/99

Log Book # 2426

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.

KS 3/13/99

SWN

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Scott W. Neil

DATE 3/13/99

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page

0700	Keith Simpson (KS), Fred Ranger (FR), Scott Neil (SN) arrive on-site. Prepare to start shift.
1130	Lunch
1210	Prep for beginning of shift.
1235	KS + FR depart trailer for well inspection / H2O level meas.
1435	SN departs trailer for ABG.
1502	SN arrives at well ~~B~~ SWN 03B04 and begins setup.
1520	Begin purging. See field notes for detailed information on purging well 03B04.
1646	Begin sampling - sample ID AB04ZA99; See G.W. Sample Log Form for details.
1820	End sampling. Load vehicle and return to trailer.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 42

SIGNATURE Scott W. Neil

DATE 5/17/99

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 41

1855	Arrive at trailer. Unload vehicle and place samples in refrig. Begin Natural Attenuation chemistry for Fe, Nitrite, and Nitrate.
2000	Depart trailer for hotel

Weather: Warm and humid, upper 60's to low 80's (until ≈ 1600); after 1600 hrs, thunderstorms with high winds and hail.

Void
Sam 5/17/99

Work continued to Page

SIGNATURE Scott W. Reid DATE 5/18/99

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page NA

0700	Arrive at trailer and begin prep. for todays purging / sampling.
0710	SW prepares Trip Blank - TB05189901. FR calibrates PID - PID not stabilizing - FR cleans bulb, but PID not stabilizing.
0748	
~~0743~~ SW	SW departs for ABG.
0755 SW	
~~0758~~	SW arrives at ABG office to inform personnel of sampling activities - ABG personnel informs SW of burning activities around 1130.
0805	SW departs office for well 03C03.
0810	SW arrives at well 03C03 and begins setting up - heavy rain persists (since ≈ 0720).
0814	Purging begins - one casing volume = 10.6 gallons. Begin purging @ 133 mL/min.
0849	Increase flow rate to 100 mL/min

Work continued to Page 44

SIGNATURE Scott W. Reid DATE 5/18/99

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 43

0859 Increase flow rate to 184 ml/min - refer to purge notes (field forms) for specific information on purging.

1007 Rain ends - partly sunny & breezy.

1105 Purging stopped due to burning activity near well.

1131 Return to well and begin purging - water level @ 87.84 FT.

1226 End purging.

1230 Begin sampling - sample ID AC032A99.

1348 End sampling and begin sampling for Natural Attenuation parameters.

1400 End NA samples - load vehicle and depart for trailer.

1433 Arrive at trailer. Place samples in refrig.

1444 Begin field chemistry.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 45

SIGNATURE Scott Reid DATE 5/18/99

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 44

1607 End field chemistry and clean-up area / glassware.

1615 Depart trailer for ABG.

1633 Arrive at well 03B02 and begin setup for purging and sampling.

1645 Begin purging. Water is brown. Refer to field forms for this well for specific information on purging.

1952 End sampling and natural attenuation sampling. Load vehicle and return to trailer.

2027 Arrive at trailer - unload van and place samples in refrig.

2045 Depart trailer for hotel.

Weather: Heavy rain until ≈ 1000; then mostly sunny & breezy, low 70's.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Scott Reid DATE 5/18/99

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page

0700	Arrive at trailer (FR + SN). Calibrate PID and prep. Trip Blank. Begin loading vehicle for todays purging and sampling activities.
0743	Depart trailer for ABG (FR + SN).
0802	Arrive at ABG office - Bobby tells us that they will be burning at 0830, so we cannot start until after they burn
0836	Arrive at well 03C09P2 and set-up for purging and sampling.
0855	Begin purging - see purge field forms for specific information for purging of well 03C09P2.
1055	End purging - purge time = 120 min; total volume purged = 53 gallons
1100	Start sampling - sample ID AC09P22A99
1212	End sampling. Pack vehicle - depart ABG.

Work continued to Page 47

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 5/19/94

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 46

1240	Arrive at trailer - unpack samples and place in the refrigerator.
1246	Perform field chemistry for alkalinity.
1303	Depart trailer for ABG. Upon arrival at the ABG, burning will be done at 1330 for ≈ 15 minutes.
1330	Aid Keith Simpson (KS) in taking ambient blank.
1400	Depart ABG for bottles to purge and sample 03C02P2.
1417	Arrive at trailer - pick-up sample bottles and depart for ABG.
1436	Arrive at 03C02P2 and set up
1450	Begin purging - explosive activities are going on. Please refer to field forms for specific information on purging 03C02P2.

Work continued to Page 48

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 5/19/94

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 47

1551 Explosive activities at the ABG come to ~~an~~ SN an end.

1618 Sampling begins - duplicate sample taken at this well: FD051990 1. Sample ID AC02P22A99.

1810 End sampling - do Titrets for field chemistry on sample for CO_2 and alkalinity.

1821 Load vehicle w/ equipment and samples. Depart for trailer.

1839 Arrive at trailer and unload vehicle. Place samples in refrig. Do paper work.

1920 Depart trailer for hotel.

Weather: Sunny, low 50's - mid 70's.

Void
SWN 5/19/99

Work continued to Page

SIGNATURE Scott W. Reid DATE 5/19/99
WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page

0700 Arrive at trailer and begin prep for surface water points.

0715 FR calibrates pH; SN preps. trip blank.

0753 FR + SN depart trailer for ABG/surface water points.

0815 Arrive at ABG office to inform personnel of pending activities.

0820 Arrive at Creek ~~below~~ At Boundary sample location and set SN up for sampling.

0830 Begin sampling sample ID ACRB2A99.

0858 End sampling - tag sample containers and perform field analyses.

1023 Begin sampling ACRA2A99, Creek Below Spring A.

1036 End sampling - tag sample containers and perform field analyses.

Work continued to Page 50

SIGNATURE Scott W. Reid DATE 5/20/99
WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 49

1105	Perform field analyses for Spring A - sample ID ASPA2A99.
1141	Meet FR at vehicles - pack vehicles and depart for trailer.
1158	Arrive at trailer. Unload samples and place them in the refrigerator.
1211	Depart for lunch.
1244	Return from lunch. SN will perform Natural Attenuation field tests at the trailer. FR will return to ABG to sample Spring C and Spring A (also Dup and MS/MSD).
1305	SN begins NA field analyses.
1655	SN finishes NA on ACRB2A99 and ACRA2A99. Cleans up and departs for ABG to help FR.
1715	Arrive at Spring C. Collect sample for field chemistry and take samples from FR -

Work continued to Page 51

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott A. Neil

DATE 5/20/99

WITNESS

DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 50

1743	Depart Spring C for trailer to continue NA field parameters.
1803	Arrive at trailer - unload samples.
1812	Begin NA field chemistry and continue ~~till~~ until the end of the day. SN
2123	Depart trailer for hotel after completing field chemistry and cleaning glassware / area.

WEATHER: Sunny, low 60's - low 80's.

VOID
5/20/99
SNA

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott A. Neil

DATE 5/20/99

WITNESS

DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page

0700 Arrive at trailer and prep for todays sampling activities - FR, KS, SN on site.

0720 FR calibrates PID; SN prepares Trip Blanks.

0835 FR + SN arrive at ABG - burning activities are going on so entry is denied until finished burning.

0839 Given the go-ahead to enter the burning area.

0843 Arrive at well 03C11 and set-up to begin purging - see field forms for specific information on this well.

1003 Sun rising higher in the sky causing elevated temperature readings - trying to keep flow-thru cell out of direct sunlight. Also, ABG is supposed to have another burn around noon. May not be done sampling by that time - if not, will have to leave the burn area.

Work continued to Page 53

SIGNATURE Scott W. Reid DATE 5/21/99
WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7651
BOOK 2426

Work continued from Page 52

1023 Army Corps of Engineers abandoned a 4 inch x 12' from 03C11 - grouted the hole at 1023.

1028 Took field parameters - unchanged except for the water level which raised to 44.02 ft. from 45.03 ft.

1033 Hole still being grouted parameters are changing especially water level, turbidity. Increased flow rate. pH rising.

1039 Grouting of abandoned well has ceased. Water level still ~~dropping~~ rising. SW

1100 Burning started while purging was still ongoing.

1105 Tom Brent stopped by to check the abandoned well.

1116 Tom Brent departs well site. Burning still ongoing

1258 End purging - purged for 4 hours

Work continued to Page 54

SIGNATURE Scott W. Reid DATE 5/21/99
WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 53

~~But~~ parameters not stable. Sampled per SW FSP. Explosive activity ongoing during sampling.

1303 Begin sampling - Sample ID AC112A99.

1438 End sampling including field chemistry. Load vehicle and depart ABG.

1519 Arrive at trailer. Unload vehicle and place samples in the refrigerator.

1620 Start field chemistry for Natural Attenuation.

1754 End field chemistry. Clean up and depart trailer for FED Ex.

1848 Arrive at FedEx. KS drops off samples. Departs for hotel.

VOID

SWN 5/21/99

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page ~~54~~

SIGNATURE Scott W. Reid DATE 5/21/99

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page

0700 KS, FR, SW on site.

0715 FR calibrates PID; SW prepares Trip Blank.

0725 Load vehicles for this mornings purging and sampling activities

0804 Depart trailer for ABG.

0823 SW arrives at well 03C10 and begins to setup for purging and sampling.

0845 Begin purging well 03C10. Refer to Low-Flow Purge Data Form for specific information regarding this well. Moderate rain falling.

0955 Rain ends. Sediment in bottom of Flow-Thru Cell cup causing erratic turbidity readings.

1125 Flow thru cup appears clear - turbidity has dropped

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 56

SIGNATURE Scott W. Reid DATE 5/22/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 55

1155 End purging.

1200 Begin sampling - sample ID AC102A99. Rain begins and persists until 1215.

1321 End sampling finish field chemistry. Load van and depart for trailer

1347 Stop at well 03C12 to drop-off colorimeter so FR can run his sulfide analysis for 03C12.

1357 Depart ABG ~~to~~ (SW) for trailer.

1410 Arrive at trailer and begin field chemistry.

1412 Unload samples from van and place them in the refrigerator. Continue to run field chemistry.

1540 End field chemistry analysis.

1545 Depart for ABG

Work continued to Page 57

SIGNATURE Scott W. Neil DATE 5/22/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 56

1602 Arrive at well 03C20 and setup to purge.

1610 Begin purging. Refer to Low Flow Purge Data Form for specific info. on well 03C20.

1805 Sampling begins. Sample ID is (SW) ~~03C7~~ AC202A99.

1855 End sampling and load vehicle.

1910 Arrive at trailer - unload equipment and samples. Place samples in refrigerator. Do alkalinity for NA.

1930 Depart for hotel.

WEATHER: Partly sunny, mid 70's

VOID
5/22/99 SWN

Work continued to Page

SIGNATURE Scott W. Neil DATE 5/22/99
WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page

0700 Arrive on-site FR + SW. Prep for todays activities.

0710 SW calibrates PID and loads vehicle for sampling of well 03C15. This well will get a duplicate and an MS/MSD. Field chemistry will be for alkalinity only.

0729 Depart trailer for ABG (SW).

0745 Arrive at well 03C15 and begin setting up equipment.

0805 Begin purging well 03C15. From previous data on this well, flow rate was set higher than FSP states. Refer to Low-Flow Purge Data Form for specific purge information for 03C15.

