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Phase II Ground Water RCRA Facility Investigation Solid Waste Management Unit 30 (Landfarm) Including Monitoring Rounds One Through Five Naval Surface Warfare Center (NSWC)

Crane, Indiana

NAVFAC
Naval Facilities Engineering Command

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

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October 2004

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PHASE II GROUND WATER
RCRA FACILITY INVESTIGATION
SOLID WASTE MANAGEMENT UNIT 30
(LANDFARM)
INCLUDING MONITORING ROUNDS ONE THROUGH FIVE

NAVAL SURFACE WARFARE CENTER (NSWC)
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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ACRONYMS/ABBREVIATIONS

ANOVA	Analysis of Variance
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CMS	Corrective Measures Study
COC	Chain-of-custody
Cr^{+6}	Hexavalent Chromium
CTO	Contract Task Order
HSWA	Hazardous and Solid Waste Amendments
IDLs	Instrument Dection Limits
IDW	Investigation-Derived Waste
NAD	Naval Ammunition Depot
MCL	Maximum Contaminant Level
MDLs	Method Dection Limits
MSL	Mean Sea Level
NAVFAC	Naval Facilities Engineering Command
NAVY	U.S. Department of the Navy
NFESC	Naval Facilities Engineering Service Center
NSWC	Naval Surface Warfare Center
PCB	Polychlorinated Biphenyl
POC	Point of Compliance
PPE	Personal Protective Equipment
PRG	Preliminary Remediation Goals
QAPP	Quality Assurance Project Plan
RBTL	Risk-Based Target Level
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facilities Investigation
RL	Reporting Limit
SAS	Sludge Application Site
SMCL	Secondary Maximum Contaminant Level
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SQL	Sample Quantitation Limit
SWMU 30	Solid Waste Management Unit 30 "The Landfarm"
SWMU	Solid Waste Management Unit

TCLP	Toxicity Characteristic Leaching Procedure
TKN	Total Kjeldahl Nitrogen
TOM	Task Order Manager
TOC	Top of Casing
TtNUS	Tetra Tech NUS, Inc.
USACEWES	U.S. Army Corps of Engineers Waterways Experiment Station
U.S. EPA	U.S. Environmental Protection Agency
USCS	United Soil Classifications System
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

NSWC operates a wastewater treatment plant that generates sludges. NSWC historically used land application for the disposal of sludge from its main on-site sewage treatment plant. These sludges are from the processing of domestic and process wastewater sources. Process sources include wastewater from metal finishing operations; surface coating operations; the loading, assembly, and packing of ordnance; water treatment plant backwash; boiler blowdowns; and industrial laundry.

In October 1980, NSWC filed a RCRA Section 3010 Notification and a Part A (interim status) permit application to operate as a treatment, storage, or disposal facility. The application for the Part A permit was approved and the facility was allowed to operate as though it had a permit. In December 1983, NSWC applied for and obtained a sludge application permit to spray sludges from its wastewater treatment plant along approximately 18 miles of roadside near the western boundary of the facility. On April 13, 1988, NSWC was issued a permit (effective May 6, 1988) to apply sludge to a 2.5-acre site (the Landfarm) located near an existing sanitary landfill. Sludges from the on-site wastewater treatment facility were applied to this site from November 16, 1988 through March 1995. In June of 1994, NSWC began applying sludges to eight new land-application-permitted sites located south and southeast of the Landfarm.

In 1992, the U.S. EPA became concerned that the sludges from the on-site treatment plant should be characterized as F006 waste (i.e., wastewater treatment sludges from electroplating operations). U.S. EPA contended that the wastewaters discharging from the electroplating shop pretreatment plants were mixing with other wastewaters in the sewer system prior to arrival at the main sewage treatment plant. In response to U.S. EPA concerns, NSWC implemented measures to prevent the discharge of wastes from the plating shops and the resulting mixing with other wastewaters. In 1995, U.S. EPA renewed and modified the NSWC permit to include the Landfarm as SWMU #30/00 to settle the enforcement issue concerning F006 and to modify the HSWA corrective action requirements and schedule. U.S. EPA had already required NSWC to conduct an RFI at the Landfarm as part of the 1989 permit to determine if the previous application of sludges possibly contaminated with plating wastes had adversely affected the shallow groundwater regime. The results of the RFI investigations at the Landfarm would be used to determine the need for activity along the 18 miles of roadside.

NSWC submitted this RCRA Facility Investigation Report for the Landfarm in May 2001. The purpose of this investigation was to determine if the previous application of sludges possibly contaminated with plating wastes had impacted the shallow groundwater regime. From October 1999 to October 2000,

NSWC conducted five rounds of groundwater sampling from seven wells at the Landfarm. Samples were collected quarterly to examine the variability of the analytical data versus time and seasonal changes. Groundwater samples were analyzed for a list of parameters associated with sludge application operations. The parameters for the first two rounds of sampling included volatile organic compounds (VOCs), metals, explosives, cyanide, nitrate/nitrite, ammonia, and phosphorous. Data from the initial two rounds were used to focus the subsequent three sampling rounds on a list of potential contaminants of concern. Because metals were the primary contaminants of concern associated with this SWMU, metals analysis was conducted on all five sampling rounds.

VOCs and explosives were not detected in any of the wells during sampling rounds 1 and 2 and were eliminated from analysis for the remaining three rounds. Four metals exceeded their respective Risk Based Target Levels (RBTLs) in at least one sample. RBTLs are used as conservative screening values to identify potential constituents of concern. Chemical concentrations above a RBTL would not automatically designate a site as "dirty" or trigger a response action. However, exceeding a RBTL suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate. The RFI RBTLs values were based on Drinking Water Standards, EPA's Region 9 Preliminary Remedial Goals (PRG), and other human health based criteria.

Arsenic was detected above its RBTL fifteen times throughout the sampling period, but the maximum detected value was below drinking water standards. Cadmium, Nickel, and Thallium were detected above their RBTLs very infrequently throughout the sampling period. As an additional check, a statistical test was performed to determine if parameter concentrations detected in downgradient wells were significantly different from those detected in samples from the upgradient wells. The Analysis of Variance (ANOVA) technique was the basic approach used to compare data from upgradient and downgradient monitoring well locations. The ANOVA technique was used to test whether there was statistically significant evidence of contamination associated with SWMU #30/00. The test was performed on all parameters detected at least once in the five downgradient wells during the five sampling rounds. The results of the ANOVA showed that none of the parameters had downgradient concentrations that were higher than their respective upgradient concentrations at a statistical significance of 5% (i.e., 95% confidence). This supported the hypothesis that there was no significant impact on ground water at the site caused by activities at the SWMU.

Because of no impact to ground water, NSWC requested No Further Action at this SWMU for all media. The U.S. EPA recommended that NSWC collect and analyze soil/sludge samples from the Landfarm in order to identify any potential risks that may be present in the soil/sludge exposure pathway. Soil/sludge sampling field investigation activities at the Landfarm were conducted in early March 2002 and were

reported in the Final Phase II RCRA Facility Investigation Report (RFI) for Solid Waste Management Unit 30 (Landfarm) Addendum for Soil/Sludge Sampling and Risk Screening Report dated October 2004. This addendum was prepared as a stand-alone attachment to the final Ground Water RFI Report. NSWC collected 18 surface and subsurface soil samples from a grid encompassing the SWMU proper as well as perimeter samples. The samples were analyzed for metals as these were the primary constituents of concern at the Landfarm. Sample results were