0955 End purging. Prepare for sampling Duplicate and MS/MSD. KS at well.

1000 Start sampling - sample ID AC152A99.

1207 End sampling. Pack up vehicle and depart for trailer.

1222 Arrive at trailer ~~SW~~ unload vehicle and place samples in the refrigerator. Lunch —

1314 Arrive at 03C26 to relieve FR.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 59

SIGNATURE Scott W. Neil DATE 5/23/99

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page 58

Continue sampling 03C26 - sample ID AC262A99.

1426 FR arrives back at 03C26. Continue sampling well 03C26.

1430 Rain starts - moderate to heavy.

1530 Rain still persists.

1620 End sampling FR + SW load vehicle and go to well 03C04 and setup.

1700 SW departs for trailer. Prepares for tomorrows events and cleans up. Do paper work.

1820 Depart trailer for hotel (SW).

Weather: Clear early; late afternoon rain.

SW VOID 5/24/99

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Scott W. Neil DATE 5/23/99

WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page

0700 FR, SN, KS on site. SN begins prep for today's activities.
0723 SN departs for ABG.
0747 Arrive at ABG office to get permission to sample in burn area.
0755 Vehicle gets stuck in the mud - ABG personnel call for tow truck
0822 Tow truck pulls vehicle out of mud - SN proceeds to well 03C27.
0830 SN arrives at 03C27 and begins to set up for activities.
0850 Begin purging well 03C27. Refer to Low-Flow Purge Data Form for specific details on purging.
1020 End purging - purged 2.4 gallons.
1025 Begin sampling - sample ID AC272A99. Refer to the GW Sample Log Form for specific sampling information.
1038 Sampling ends. Load vehicle and go to ABG office for permission to enter ABG burning area again.
1244 Permission granted until 1600 hrs. Depart for 03C08P2.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 61

SIGNATURE Scott Reid DATE 5/24/99
WITNESS DATE

TITLE NSWC Crane **PROJECT NO.** 7651
BOOK 2426

Work continued from Page 60

1249 Arrive at 03C08P2 and begin setup for purging.
1305 Purging begins. Refer to Low-Flow Purge Data Form for specific information on purging.
1705 End purging. Purged for 4 Hours, but volume not completely taken. Sampled per FSP.
1710 Sampling begins. Sample ID AC08P22A99. Refer to GW Sample Log Form for sampling information.
1845 End sampling. Pack vehicle and return to trailer.
1900 Do field chemistry test for alkalinity.
1920 Depart for hotel.

Weather: Sunny + breezy, 45-65°F.

Void
SNW 5/24/99

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Scott Reid DATE 5/24/99
WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7651

BOOK 2426

Work continued from Page

E.P. Johns on site

0700 Arrive at trailer and begin prep. for sampling + purging activities.

0755 Depart trailer for 03C25.

0821 Arrive at creek. Walk equipment back to well 03C25 and setup to purge/sample.

0905 Begin purging. See Low-Flow Purge Data Form for purging info.

1045 Begin sampling - sample ID AC252A99. Refer to G.W. Sample Log Form for info on sampling.

1156 End sampling; pack vehicle and depart for lunch.

1300 Arrive at trailer. Unload vehicle. SN does NA, KS packs coolers, FR packs equipment for FAD80.

1530 E.P. Johns departs site. Demobilization activities continue.

1700 Depart for hotel.

WEATHER: Mostly sunny, 45-65°F.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE

PROJECT NO.

BOOK

Work continued from Page

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TITLE NSWC CRANE, IN 5-18-99 RAIN AM CLOUDS+SUN PM PROJECT NO. 7651 BOOK 2456

Work continued from Page

AM: DO SYNOPTIC WATER LEVELS AT THE ABG AREA SEE KEITH S. NOTEBOOK.

PM: PREP TO COLLECT SPL @ Ø3 C17 FUR+KS

1300 GOTO Ø3C17 SET UP TO PURGE+SPL

1357 START PURGE @ C17

1454 FINNISH PURGE @ C17

1458 BEGIN TO FILL CONTAINERS

1514 FINNISH FILLING CONTAINERS KS GO TO TRAILER, FUR CONT TO CLEAN UP.

1630 FUR ARR AT TRAILER DISPOSE IDW ~2.5 GALS, PLACE SPAT SAMPLE IN TO REF.

GO TO SN TO PICK UP FIELD MAT PARA SPL NOT READY WAIT 1/2 HR.

1900 RETURN TO TRAILER w/ NAT. ATT PARA SPL. PREP FOR TO-MORROW SAMPLING ACT.

2030 FUR+SN DEPART TRAILER.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Fred M Ramser DATE 5-18-99

WITNESS DATE

TITLE NSWC CRANE, IN 5-19-99 AM: CLEAR 50-60°s PROJECT NO. 7651 BOOK 2456

Work continued from Page

0700 FUR + SN MEET KS. AT TRAILER (TENNS FIELD OFFICE) CALIBRATE EQUIPMENT.

0800 FUR+SN GO TO ABG. SITE OPP. SAYS BURNING @ 830 AM EVERYDAY THIS WEEK. WE CAN GAIN ACCESS AFTER 830

0830 FUR GO TO TRAILER GET ADD. SUPPLIES

0845 GOTO WELL C07 BEGIN TO SETUP SAMPLING EQUIP.

- BLADDER VOL ~ 155 ml
- SET DISCHARGE/REFILL @ 40/40 TO HIGH
- LOWER TO 70/70 CLOSER TO 60ml

0943 - ESTABLISH FLOW RATE @ 60ml DISCHARGE/REFILL @ 74/74

1325 - ACHIEVED STABLE PARAMETERS HOWEVER MUST LEAVE LOC TO ALLOW FOR OB OPERATIONS. STOP PURGE PROCESS

1410 BEGIN TO FILL CONTAINERS AT AC07. VOAs

1737 FINNISHED FILLING CONTAINERS AT AC07, INCLUDING ALK FOR FIELD ANAL.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Fred M Ramser DATE 5-19-99

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO.

5-19-99

BOOK

Work continued from Page

1800 PWR GOTO FIELD TRAILER, RUN ACK TEST ON AC07 GW SPL.
- PREP FOR TO-MORROWS SPL
- CAL YSI MULTI-METERS

1920 LV SITE FOR THE DAY

VOID PWR

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

DATE 5-19-99

DATE

TITLE NSWC CRANE AM: CLEAR 50's

PROJECT NO. 7651

5-20-99

BOOK 2456

Work continued from Page

0700 PWR ARR AT FIELD TRAILER LOAD VEH. W/ STREAM SAMPLES CONTAINERS ETC. WILL BE WORKING WITH SCOTT WELL SEE HIS NOTEBOOK FOR TODAYS ACTIVITIES.

1300 SCOTT WILL RUN ANA WHILE I GO TO SPRINGS TO SAMPLE.

1800 COMPLETED SAMPLING SPRINGS

2000 LV SITE.

VOID PWR

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE SLR

WITNESS

DATE 5-20-99

DATE

TITLE SWC CRANE 5-21-99 PROJECT NO. 7651 BOOK

Work continued from Page

0700 FWC, NS+KS ARR AT FIELD TRAILER
PREP TO PURGE AT C04
- NOTE: START @ 60 ml/min CONTAINERS
FILL NH (500 ml) + CHLORIDE + SULFATE
(300 ml)

- SULFIDE 500 ml
- TOX 500 ml
- EXPLO

NOTE: DEPTH TO WL @
79.00' BTOC MARKS

0830 GO TO ABG, SET UP ON 03C04

1100 LV BURN AREA DUE TO BURNING OPERATION
WELL PRODUCING LITTLE WATER

1200 WILL DO NAT. ATT PARAMETER FOR
THE REMAINING OF THE DAY, CLEAN UP
TRAILER, CALIBRATE YSI

1900 LV SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Fred Kramer DATE 5-21-99
WITNESS DATE

TITLE AM: OVERCAST RAINY 5-22-99 PROJECT NO. 7651 BOOK

Work continued from Page

0715 FWC, NS+KS ARR AT FIELD TRAILER
PREP TO PURGE @ C4 + 12

0815 GO TO ABG

0830 PUR SET UP ON 3C04

1030 PUR GO TO C12
1110 SET UP AT 3C12 WELL
1651 FINISH SAMPLING 3C12 WELL
1700 GO TO 3C04 COLLECTED

1830 COLLECTED 3 PLS FROM 3C04

1930 DO NAT. ATTN. PARAMETERS
PREP YSI'S
2000 LV SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Fred Kramer DATE 5-22-99
WITNESS DATE

TITLE NSWC CRANE
AM: FOGGY MID 60's PROJECT NO. 7651
5-23-99 PM: RAINY MID 60's BOOK

Work continued from Page

0700 ARR AT FIELD TRAILER PREP TO SAMPLE AT C26

0800 GO TO ABG

0825 START PURGING 3C26

1620 COMPLETED SAMPLING @ 3C26 GO TO 3C04

1635 PUR + SN SET UP AT 3C04 TO COMPLETE SAMPLING, START W/ TOTAL PHOSPHOUS

1720 COMPLETED SAMPLING @ 3C04

1800 GO TO TRAILER PLACE EQUIP ON CART PREP FOR TOMORROWS ACTIVITIES

1815 LV SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Fred U Ramer DATE 5-23-99
WITNESS DATE

TITLE NSWC CRANE
AM: PARTLY CLOUDY WINDY 50's PROJECT NO. 7651
5-24-99 BOOK

Work continued from Page

0700 PUR, KS, SN ARR AT TRAILER PREP EQUIP, LOAD TRUCK W/ CONT FOR 3C30 WELL

0730 PUR GO TO 3C30

0800 START PURGING 3C30

1200 BEGIN TO FILL CONTAINERS

1520 FINNISH FILLING CONTAINERS AT 3C30
GO TO ABG AREA EXCHANGE FULL N_2 TANK FOR MT TANK WITH SCOT N

1630 RETURN TO TRAILER TO RUN ALK ON BOTH 3C30 AND 3C

1800 PUR LV SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Fred U Ramer DATE 5-24-99
WITNESS DATE

Work continued from Page

PREFORMED ANALYSIS ON SAMPLE AB04-2A99

1745 - DISSOLVED OXYGEN = 0.49 mg/L *CHEMETS @ WELL HEAD = N/A mg/L
1755 - ALKALINITY = 75.2 mg/L
1818 - CARBON DIOXIDE = 62.4 mg/L
1855 - SULFIDE = 0.00 mg/L AT WELL HEAD = 0.00 mg/L
1900 - FERROUS IRON = 3.30 LIMIT
1925 - NITRITE = 0.000 mg/L
1950 - NITRATE = 0.02 mg/L

* Chemets at well head for DO not run due to severe thunderstorm / hail.

VOID
SWN 5/17/99

Work continued from Page

DATE: 5/18/99 SAMPLE TIME: 1230

WELL ID: 03C03 ; SAMPLE ID: AC03ZA99

SAMPLED BY: SCOTT NEIL

Analysis and results for sample AC03ZA99:

1444: Dissolved Oxygen = 0.74 mg/L ; CHEMets @ well head = 1.1 mg/L.
1452: Alkalinity = 373 mg/L ; Titrets @ well head = 92 mg/L.
1501: Carbon Dioxide = 75 mg/L ; Titrets @ well head = 104 mg/L
1508: Sulfide = 0.00 mg/L ; at wellhead = 0.00 mg/L
1514: Ferrous Iron = 0.00 mg/L
1521: Nitrite = 0.001 mg/L
1544: Nitrate = 0.01 mg/L

All glassware cleaned and ready for next sample analyses.

VOID
SWN 5/18/99

SIGNATURE Scott W. Neil DATE 5/18/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

TITLE NSWC CRANE
5.18.99

PROJECT NO. 7651
BOOK NO. 1309

Work continued from Page

WELL 03C17 SAMPLE ID AC172A99

ALKALINITY @ 1650 = 125.6 mg/L

KES

WELL ABG 03B02 SAMPLE ID AB022A99 5.18.99
WELL SAMPLED BY SCOTT NEIL
FIELD CHEMICAL TEST BY KEITH SIMPSON

TIME	TEST	RESULT	COMMENTS
1935	DISSOLVED OXYGEN	0	CHEMETS @ WELL = 0.4 mg/L
1940	ALKALINITY	152 mg/L	
2012	CARBON DIOXIDE	92 mg/L	
1940	SULFIDE	0.03 mg/L	@ WELL HEAD
2012	FERROUS IRON	3.30+	LIMIT OF METER (mg/L)
2025	NITRITE	0 mg/L	
2041	NITRATE	0 mg/L	

KES

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE K. S. Simpson
DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE 5.18.99

TITLE NSWC CRANE
5.19.99

PROJECT NO. 7651
BOOK NO. 1309

Work continued from Page

DATE: 5/19/99 SAMPLE TIME: 1100

WELL ID: 03C09P2 ; SAMPLE ID: AC09P22A99

SAMPLED BY: SCOTT NEIL

ANALYSIS and results for sample AC09P22A99:

1246: Alkalinity = 182 mg/L

Scott W. Neil 5/19/99

DATE 5.19.99 SAMPLE TIME 1815

WELL ID 03C07 SAMPLE ID AC072A99
SAMPLED BY: FRED RAMSER

1815 ALKALINITY 330 mg/L

DATE 5-19-99 SAMPLE TIME 1810
WELL ID 03C02 SAMPLE ID AC02P22A99
SAMPLED BY S. NEIL

1855 ALK = 114 mg/L
TITRET @WELL ALK = 138 mg/L

RAN DUPLICATE @1910HRS
ALK = 110 mg/L

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE DATE

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page

DATE: 5/20/99 SAMPLE TIME: 0830

CREEK ID: ~~CREEK AT BOUNDARY~~ Creek at Boundary SAMPLE ID: ACRB2A99 (SW)

SAMPLED BY: Fred Ramser & Scott Neil

Analysis and results for sample ACRB2A99:

1305 Dissolved Oxygen = 9.48 mg/L ; CHEMets at creek = 9 mg/L
1314 Alkalinity = 58.0 mg/L ; Titrets at creek = 14 mg/L
1322 Carbon Dioxide = 56 mg/L ; Titrets at creek = 100 mg/L
1328 Sulfide = 0.00 mg/L ; AT creek = 0.00 mg/L
1338 Ferrous Iron = 0.01 mg/L
1345 Nitrite = 0.006 mg/L
1409 Nitrate = 0.064 mg/L →

Pretreatment done on sample before performing Nitrate analysis. Result of nitrate when pretreatment performed was 0.07 mg/L ⇒ 0.07 - 0.006 = 0.064 mg/L of Nitrate.

Glassware cleaned and preparation of area for next sample.

DATE: 5/20/99 SAMPLE TIME: 1036

CREEK ID: Creek Below Spring A SAMPLE ID: ACRA2A99

SAMPLED BY: Fred Ramser & Scott Neil

Analysis and results for sample ACRA2A99:

Work continued from Page 41 SAMPLE ACRA2A99 (continued)

1450 Dissolved Oxygen = 9.22 mg/L ; CHEMets at creek = 9 mg/L
1518 Alkalinity = 59.2 mg/L ; Titrets at creek = 20 mg/L
1524 Carbon Dioxide = 25 mg/L ; Titrets at creek = 97 mg/L
1531 Sulfide = 0.00 mg/L ; AT creek = 0.00 mg/L
1543 Ferrous Iron = 0.00 mg/L ;
1549 Nitrite = 0.006 mg/L
1625 Nitrate = 0.054 mg/L

Pretreatment done on Nitrate sample before performing analysis. Result of Nitrate after pretreatment was 0.06 mg/L ⟹ 0.06 - 0.006 = 0.054 mg/L.

Clean all glassware and prepare for next sample.

DATE: 5/20/99 SAMPLE TIME: 1331 (Duplicate and MS/MSD)

SPRING ID: Spring A SAMPLE ID: ASPA2A99 ; Dup ID FD0520990 1

SAMPLED BY: FRED RAMSER and SCOTT NEIL

~~Analy~~ (SN) Analysis and results for sample ASPA2A99:

Dissolved Oxygen = 9.76 mg/L ; CHEMets at spring = 9 mg/L
Alkalinity = 59 mg/L ; Alkalinity at spring = 27 mg/L
Carbon Dioxide = 28.4 mg/L
Sulfide = 0.00 mg/L
Ferrous Iron = 0.01 mg/L
Nitrite = 0.004 mg/L
Nitrate = 0.086 mg/L

Pretreatment done on Nitrate sample before performing analysis. Result of Nitrate after pretreatment was 0.09 mg/L ⟹ 0.09 - 0.004 = 0.086 mg/L

Work continued to Page 45

SIGNATURE Scott W. Neil DATE 5/20/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page 43

DATE: 5/20/99 SAMPLE TIME: 0000

SAMPLE ID: Spring A SAMPLE ID: FD05209901 (Dup. of ASPA2A99)

SAMPLED By: Fred Ramser

Analyses performed and results for sample FD05209901:

Dissolved Oxygen = 9.98 mg/L
Alkalinity = 86.4 mg/L
Carbon Dioxide = 10.4 mg/L
Sulfide = 0.00 mg/L; at spring = 0.00 mg/L
Ferrous Iron = 0.00 mg/L
Nitrite = 0.001 mg/L
Nitrate = 0.28 mg/L

Did not perform pretreatment for nitrate because concentration of nitrite was very low.

DATE: 5/20/99 SAMPLE TIME: 1720

SAMPLE ID: Spring C SAMPLE ID: ASPC2A99

SAMPLED By: FRED RAMSER

Analyses performed and results for sample ASPC2A99:

Dissolved Oxygen = 10.56 mg/L
Alkalinity = 79.6 mg/L
Carbon Dioxide = 31.8 mg/L
Sulfide = 0.00 mg/L; at spring = 0.00 mg/L
Ferrous Iron = 0.00 mg/L
Nitrite = 0.003 mg/L
Nitrate = 0.337 mg/L

Pretreatment done on Nitrate before performing analysis: 0.34 − 0.003 = 0.337 mg/L

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Scott W. Neil DATE 5/20/99

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page

DATE: 5-21-99 SAMPLE TIME 1000
SAMPLE ID: AC042A99 SAMPLE LOC: 03C04
SAMPLED BY: FRED W. RAMSER

TIME	TEST	RESULT
1200	DISSOLVED OXYGEN	1.80 mg/l
1220	ALKALINITY	344 mg/l
1232	CARBON DIOXIDE	208 mg/l
1445	SULFIDE	0.02 mg/l
1500	FERROUS IRON	0.04 mg/l
1525	NITRITE	0.006 mg/l
1610	NITRATE	0.124 mg/l

NOTE: PRETREATMENT DONE ON NITRATE SAMPLE BEFORE DOING ANALYSIS. [0.13 - 0.006 = 0.124]

DATE: 5/21/99 SAMPLE TIME: 1303
SAMPLE LOCATION: 03C11 SAMPLE ID: AC112A99
SAMPLED BY: SCOTT NEIL

Analyses performed and results for Sample AC112A99:

1620 Dissolved Oxygen = 5.02 mg/L ; Cl/Metals at wellhead = 3 mg/L
1631 Alkalinity = 84 mg/L
1644 Carbon Dioxide = >200 mg/L
1658 Sulfide = 0.38 mg/L ; at well head = 0.38 mg/L
1715 Ferrous Iron = 0.01 mg/L
1721 Nitrite = 0.012 mg/L
1745 Nitrate = 0.928 mg/L
Pretreatment performed on Nitrate; Value = 0.94 mg/L ⇒
0.94 - 0.012 = 0.928 mg/L
A 4" well ≈ 12 feet from 03C11 was abandoned while purging; grout was poured into the hole causing field parameters to be unstable.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE Scott W. Neil Fred W. Ramser DATE 5/21/99
DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

Work continued from Page

DATE: 5-22-99 SAMPLE TIME: 1200
SAMPLE ID: AC102A99 SAMPLE LOCATION: ABG 03C10
SAMPLE BY: SCOTT NEIL

TIME	TEST	RESULT	
1419	DISSOLVED OXYGEN	3.01 mg/L	CHEMETS @ WELL 2.7 mg/L
1426	ALKALINITY	186 mg/L	TITRETS @ WELL 91 mg/L
1433	CARBON DIOXIDE	98.8 mg/L	TITRETS @ WELL 22 mg/L
1410	SULFIDE	0 mg/L @ WELL	
1416	FERROUS IRON	0.01 mg/L	
1423	NITRITE	0.001 mg/L	
1442	NITRATE	1.739 mg/L	WITH PRETREATMENT

DATE: 5-22-99 SAMPLE TIME:
SAMPLE ID: SAMPLE LOCATION: ABG-03C12
SAMPLED BY: FRED RAMSER

1519	DISSOLVED OXYGEN	6.88 mg/L CHEMETS @ WELL = 7 mg/l	
1524	ALKALINITY	152 mg/L	
1530	CARBON DIOXIDE	59.8 mg/L	
1405	SULFIDE	0 mg/L	AT WELL = 0.0 mg/l
1540	FERROUS IRON	0.01 mg/L	
1546	NITRITE	0.003 mg/L	
1606	NITRATE	2.407 mg/L	WITH PRETREATMENT

DATE 5-22-99 SAMPLE TIME 1855
SAMPLE ID: AC202A99 SAMPLE LOC. ABG03C20

1920	ALKALINITY	214 mg/l

Work continued from Page

DATE: 5.23.99 SAMPLE TIME: 1016
SAMPLE I.D.: AC15 2A99 SAMPLE LOCATION: ABG 03C15
SAMPLED BY: SCOTT NEIL

TIME	TEST	RESULT
1225	ALKALINITY	271 mg/L
—DUP— 1233	"	263 mg/L

DATE: 5.23.99 SAMPLE TIME: 1310
SAMPLE ID: AC262A99 SAMPLE LOCATION: 03C26
SAMPLED BY: FRED RAMSER

TIME	TEST	RESULT
1335	ALKALINITY	274 mg/L

DATE: 5-24-99 SAMPLE TIME: 1519
SAMPLE ID: AC302A99 SAMPLE LOCATION: 03C30
SAMPLED BY: FRED RAMSER

TIME	TEST	RESULT
1645	ALKALINITY	240 mg/l

DATE: 5-24-99 SAMPLE TIME: 1025
SAMPLE ID: AC272A99 SAMPLE LOCATION: 03C27
SAMPLED BY SCOTT NEIL

TIME	TEST	RESULT
1705	ALKALINITY	127 mg/l

DATE: 5/24/99 SAMPLE TIME: 1710
SAMPLE LOCATION: 03C08P2 SAMPLE ID: AC08P22A99
SAMPLED BY: SCOTT NEIL

1900 Alkalinity = 356 mg/L ; Titrate @ well head = 215 mg/L

Work continued from Page

Date: 5/25/99 Sample Time: 1045

Sample Location: ABG-03C25 Sample ID: AC252499

Sample Personnel: Fred Ramser / Scott Neil

Analyses performed and results for sample AC252499:

1325 Dissolved Oxygen = 0.3 mg/L ; CHEMets @ wellhead = 0.3 mg/L.
1334 Alkalinity = 318 mg/L
1342 CO_2 = 83.8 mg/L
1347 Sulfide = 0.06 mg/L
1400 Iron = 0.15 mg/L
1408 Nitrite = 0.001 mg/L
1429 Nitrate = 0.129 mg/L

Pretreatment performed on Nitrate sample before running analysis. Result of Nitrate after pretreatment was 0.13 mg/L ⇒ 0.13 − 0.001 = 0.129 mg/L.

Note: Sulphur ~~smell~~ SW odor evident from purge / sample water.

VOID
SWN 5/25/99

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: 03B04

Sample Date: 5·17·99

Sample ID: AB042A99

Associated Documentation

Equipment Calibration Log Number(s): A6, A5, A7

Monitoring Well Inspection Form Number: A23

Water Level Measurement Form Number: A6

Ground Water Sample Log Form Number: A22

Low Flow Purge Data Form Number(s): A33

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A27

Chain-of-Custody Number(s): 34, 33, 32

Laboratory Sample ID Number:

Sample Location: 03C03

Sample Date: 5/18/99

Sample ID: AC032A99

Associated Documentation

Equipment Calibration Log Number(s): A6, A5, A7

Monitoring Well Inspection Form Number: ~~A23~~ A34

Water Level Measurement Form Number: A6

Ground Water Sample Log Form Number: A23

Low Flow Purge Data Form Number(s): A34

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A28

Chain-of-Custody Number(s): 35, 33, 32

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: 03C17

Sample Date: 5.18.99

Sample ID: AC172A99

Associated Documentation

Equipment Calibration Log Number(s): A5, A6, A7

Monitoring Well Inspection Form Number: A18

Water Level Measurement Form Number: A6

Ground Water Sample Log Form Number: A 36

Low Flow Purge Data Form Number(s): A 51

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A-29

Chain-of-Custody Number(s): 35, 32

Laboratory Sample ID Number:

Sample Location: 03B02

Sample Date: 5/18/99

Sample ID: AB022A99

Associated Documentation

Equipment Calibration Log Number(s): A5, A6, A7

Monitoring Well Inspection Form Number: A19

Water Level Measurement Form Number: A6

Ground Water Sample Log Form Number: A 24

Low Flow Purge Data Form Number(s): A35

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A31

Chain-of-Custody Number(s): 34, 32

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: 03C02P2

Sample Date: 5/19/99

Sample ID: AC02P22A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A25

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A26

Low Flow Purge Data Form Number(s): A36

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A33, A34 (Dup)

Chain-of-Custody Number(s): 43, 40

Laboratory Sample ID Number:

Sample Location: 03C04

Sample Date: 5-21/22/23.99

Sample ID: AC042A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A33

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A29

Low Flow Purge Data Form Number(s): A52

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A41

Chain-of-Custody Number(s): 45, 40, 54

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7657

Sample Location: 03C07
Sample Date: 5/19/99
Sample ID: A C07 2A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A6
Monitoring Well Inspection Form Number: A35
Water Level Measurement Form Number: A3
Ground Water Sample Log Form Number: A38
Low Flow Purge Data Form Number(s): A53
Surface Water Sample Log Form Number: NA
Field Chemical Analysis Log Form Number(s): A32
Chain-of-Custody Number(s): 42, 41, 43
Laboratory Sample ID Number:

Sample Location: 03C08P2
Sample Date: 5/24/99
Sample ID: A C08P2 2A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5
Monitoring Well Inspection Form Number: A29
Water Level Measurement Form Number: A3
Ground Water Sample Log Form Number: A34
Low Flow Purge Data Form Number(s): A45
Surface Water Sample Log Form Number: NA
Field Chemical Analysis Log Form Number(s): A52
Chain-of-Custody Number(s): 58, 59, 61
Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: 03C09 P.2

Sample Date: 5/19/99

Sample ID: AC09P22A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A33

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A26

Low Flow Purge Data Form Number(s): A36

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A30

Chain-of-Custody Number(s): 36, 43, 32

Laboratory Sample ID Number:

Sample Location: 03C10

Sample Date: 5/22/99

Sample ID: AC10 2A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A32

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A27

Low Flow Purge Data Form Number(s): A40

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A43

Chain-of-Custody Number(s): 47, 54

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: 03C11

Sample Date: 5/21/99

Sample ID: A C11 2A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A28

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A26

Low Flow Purge Data Form Number(s): A38, A39

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A42

Chain-of-Custody Number(s): 44, 54, 46, 47

Laboratory Sample ID Number:

Sample Location: 03C12

Sample Date: 5/22/99

Sample ID: A C12 2A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A27

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A30

Low Flow Purge Data Form Number(s): A55

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A44

Chain-of-Custody Number(s): 48, 54, 47, 49

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: 03C15

Sample Date: 5.23.99

Sample ID: AC152A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A31

Water Level Measurement Form Number: A31 (SW)

Ground Water Sample Log Form Number: A31

Low Flow Purge Data Form Number(s): A43

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A46 & A47 (DUP)

Chain-of-Custody Number(s): 50, 52, 53, 54

Laboratory Sample ID Number:

Sample Location: 03C20

Sample Date: 5/22/99

Sample ID: AC202A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A30

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A29

Low Flow Purge Data Form Number(s): A41

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A45

Chain-of-Custody Number(s): 54, 45, 46, 47

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7657

Sample Location: C3C25
Sample Date: 5/25/99
Sample ID: A C25 2A 99

Associated Documentation

Equipment Calibration Log Number(s): A7, A6
Monitoring Well Inspection Form Number: A24
Water Level Measurement Form Number: A6
Ground Water Sample Log Form Number: A33
Low Flow Purge Data Form Number(s): A47
Surface Water Sample Log Form Number: NA
Field Chemical Analysis Log Form Number(s): A49
Chain-of-Custody Number(s): 59, 60, 61
Laboratory Sample ID Number:

Sample Location: C3C26
Sample Date: 5·23·99
Sample ID: A C26 2A 99

Associated Documentation

Equipment Calibration Log Number(s): A7, A6
Monitoring Well Inspection Form Number: A37
Water Level Measurement Form Number: A3
Ground Water Sample Log Form Number: A39
Low Flow Purge Data Form Number(s): A54
Surface Water Sample Log Form Number: NA
Field Chemical Analysis Log Form Number(s): A48
Chain-of-Custody Number(s): 49, 54, 50, 52
Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: 03C27

Sample Date: 5/24/99

Sample ID: AC272A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A26

Water Level Measurement Form Number: A3

Ground Water Sample Log Form Number: A32

Low Flow Purge Data Form Number(s): A44

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A50

Chain-of-Custody Number(s): 56, 58, 59

Laboratory Sample ID Number:

Sample Location: 03C30

Sample Date:

Sample ID: AC302A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A5

Monitoring Well Inspection Form Number: A22

Water Level Measurement Form Number: A6

Ground Water Sample Log Form Number: A43

Low Flow Purge Data Form Number(s): A56

Surface Water Sample Log Form Number: NA

Field Chemical Analysis Log Form Number(s): A51

Chain-of-Custody Number(s): 56, 61

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7651

Sample Location: CREEK BELOW SPRING A

Sample Date: 5/20/99

Sample ID: A CRA 2A 99

Associated Documentation

Equipment Calibration Log Number(s): A7, A6

Monitoring Well Inspection Form Number: NA

Water Level Measurement Form Number: NA

Ground Water Sample Log Form Number: NA

Low Flow Purge Data Form Number(s): NA

Surface Water Sample Log Form Number: A7

Field Chemical Analysis Log Form Number(s): A39

Chain-of-Custody Number(s): 39, 44, 37, 43

Laboratory Sample ID Number:

Sample Location: CREEK AT BOUNDARY

Sample Date: 5/20/99

Sample ID: A CRB 2A 99

Associated Documentation

Equipment Calibration Log Number(s): A7, A6

Monitoring Well Inspection Form Number: NA

Water Level Measurement Form Number: NA

Ground Water Sample Log Form Number: NA

Low Flow Purge Data Form Number(s): NA

Surface Water Sample Log Form Number: A11

Field Chemical Analysis Log Form Number(s): A35

Chain-of-Custody Number(s): 43, 44, 43

Laboratory Sample ID Number:

NSWC CRANE
DOCUMENT TRACKING
PROJECT NO. 7657

Sample Location: SPRING A

Sample Date: 5/20/99

Sample ID: ASPA2A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A6

Monitoring Well Inspection Form Number: NA

Water Level Measurement Form Number: NA

Ground Water Sample Log Form Number: NA

Low Flow Purge Data Form Number(s): NA

Surface Water Sample Log Form Number: A8

Field Chemical Analysis Log Form Number(s): A37, A38 (Duplicate)

Chain-of-Custody Number(s): 38, 37, 44, 31, 43

Laboratory Sample ID Number:

Sample Location: SPRING C

Sample Date: 5/20/99

Sample ID: A SPC 2A99

Associated Documentation

Equipment Calibration Log Number(s): A7, A6

Monitoring Well Inspection Form Number: NA

Water Level Measurement Form Number: NA

Ground Water Sample Log Form Number: NA

Low Flow Purge Data Form Number(s): NA

Surface Water Sample Log Form Number: A9

Field Chemical Analysis Log Form Number(s): A40

Chain-of-Custody Number(s): 41, 44, 43

Laboratory Sample ID Number:

ATTACHMENT 10

FEDERAL EXPRESS AIRBILLS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

PICK UP # 8

FedEx *USA Airbill* FedEx Tracking Number 810431413839

0210

SPHE Sender's

1 From (please print and press hard)

Date 5.19.99 Sender's FedEx Account Number 1771-8058-0

Sender's Name SCOTT NEIL Phone (412) 921-~~8965~~ 7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR 5TH FL Dept/Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220-2746

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 HUGH PRENTICE Phone (206) 767 5060

Company LAUCKS TESTING LAB

Address 940 SOUTH 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
5	230	$ .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.

321

WCSI 12 Rev. Date 7 Part #153 ©1994-98 Fe PRINTED IN U.S.

Questions? Call 1·800·Go·FedEx (800)463-3339

The World On Time

0086558381

FedEx

After completion, the MPS Sender copy (pink) is given to the sender.

Domestic Multiple Package Shipment Labels

Shipment Date 5.19.99 Master Airbill Number 810431413839

2 of 5 — Form I.D. No. 0260 — 8076 0835 4789

3 of 5 — Form I.D. No. 0260 — 8076 0835 4790

4 of 5 — Form I.D. No. 0260 — 8076 0835 4804

5 of 5 — Form I.D. No. 0260 — 8076 0835 4815

___ of ___ — Form I.D. No. 0260 — 8076 0835 4826

PART 154255 Format #358 • Rev. Date 5/98 • ©1994-98 FedEx • PRINTED IN U.S.A. • UBFW 7/98

PICK-UP 12

FedEx USA Airbill

FedEx Tracking Number 810431413817

Form I.D. No. 0210

SPH2

Sender's

1 From (please print and press hard)

Date 5.21.99 Sender's FedEx Account Number 1771-8058-0

Sender's Name SCOTT NEIL Phone (412) 921-~~8965~~ 7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR 5TH FL

Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220-2746

2 Your Internal Billing Reference Information (Optional-First 24 characters will appear on invoice) GT038 7651 CRANE

3 To (please print and press hard)

Recipient's Name SAMPLE RECEIPT Phone 2061767 5060

Company LAUCKS TESTING LAB

Address 7607 PERIMETER RD

(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 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. [illegible] Guide. Both are available on request. SEE BACK OF [illegible] 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 [illegible]

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	455	$ .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*

Domestic Multiple Package Shipment Labels

Shipment Date 5.21.99

Master Airbill Number 810431413817

2 of 9

8076 0835 4734 Form I.D. No. 0260

3 of 9

8076 0835 4745 Form I.D. No. 0260

4 of 9

8076 0835 4756 Form I.D. No. 0260

5 of 9

8076 0835 4767 Form I.D. No. 0260

6 of 9

8076 0835 4778 Form I.D. No. 0260

PART 154255 • Format #358 • Rev. Date 5/98 • ©1994-98 FedEx • PRINTED IN U.S.A. • UBFW 7/98

Domestic Multiple Package Shipment Labels

Shipment Date 5.21.99

Master Airbill Number 810431413817

7 of 9

8096 7474 6010 Form I.D. No. 0260

8 of 9

8096 7474 6020 Form I.D. No. 0260

9 of 9

8096 7474 6031 Form I.D. No. 0260

___ of ___

8096 7474 6042 Form I.D. No. 0260

___ of ___

8096 7474 6053 Form I.D. No. 0260

PART 154255 • Format #358 • Rev. Date 5/98 • ©1994-98 FedEx • PRINTED IN U.S.A. • SRW 10/98

FedEx USA Airbill FedEx Tracking Number 810431413840 Form I.D. No. 0210 SPH2: **Sender's Copy**

1 From (please print and press hard)

Date 5.20.99 Sender's FedEx Account Number 1771-8058-0

Sender's Name SCOTT NEIL Phone (412) 921-~~8765~~ 7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR 5TH FL

Dept./Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220-2746

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

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	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.

321

WCSL 1298 Rev. Date 7/94 Part #153035 ©1994 9/94 FedEx PRINTED IN U.S.A.

Questions?
Call 1·800·Go·FedEx (800)463-3339

The World On Time

0086558381

PICK-UP # 5

FedEx *USA Airbill* FedEx Tracking Number 810431413791 Form No 0210 SPH2 Sender's

1 From (please print and press hard)

Date 5-24-99 Sender's FedEx Account Number 1771-8058-0

Sender's Name SCOTT NEIL Phone (412) 921-~~8785~~ 7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR 5TH FL

Dept/Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220-2746

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 RECEIPT Phone 206 767 5060

Company LAUCKS TESTING LAB

Address 940 SOUTH HARNEY ST

(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 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 or

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 [illegible] SEE BACK OF SENDER'S COPY [illegible] We will [illegible] the [illegible] unless [illegible] actual loss in a timely manner. Your right to recover from us for any loss includ[illegible] value of the package, loss of sales, interest, profit, attorney's fees, costs, and [illegible] of damage, whether direct, incidental, consequential, or special, and is lim[illegible] documented $500. Feder[illegible] portation ch[illegible]

Questions? Call 1-800-G[illegible]

4a Express Package Service *Packages under 150 lbs.* Delivery Date

☒ 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 ☐ 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

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
7	348	$ .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.

is given to the sender.

2 of 7

Domestic Multiple Package Shipment Labels

Shipment Date 5-24-99 7 of 8

Master Airbill Number 810431413791

8096 7474 5962 Form I.D. No. 0260

Domestic Multiple Package Shipment Labels

Shipment Date 5-24-99 2 of 7

Master Airbill Number 810431413791

8096 7474 5918 Form I.D. No. 0260

~~8 of 8~~

8096 7474 5973 Form I.D. No. 0260

3 of 7

3 of 7

8096 7474 5929 Form I.D. No. 0260

___ of ___

8096 7474 5984 Form I.D. No. 0260

4 of 7

4 of 7

8096 7474 5930 Form I.D. No. 0260

___ of ___

8096 7474 5995 Form I.D. No. 0260

5 of 7

5 of 7

8096 7474 5940 Form I.D. No. 0260

___ of ___

8096 7474 6009 Form I.D. No. 0260

6 of 7

6 of 7

8096 7474 5951 Form I.D. No. 0260

PART 154255 • Format #358 • Rev. Date 5/98 • ©1994-98 FedEx • PRINTED IN U.S.A. • SRW 10/98

SPH21

FedEx *USA Airbill* FedEx Tracking Number 810431413736 Form I.D. No. 0210 Sender's Copy

1 From (please print and press hard)

Date 5.25.99 Sender's FedEx Account Number 1771-8058-0

Sender's Name SCOTT NEIL Phone (412) 921-~~8965~~ 7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR 5TH FL Dept/Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220-2746

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 HUGH PRENTICE Phone 2061767 5060

Company LAUCKS TESTING LAB

Address 940 SOUTH 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
4	135	$ .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.

321

WCSI 129 Rev. Date 7/95 Part #153023 ©1994-95 FedEx PRINTED IN U.S.A.

Questions?
Call 1·800·Go·FedEx (800)463-3339

The World On Time

0086558381

After completion, the MPS Sender copy (pink) is given to the sender.

FedEx.

5.25.99

Domestic Multiple Package Shipment Labels

Shipment Date 5.26.99 Master Airbill Number 810431413736

Form I.D. No.	Airbill Number	Shipment Date	Page
0260	8096 7474 5815	5.26.99	2 of 4
0260	8096 7474 5826		3 of 4
0260	8096 7474 5837		4 of 4
0260	8096 7474 5848		___ of ___
0260	8096 7474 5859		___ of ___

PAN 1(2)23 • Initial Pick • Rev. Date 3/96 • 6/96 Jet Print • PRINTED IN U.S.A. • SRW 10/96

FedEx USA Airbill FedEx Tracking Number 810431413780 Form I.D. No. 0210 SPH21 Sender's Copy

1 From (please print and press hard)

Date 5-26-99 Sender's FedEx Account Number 1771-8058-0

Sender's Name SCOTT NEIL Phone (412) 921-7090

Company TETRA TECH NUS INC

Address 661 ANDERSEN DR 5TH FL

Dept/Floor/Suite/Room

City PITTSBURGH State PA ZIP 15220-2746

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 RECEIPT Phone (412) 8265245

Company MICROSEEPS

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.

Questions?
Call 1·800·Go·FedEx[1] (800)463-3339

The World On Time

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	10	$ .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.

321

WCSL 129

0086558361

ATTACHMENT 11

TABULAR LISTING OF GROUND WATER/SURFACE WATER DATA MONITORING EVENT NO. 3 (MAY 17-26, 1999)

NSWC CRANE
SUMMARY OF ALL GROUNDWATER AND SURFACE WATER RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	03B02	03B04	03C02P2	03C02P2	03C03	03C04	03C07	03C08P2	03C09P2	03C10	03C11	03C12	03C15	03C15
Aquifer	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEECH CREEK	BEAVER BEND	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
Nsample	AB022A99	AB042A99	AC02P22A99	AC02P22A99-D	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	AC152A99-D
Sample	AB022A99	AB042A99	AC02P22A99	FD05199901	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	FD05239901
SA Code	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
Sample Date	5/18/99	5/17/99	5/19/99	5/19/99	5/18/99	5/21/99	5/19/99	5/24/99	5/19/99	5/22/99	5/21/99	5/22/99	5/23/99	5/23/99
Duplicate				AC02P22A99										AC152A99
Volatile Organics (ug/L)														
1,1,1-TRICHLOROETHANE	0.5 UJ	0.5 UJ			0.5 UJ	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		
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
1,2-DICHLOROETHANE	0.5 U	0.5 U			0.5 U	0.5 U				23	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		
CARBON TETRACHLORIDE	0.3 UJ	0.3 UJ			0.3 UJ	0.3 U				1.2	0.3 U	0.3 U		
CHLOROETHANE	0.5 U	0.5 U			0.5 U	0.5 U				0.5 U	0.5 U	0.5 U		
CHLOROFORM	0.3 U	0.3 U			0.3 U	0.3 U				1.9	1.4	0.3 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	14	0.5 U	0.5 U	120	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		
METHYLENE CHLORIDE	1 U	1 U			1 U	1 U				1 U	1 U	1 U		
TETRACHLOROETHENE	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		
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
TRICHLOROETHENE	0.5 U	0.5 U	3.2	3.2	0.5 U	0.6	3	61	150	63	760	19	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	8	0.5 U	0.5 U	0.5 U
XYLENES, TOTAL	1 U	1 U			1 U	1 U				1 U	1 U	1 U		
Dissolved Gases (ug/L)														
ETHANE	0.087	0.033			0.012	0.011				0.012	0.632	0.012		
ETHENE	0.024	0.005 U			0.005 U	0.021				0.005 U	0.07	0.005 U		
METHANE	9.715	8.027			5.308	7.51				1.352	5320	0.722		
Energetics (ug/L)														
1,3,5-TRINITROBENZENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
1,3-DINITROBENZENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
2,4,6-TRINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
2,4-DIAMINO-6-NITROTOLUENE	0.95 UJ	0.52 U			0.20 U	1 U				0.65 U	0.71 U	0.30 U	1.1 U	
2,4-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
2,6-DIAMINO-4-NITROTOLUENE	0.95 UJ	0.52 U			0.20 U	1 U				0.65 U	0.71 U	0.30 U	1.1 U	
2,6-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
2-AMINO-4,6-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	2.6	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
2-NITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
3,5-DINITROANILINE	0.95 UJ	0.52 U			0.20 U	1 U				0.65 U	0.71 U	0.30 U	1.1 U	
3-NITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
4,4'-TN-AZOXY	0.95 UJ	0.52 U			0.20 U	1 U				0.65 U	0.71 U	0.30 U	1.1 U	
4-AMINO-2,6-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
4-NITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
HMX	0.95 UJ	0.52 U	9.3	9.1	0.20 U	1 U	4.5 J	32	3.2	6.8	2.9	29	1.1 U	0.58 U
MNX	0.95 UJ	0.52 U			0.20 U	1 U				2.9	0.71 U	0.32	1.1 U	
NITROBENZENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
NITROCELLULOSE	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1300	1000 U	1000 U	1000 U	1100	1200	1000 U
NITROGLYCERIN	9.5 UJ	5.2 U	6.8 U	7.1 U	1.9 U	10 U	6.4 U	4.4 U	7.5 U	6.5 U	7.1 U	3 U	11 U	5.8 U
PETN	4.7 UJ	2.6 U	3.4 U	3.6 U	0.97 U	5 U	3.2 U	2.2 U	3.8 U	3.2 U	3.6 U	1.5 U	5.6 U	2.9 U
PICRIC ACID	1 U	1 U			1 U	1.1 U				1 U	1 U	1 U		

NSWC CRANE
SUMMARY OF ALL GROUNDWATER AND SURFACE WATER RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	03B02	03B04	03C02P2	03C02P2	03C03	03C04	03C07	03C08P2	03C09P2	03C10	03C11	03C12	03C15	03C15
Aquifer	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEECH CREEK	BEAVER BEND	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
Nsample	AB022A99	AB042A99	AC02P22A99	AC02P22A99-D	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	AC152A99-D
Sample	AB022A99	AB042A99	AC02P22A99	FD05199901	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	FD05239901
SA Code	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
Sample Date	5/18/99	5/17/99	5/19/99	5/19/99	5/18/99	5/21/99	5/19/99	5/24/99	5/19/99	5/22/99	5/21/99	5/22/99	5/23/99	5/23/99
Duplicate				AC02P22A99										AC152A99
RDX	0.95 UJ	0.52 U	1.9	1.9	0.20 U	1 U	19	81	150	100	12	11	1.1 U	0.58 U
TETRYL	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U
TNX	0.95 UJ	0.52 U			0.20 U	1 U				0.66	0.71 U	0.30 U	1.1 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	1.1 U	1.1 U	1.1 U	1.1 U
ARSENIC	7.7	5.4	1.1 U	1.1 U	1.1 U	1.4	1.1 U	1.1 U	1.1 U	1.1 U	2.2	1.1 U	1.1 U	1.1 U
BARIUM	82.2	83.9	85.9	86.3	39.0	28.7	30.7	16.4	14.8	44.3	54.3	90.9	23.0	21.8
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	1.1 U	1.1 U	1.1 U	1.1 U
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	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	82.9	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	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	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
IRON	12900	6850			111 U	111 U				111 U	111 U	289		
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	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
MANGANESE	1240	1700	16.7 U	16.7 U	16.7 U	75.3	16.7 U	16.7 U	49.7	16.7 U	16.7 U	16.7 U	34.7	33.9
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	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	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	3.8	2.1	1.1 U	1.8	4.3	8.7	2.6	2.0	1.9
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	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	1.1 U	1.1 U	1.1 U	1.1 U
TIN	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
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	2.2 U	2.2 U	2.2 U	2.2 U
ZINC	41.0	11.1 U	11.1 U	11.1 U	16.0	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	28.1 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	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
ARSENIC, FILTERED	6.8	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	1.1 U	1.1 U
BARIUM, FILTERED	74.8	74.0	76.3	75.6	35.4	29.2	26.0	62.9	11.8	44.3	38.3	89.3	21.0	21.3
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	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	2.6	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
CALCIUM, FILTERED	42100	23300	49000	46300	1110 U	139000	92200	119000	75900	92400	119000	97100	99300	104000
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	5.6 U	99	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	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	2.2 U	2.6	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	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
MAGNESIUM, FILTERED	7430	3410	9480	9280	1110 U	191000	46600	39300	14600	11900	61400	7970	43700	44300
MANGANESE, FILTERED	1260	1670	16.7 U	16.7 U	16.7 U	70.6	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	34.1	36.6
MERCURY, FILTERED	0.20 U	0.20 UJ	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	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	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U
POTASSIUM, FILTERED	1110 U	1110 U	2470	2470	1110 U	3010	4710	15200	1110 U	1110 U	165000	1900	1790	1620
SELENIUM, FILTERED	1.1 U	1.1 U	1.1 U	1.2	1.1 U	2.4	1.7	1.1	1.7	2.8	7.2	1.2	1.1	1.1
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	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U
SODIUM, FILTERED	9020	5200	34100	34300	207000	48800	22500	14400	4350	7070	209000	14400	25500	25400
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	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	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U

NSWC CRANE
SUMMARY OF ALL GROUNDWATER AND SURFACE WATER RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	03B02	03B04	03C02P2	03C02P2	03C03	03C04	03C07	03C08P2	03C09P2	03C10	03C11	03C12	03C15	03C15
Aquifer	ALLUVIUM	ALLUVIUM	BEECH CREEK	BEECH CREEK	BEAVER BEND	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
Nsample	AB022A99	AB042A99	AC02P22A99	AC02P22A99-D	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	AC152A99-D
Sample	AB022A99	AB042A99	AC02P22A99	FD05199901	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	FD05239901
SA Code	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
Sample Date	5/18/99	5/17/99	5/19/99	5/19/99	5/18/99	5/21/99	5/19/99	5/24/99	5/19/99	5/22/99	5/21/99	5/22/99	5/23/99	5/23/99
Duplicate				AC02P22A99										AC152A99
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	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	11.1 U	11.1 U	233 J	11.1 U	11.1 U
Miscellaneous Parameters (mg/L)														
ALKALINITY	152	75.2	110		373	344	330	356	182	186	84	152	271	
BICARBONATE ALKALINITY	152	75.2	110		373	344	330	356	182	186	84	152	271	
CARBON DIOXIDE	92	62.4			75	208				98.8	2000 >	59.8		
CARBONATE ALKALINITY	0	0	0		0	0	0	0	0	0	0	0	0	
CHLORIDE	5 U	5 U	68	70	5 U	6	9	13	5	9	29	41	4	5
CYANIDE	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
DISSOLVED OXYGEN-HACH	0	0.49			0.74	1.8				3.01	5.02	6.88		
DISSOLVED OXYGEN-METER	0.84	0.97	13.66		1.11	2.6	2.02	6.74	8.81	3.08	1.48	8.56	1.84	
DISOLVED PHOSPHORUS	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
FERROUS IRON	3.3	3.3			0	0.04				0.01	0.01	0.01		
HYDROXIDE ALKALINITY	0	0	0		0	0	0	0	0	0	0	0	0	
NITRATE	0	0.02			0.01	0.124				1.739	0.928	2.407		
NITRITE	0	0			0.001	0.006				0.001	0.012	0.003		
OXIDATION REDUCTION POTENTIAL (MV)	-125.9	-81.5	142		54.1	-35.7	183.2	169	133.2	214.6	-110.8	194.2	-39.1	
PH ()	7.21	6.98	7.12		9.24	7.26	7.28	7.34	6.84	6.65	11.06	7.3	7.19	
SPECIFIC CONDUCTIVITY (MS/CM)	0.343	0.198	0.494		0.901	1.657	0.846	0.875	0.492	0.506	2.106	0.62	0.781	
SULFATE	27	16	28	28	88	830	98	130	49	64	980	61	170	170
SULFIDE	1 U	1 U			1 U	1 U				1 U	1 U	1 U		
SULFIDE	0.03	0			0	0.02				0	0.38	0		
TEMPERATURE (C)	12.5	12.8	13.2		15.7	18.05	18.3	16.4	16	16.3	18.2	17.4	13.6	
TOTAL ORGANIC CARBON	1.5	1.1	2	2	1 U	1 U	1 U	1.4	1.1	1.4	10	1.3	1 U	1
TOTAL ORGANIC HALOGENS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.04	0.11	0.06	0.8	0.02 U	0.03	0.02 U
TOTAL PHOSPHORUS	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	6	7		3	5	4	1	9	0	240	5.8	1	
WATER LEVEL (FT)	5.33	6.52	37.34		87.81	76.14	78.99	74.88	45.53	50.21	44.44	41.85	64.76	

NSWC CRANE
SUMMARY OF ALL GROUNDWATER AND SURFACE WATER RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	03C17	03C20	03C25	03C26	03C27	03C30	CRA	CRB	SPRING A	SPRING A	SPRING C
Aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK					
Matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Nsample	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	ASPA2A99-D	ASPC2A99
Sample	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	FD05209901	ASPC2A99
SA Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
Sample Date	5/18/99	5/22/99	5/25/99	5/23/99	5/24/99	5/24/99	5/20/99	5/20/99	5/20/99	5/20/99	5/20/99
Duplicate										ASPA2A99	
Volatile Organics (ug/L)											
1,1,1-TRICHLOROETHANE			0.5 U				0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
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	0.5 U
1,2-DICHLOROETHANE			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
CARBON TETRACHLORIDE			0.3 U				0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ
CHLOROETHANE			0.5 U				0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CHLOROFORM			0.3 U				0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CIS-1,2-DICHLOROETHENE	0.5 U	63	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
METHYLENE CHLORIDE			1 U				1 U	1 U	1 U	1 U	1 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	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
TRICHLOROETHENE	0.5 U	3300	0.5 U	9.1	3.8	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
XYLENES, TOTAL			1 U				1 U	1 U	1 U	1 U	1 U
Dissolved Gases (ug/L)											
ETHANE			0.064				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
ETHENE			0.005 U				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
METHANE			49.4				0.957	2.005	0.113	0.124	0.076
Energetics (ug/L)											
1,3,5-TRINITROBENZENE	0.36 U	6.2	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
1,3-DINITROBENZENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2,4,6-TRINITROTOLUENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.84	0.87	0.66 U
2,4-DIAMINO-6-NITROTOLUENE			1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2,4-DINITROTOLUENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2,6-DIAMINO-4-NITROTOLUENE			1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2,6-DINITROTOLUENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2-AMINO-4,6-DINITROTOLUENE	0.36 U	11	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2-NITROTOLUENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
3,5-DINITROANILINE			1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
3-NITROTOLUENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
4,4'-TN-AZOXY			1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
4-AMINO-2,6-DINITROTOLUENE	0.36 U	17	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.77	0.80	0.66 U
4-NITROTOLUENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
HMX	0.36 U	24	1 U	0.81 U	0.55 U	0.79 U	3.5	3.3	5.5	5.9	1.5
MNX			1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
NITROBENZENE	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
NITROCELLULOSE	1000 U	1000 U	1400	1100	1200	1100	1000 U	1000 U	1000 U	1000 U	1000 U
NITROGLYCERIN	3.6 U	6.8 U	10 U	8.1 U	5.5 U	7.9 U	5.5 U	6 U	3.2 U	7.3 U	6.6 U
PETN	1.8 U	3.4 U	5.1 U	4 U	2.7 U	4 U	2.7 U	3 U	1.6 U	3.6 U	3.3 U
PICRIC ACID			1 U				1 U	1 U	1 U	1 U	1 U

NSWC CRANE
SUMMARY OF ALL GROUNDWATER AND SURFACE WATER RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	03C17	03C20	03C25	03C26	03C27	03C30	CRA	CRB	SPRING A	SPRING A	SPRING C
Aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK					
Matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Nsample	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	ASPA2A99-D	ASPC2A99
Sample	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	FD05209901	ASPC2A99
SA Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
Sample Date	5/18/99	5/22/99	5/25/99	5/23/99	5/24/99	5/24/99	5/20/99	5/20/99	5/20/99	5/20/99	5/20/99
Duplicate										ASPA2A99	
RDX	0.36 U	150	1 U	0.81 U	0.55 U	0.79 U	3.6	3.1	6	6.6	1.9
TETRYL	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
TNX			1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 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	1.1 U
ARSENIC	2.3	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	11.7	33.9	1.1 U	37.9	31.9	69.1	65.8	64.9	73.1	72.3	45.4
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	1.1 U
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	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	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	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	2.2 U	2.2 U
IRON			158				111 U	111 U	138	177	206
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	1.1 U	1.1 U
MANGANESE	114	16.7 U	24.4	23.8	16.7 U	19.1	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	0.20 U	0.20 U	0.20 U	0.20	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	11.1 U	11.1 U
SELENIUM	1.4	1.6	1.1 U	1.7	1.2	2.3	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	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	1.1 U
TIN	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
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	2.2 U
ZINC	15.0	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)											
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	1.1 U	1.1 U
ARSENIC, FILTERED	1.7	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	10.0	30.6	15.8	35.2	31.1	66.4	59.6	60.4	64.6	63.2	39.3
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	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	1.1 U	1.1 U
CALCIUM, FILTERED	179000	89100	104000	91800	52500	54500	24400	22900	25000	24600	22700
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	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	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	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	1.1 U	1.1 U
MAGNESIUM, FILTERED	173000	29900	58200	49600	2830	33200	4430	4780	5870	6080	4140
MANGANESE, FILTERED	105	16.7 U	24.0	24.3	16.7 U	17.8	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	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	11.1 U	11.1 U
POTASSIUM, FILTERED	2720	1720	2460	2210	1110 U	2690	1110 U	1190	1370	1370	1110 U
SELENIUM, FILTERED	1.2	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
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	3.3 U	3.3 U
SODIUM, FILTERED	101000	11700	60400	15700	5340	71100	2640	2860	3790	3970	2490
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	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	11.1 U	11.1 U

NSWC CRANE
SUMMARY OF ALL GROUNDWATER AND SURFACE WATER RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	03C17	03C20	03C25	03C26	03C27	03C30	CRA	CRB	SPRING A	SPRING A	SPRING C
Aquifer	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK	BEECH CREEK					
Matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Nsample	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	ASPA2A99-D	ASPC2A99
Sample	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	FD05209901	ASPC2A99
SA Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
Sample Date	5/18/99	5/22/99	5/25/99	5/23/99	5/24/99	5/24/99	5/20/99	5/20/99	5/20/99	5/20/99	5/20/99
Duplicate										ASPA2A99	
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	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	12.1	11.1 U
Miscellaneous Parameters (mg/L)											
ALKALINITY	125.6	214	318	274	127	240	59.2	58	59	86.4	79.6
BICARBONATE ALKALINITY	125.6	214	318	274	127	240	59.2	58	59	86.4	79.6
CARBON DIOXIDE			83.8				25	56	28.4	10.4	31.8
CARBONATE ALKALINITY	0	0	0	0	0	0	0	0	0	0	0
CHLORIDE	5 U	6	2	4	3	2	5 U	5 U	5 U	5 U	5 U
CYANIDE	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
DISSOLVED OXYGEN-HACH			0.3				9.22	9.48	9.76	9.98	10.56
DISSOLVED OXYGEN-METER	2.24	4.95	4.89	28.39	12.31	14.22	9.02	9.84	9.1		9.01
DISOLVED PHOSPHORUS	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
FERROUS IRON			0.15				0	0.01	0.01	0	0
HYDROXIDE ALKALINITY	0	0	0	0	0	0	0	0	0	0	0
NITRATE			0.129				0.054	0.064	0.086	0.28	0.337
NITRITE			0.001				0.006	0.006	0.004	0.001	0.003
OXIDATION REDUCTION POTENTIAL (MV)	-52.4	168.1	-74.8	63.7	164.4	-89.7	129.4	123.3	153.7		124.9
PH ()	7	7.23	7.2	7.03	7.66	9.59	7.44	7.46	7.54		7.47
SPECIFIC CONDUCTIVITY (MS/CM)	2.19	0.6	0.981	0.71	0.283	0.557	0.156	0.157	0.168		0.14
SULFATE	1300	110	260	100	9	120	23	24	29	30	23
SULFIDE			1 U				1 U	1 U	1 U	1 U	1 U
SULFIDE			0.06				0	0	0	0	0
TEMPERATURE (C)	14.5	14.9	12.7	17.4	12.5	14.22	13.6	12.9	12.6		12.2
TOTAL ORGANIC CARBON	1.2	1.6	1 U	1.3	1 U	1 U	1.6	1.9	1.5	1.6	1.4
TOTAL ORGANIC HALOGENS	0.02 U	1.5	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
TOTAL PHOSPHORUS	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)	1.2	1	0	1.3	2	0.7	5	5	8		7
WATER LEVEL (FT)	138.22	89.63	46.97	82.8	60.75	223.51					

ATTACHMENT 12

POSITIVE DETECTIONS
FOR
GROUND WATER/SURFACE WATER
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

SUMMARY OF PARAMETERS DETECTED AT LEAST ONCE
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

location	03B02	03B04	03C02P2	03C02P2	03C03	03C04	03C07	03C08P2	03C09P2	03C10	03C11	03C12	03C15	03C15	03C17	03C20	03C25	03C26	03C27	03C30	CREEK	CREEK	SPRING A	SPRING A	SPRING C
aquifer	ALLUVIUM	ALLUVIUM	BEECH CREEK	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					
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	AB022A99	AB042A99	AC02P22A99	AC02P22A99-D	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	AC152A99-D	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	ASPA2A99-D	ASPC2A99
sample	AB022A99	AB042A99	AC02P22A99	FD05199901	AC032A99	AC042A99	AC072A99	AC08P22A99	AC09P22A99	AC102A99	AC112A99	AC122A99	AC152A99	FD05239901	AC172A99	AC202A99	AC252A99	AC262A99	AC272A99	AC302A99	ACRA2A99	ACRB2A99	ASPA2A99	FD05209901	ASPC2A99
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
sample_dat	05/18/99	05/17/99	05/19/99	05/19/99	05/18/99	05/21/99	05/19/99	05/24/99	05/19/99	05/22/99	05/21/99	05/22/99	05/23/99	05/23/99	05/18/99	05/22/99	05/25/99	05/23/99	05/24/99	05/24/99	05/20/99	05/20/99	05/20/99	05/20/99	05/20/99
duplicate				AC02P22A99										AC152A99										ASPA2A99	
Volatile Organics (ug/L)																									
1,2-DICHLOROETHANE	0.5 U	0.5 U			0.5 U	0.5 U				23	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	0.3 UJ	0.3 UJ			0.3 UJ	0.3 U				1.2	0.3 U	0.3 U					0.3 U				0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ	0.3 UJ
CHLOROFORM	0.3 U	0.3 U			0.3 U	0.3 U				1.9	1.4	0.3 U					0.3 U				0.3 U	0.3 U	0.3 U	0.3 U	0.3 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	14	0.5 U	0.5 U	120	0.5 U	0.5 U	0.5 U	0.5 U	63	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	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
TRICHLOROETHENE	0.5 U	0.5 U	3.2	3.2	0.5 U	0.6	3	61	150	63	760	19	0.5 U	0.5 U	0.5 U	3300	0.5 U	9.1	3.8	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	8	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
Dissolved Gases (ug/L)																									
ETHANE	0.087	0.033			0.012	0.011				0.012	0.632	0.012					0.064				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
ETHENE	0.024	0.005 U			0.005 U	0.021				0.005 U	0.07	0.005 U					0.005 U				0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
METHANE	9.715	8.027			5.308	7.51				1.352	5320	0.722					49.4				0.957	2.005	0.113	0.124	0.076
Energetics (ug/L)																									
1,3,5-TRINITROBENZENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	6.2	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
2,4,6-TRINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	0.68 U	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.84	0.87	0.66 U
2-AMINO-4,6-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	2.6	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	11	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
4-AMINO-2,6-DINITROTOLUENE	0.95 UJ	0.52 U	0.68 U	0.71 U	0.20 U	1 U	0.64 U	0.44 U	0.75 U	0.65 U	0.71 U	0.30 U	1.1 U	0.58 U	0.36 U	17	1 U	0.81 U	0.55 U	0.79 U	0.55 U	0.60 U	0.77	0.80	0.66 U
HMX	0.95 UJ	0.52 U	9.3	9.1	0.20 U	1 U	4.5 J	32	3.2	6.8	2.9	29	1.1 U	0.58 U	0.36 U	24	1 U	0.81 U	0.55 U	0.79 U	3.5	3.3	5.5	5.9	1.5
MNX	0.95 UJ	0.52 U			0.20 U	1 U				2.9	0.71 U	0.32	1.1 U				1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
NITROCELLULOSE	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1300	1000 U	1000 U	1000 U	1100	1200	1000 U	1000 U	1000 U	1400	1100	1200	1100	1000 U	1000 U	1000 U	1000 U	1000 U
RDX	0.95 UJ	0.52 U	1.9	1.9	0.20 U	1 U	19	81	150	100	12	11	1.1 U	0.58 U	0.36 U	150	1 U	0.81 U	0.55 U	0.79 U	3.6	3.1	6	6.6	1.9
TNX	0.95 UJ	0.52 U			0.20 U	1 U				0.66	0.71 U	0.30 U	1.1 U				1 U				0.55 U	0.60 U	0.33 U	0.73 U	0.66 U
Total Metals (ug/L)																									
ARSENIC	7.7	5.4	1.1 U	1.1 U	1.1 U	1.4	1.1 U	1.1 U	1.1 U	1.1 U	2.2	1.1 U	1.1 U	1.1 U	2.3	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	82.2	83.9	85.9	86.3	39.0	28.7	30.7	16.4	14.8	44.3	54.3	90.9	23.0	21.8	11.7	33.9	1.1 U	37.9	31.9	69.1	65.8	64.9	73.1	72.3	45.4
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	82.9	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	5.6 U	5.6 U	5.6 U	5.6 U
IRON	12900	6850			111 U	111 U				111 U	111 U	289					158				111 U	111 U	138	177	206
MANGANESE	1240	1700	16.7 U	16.7 U	16.7 U	75.3	16.7 U	16.7 U	49.7	16.7 U	16.7 U	16.7 U	34.7	33.9	114	16.7 U	24.4	23.8	16.7 U	19.1	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	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	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20	0.20 U
SELENIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	3.8	2.1	1.1 U	1.8	4.3	8.7	2.6	2.0	1.9	1.4	1.6	1.1 U	1.7	1.2	2.3	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
ZINC	41.0	11.1 U	11.1 U	11.1 U	16.0	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	28.1 U	15.0	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	6.8	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	1.1 U	1.1 U	1.7	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	74.8	74.0	76.3	75.6	35.4	29.2	26.0	62.9	11.8	44.3	38.3	89.3	21.0	21.3	10.0	30.6	15.8	35.2	31.1	66.4	59.6	60.4	64.6	63.2	39.3
CADMIUM, FILTERED	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.6	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	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
CALCIUM, FILTERED	42100	23300	49000	46300	1110 U	139000	92200	119000	75900	92400	119000	97100	99300	104000	179000	89100	104000	91800	52500	54500	24400	22900	25000	24600	22700
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	5.6 U	99	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	5.6 U	5.6 U	5.6 U	5.6 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	2.2 U	2.6	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
MAGNESIUM, FILTERED	7430	3410	9480	9280	1110 U	191000	46600	39300	14600	11900	61400	7970	43700	44300	173000	29900	58200	49600	2830	33200	4430	4780	5870	6080	4140
MANGANESE, FILTERED	1260	1670	16.7 U	16.7 U	16.7 U	70.6	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U	34.1	36.6	105	16.7 U	24.0	24.3	16.7 U	17.8	16.7 U	16.7 U	16.7 U	16.7 U	16.7 U
POTASSIUM, FILTERED	1110 U	1110 U	2470	2470	1110 U	3010	4710	15200	1110 U	1110 U	165000	1900	1790	1620	2720	1720	2460	2210	1110 U	2690	1110 U	1190	1370	1370	1110 U
SELENIUM, FILTERED	1.1 U	1.1 U	1.1 U	1.2	1.1 U	2.4	1.7	1.1	1.7	2.8	7.2	1.2	1.1	1.1	1.2	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
SODIUM, FILTERED	9020	5200	34100	34300	207000	48800	22500	14400	4350	7070	209000	14400	25500	25400	101000	11700	60400	15700	5340	71100	2640	2860	3790	3970	2490
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	233 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	12.1	11.1 U
Miscellaneous (mg/L)																									
ALKALINITY (MG/L)	152	75.2	110		373	344	330	356	182	186	84	152	271		125.6	214	318	274	127	240	59.2	58	59	86.4	79.6
BICARBONATE ALKALINITY (MG/L)	152	75.2	110		373	344	330	356	182	186	84	152	271		125.6	214	318	274	127	240	59.2	58	59	86.4	79.6
CARBON DIOXIDE (MG/L)	92	62.4			75	208				98.8	2000 >	59.8					83.8				25	56	28.4	10.4	31.8
CHLORIDE	5 U	5 U	68	70	5 U	6	9	13	5	9	29	41	4	5	5 U	6	2	4	3	2	5 U	5 U	5 U	5 U	5 U
CYANIDE	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
DISSOLVED OXYGEN-HACH (MG/L)	0	0.49			0.74	1.8				3.01	5.02	6.88					0.3				9.22	9.48	9.76	9.98	10.56
DISSOLVED OXYGEN-METER (MG/L)	0.84	0.97	13.66		1.11	2.6	2.02	6.74	8.81	3.08	1.48	8.56	1.84		2.24	4.95	4.89	28.39	12.31	14.22	9.02	9.84	9.1		9.01
FERROUS IRON (MG/L)	3.3	3.3			0	0.04				0.01	0.01	0.01					0.15				0	0.01	0.01	0	0
NITRATE (MG/L)	0	0.02			0.01	0.124				1.739	0.928	2.407					0.129				0.054	0.064	0.086	0.28	0.337
NITRITE (MG/L)	0	0			0.001	0.006				0.001	0.012	0.003					0.001				0.005	0.006	0.004	0.001	0.003
OXIDATION REDUCTION POTENTIAL (MV)	-125.9	-81.5	142		54.1	-35.7	183.2	169	133.2	214.6	-110.8	194.2	-39.1		-52.4	168.1	-74.8	63.7	164.4	-89.7	129.4	123.3	153.7		124.9
PH ()	7.21	6.98	7.12		9.24	7.26	7.28	7.34	6.84	6.65	11.05	7.3	7.19		7	7.23	7.2	7.03	7.66	9.59	7.44	7.46	7.54		7.47
SPECIFIC CONDUCTIVITY (MS/CM)	0.343	0.198	0.494		0.901	1.657	0.846	0.675	0.492	0.506	2.106	0.62	0.781		2.19	0.6	0.981	0.71	0.283	0.557	0.156	0.157	0.168		0.14
SULFATE	27	16	28	28	88	830	98	130	49	64	980	61	170	170	1300	110	260	100	9	120	23	24	29	30	23
SULFIDE (MG/L)	0.03	0			0	0.02				0	0.38	0					0.06				0	0	0	0	0
TEMPERATURE (C)	12.5	12.8	13.2		15.7	18.05	18.3	16.4	16	16.3	18.2	17.4	13.6		14.5	14.9	12.7	17.4	12.5	14.22	13.6	12.9	12.6		12.2
TOTAL ORGANIC CARBON	1.5	1.1	2	2	1 U	1 U	1 U	1.4	1.1	1.4	10	1.3	1 U	1	1.2	1.6	1 U	1.3	1 U	1 U	1.6	1.9	1.5	1.6	1.4
TOTAL ORGANIC HALOGENS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.04	0.11	0.06	0.8	0.02 U	0.03	0.02 U	0.02 U	1.5	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
TURBIDITY (NTU)	8	6	7		3	5	4	1	9	0	240	5.8	1		1.2	1	0	1.3	2	0.7	5	5	8		7
WATER LEVEL (FT)	5.33	6.52	37.34		87.81	76.14	78.99	74.88	45.53	50.21	44.44	41.85	64.76		138.22	89.63	46.97	82.8	60.75	223.51					

ATTACHMENT 13

SUMMARY OF AMBIENT AND TRIP BLANK RESULTS
MONITORING EVENT NO. 3
(MAY 17-26, 1999)

NSWC CRANE
SUMMARY OF AMBIENT AND TRIP BLANK RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK
Matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Nsample	AB05199901	TB05179901	TB05189901	TB05189902	TB05199901	TB05199902	TB05209901	TB05219901	TB05239901	TB05249901	TB05259901
Sample	AB05199901	TB05179901	TB05189901	TB05189902	TB05199901	TB05199902	TB05209901	TB05219901	TB05239901	TB05249901	TB05259901
SA Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Quality Control Type	AB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB
Sample Date	5/19/99	5/17/99	5/18/99	5/18/99	5/19/99	5/19/99	5/20/99	5/21/99	5/23/99	5/24/99	5/25/99
Volatile Organics (ug/L)											
1,1,1-TRICHLOROETHANE	0.5 UJ	0.5 UJ	0.5 UJ		0.5 UJ		0.5 UJ	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
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
1,2-DICHLOROETHANE	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
CARBON TETRACHLORIDE	0.3 UJ	0.3 UJ	0.3 UJ		0.3 UJ		0.3 UJ	0.3 U			0.3 U
CHLOROETHANE	0.5 U	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U			0.5 U
CHLOROFORM	0.3 U	0.3 U	0.3 U		0.3 U		0.3 U	0.3 U			0.3 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
ETHYLBENZENE	0.5 U	0.5 U	0.5 U		0.5 U		0.5 U	0.5 U			0.5 U
METHYLENE CHLORIDE	1 U	1 U	1 U		1 U		1 U	1 U			1 U
TETRACHLOROETHENE	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
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
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
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
XYLENES, TOTAL	1 U	1 U	1 U		1 U		1 U	1 U			1 U
Dissolved Gases (ug/L)											
ETHANE	0.005 U										
ETHENE	0.005 U										
METHANE	0.134										
Energetics (ug/L)											
1,3,5-TRINITROBENZENE	0.42 U										
1,3-DINITROBENZENE	0.42 U										
2,4,6-TRINITROTOLUENE	0.42 U										
2,4-DIAMINO-6-NITROTOLUENE	0.42 U										
2,4-DINITROTOLUENE	0.42 U										
2,6-DIAMINO-4-NITROTOLUENE	0.42 U										
2,6-DINITROTOLUENE	0.42 U										
2-AMINO-4,6-DINITROTOLUENE	0.42 U										
2-NITROTOLUENE	0.42 U										
3,5-DINITROANILINE	0.42 U										
3-NITROTOLUENE	0.42 U										
4,4'-TN-AZOXY	0.42 U										
4-AMINO-2,6-DINITROTOLUENE	0.42 U										
4-NITROTOLUENE	0.42 U										
HMX	0.42 U										
MNX	0.42 U										
NITROBENZENE	0.42 U										
NITROCELLULOSE	1000 U										
NITROGLYCERIN	4.2 U										
PETN	2.1 U										
PICRIC ACID	1.1 U										
RDX	0.42 U										
TETRYL	0.42 U										
TNX	0.42 U										
Total Metals (ug/L)											
ANTIMONY	1.1 U										
ARSENIC	1.1 U										
BARIUM	1.1 U										
BERYLLIUM	1.1 U										
CADMIUM	1.1 U										
CHROMIUM	5.6 U										
COBALT	3.3 U										
COPPER	2.2 U										
IRON	111 U										
LEAD	1.1 U										

NSWC CRANE
SUMMARY OF AMBIENT AND TRIP BLANK RESULTS
MONITORING EVENT NO. 3
AMMUNITION BURNING GROUNDS

Location	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK
Matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Nsample	AB05199901	TB05179901	TB05189901	TB05189902	TB05199901	TB05199902	TB05209901	TB05219901	TB05239901	TB05249901	TB05259901
Sample	AB05199901	TB05179901	TB05189901	TB05189902	TB05199901	TB05199902	TB05209901	TB05219901	TB05239901	TB05249901	TB05259901
SA Code	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Quality Control Type	AB	TB	TB	TB	TB	TB	TB	TB	TB	TB	TB
Sample Date	5/19/99	5/17/99	5/18/99	5/18/99	5/19/99	5/19/99	5/20/99	5/21/99	5/23/99	5/24/99	5/25/99
MANGANESE	16.7 U										
MERCURY	1.1										
NICKEL	11.1 U										
SELENIUM	1.1 U										
SILVER	3.3 U										
THALLIUM	1.1 U										
TIN	11.1 U										
VANADIUM	2.2 U										
ZINC	11.1 U										
Dissolved Metals (ug/L)											
ANTIMONY, FILTERED	1.1 U										
ARSENIC, FILTERED	1.1 U										
BARIUM, FILTERED	1.1 U										
BERYLLIUM, FILTERED	1.1 U										
CADMIUM, FILTERED	1.1 U										
CALCIUM, FILTERED	1110 U										
CHROMIUM, FILTERED	5.6 U										
COBALT, FILTERED	3.3 U										
COPPER, FILTERED	2.2 U										
LEAD, FILTERED	1.1 U										
MAGNESIUM, FILTERED	1110 U										
MANGANESE, FILTERED	16.7 U										
MERCURY, FILTERED	0.20 U										
NICKEL, FILTERED	11.1 U										
POTASSIUM, FILTERED	1110 U										
SELENIUM, FILTERED	1.1 U										
SILVER, FILTERED	3.3 U										
SODIUM, FILTERED	1110 U										
THALLIUM, FILTERED	1.1 U										
TIN, FILTERED	11.1 U										
VANADIUM, FILTERED	2.2 U										
ZINC, FILTERED	11.1 U										
Miscellaneous Parameters (mg/L)											
ALKALINITY											
BICARBONATE ALKALINITY											
CARBON DIOXIDE											
CARBONATE ALKALINITY											
CHLORIDE	5 U										
CYANIDE	0.014										
DISSOLVED OXYGEN-HACH											
DISSOLVED OXYGEN-METER											
DISOLVED PHOSPHORUS	0.1 U										
FERROUS IRON											
HYDROXIDE ALKALINITY											
NITRATE											
NITRITE											
OXIDATION REDUCTION POTENTIAL (MV)											
PH ()											
SPECIFIC CONDUCTIVITY (MS/CM)											
SULFATE	5 U										
SULFIDE	1 U										
SULFIDE											
TEMPERATURE (C)											
TOTAL ORGANIC CARBON	1 U										
TOTAL ORGANIC HALOGENS	0.02 U										
TOTAL PHOSPHORUS	0.1 U										
TURBIDITY (NTU)											
WATER LEVEL (FT)											

VOLUME II OF II

Consists of the following attachments:

Attachment 14	Laucks Testing Laboratories, Inc., Data Package and Electronic Data Deliverable; TtNUS Electronic Database File Monitoring Event No. 3 (May 17-26, 1999)
Attachment 15	TtNUS Data Validation Letters for Laucks Testing Laboratories, Inc., Analytical Data Monitoring Event No. 3 (May 17-26, 1999)
Attachment 16	Microseeps, Inc., Data Packages and Electronic Deliverable; TtNUS Data Validation Letters for Microseeps, Inc., Analytical Data Monitoring Event No. 3 (May 17-26, 1999)

Volume II of II
is provided only in the record copy of this report, which is maintained in the NSWC Crane Ground Water Monitoring Information Repository.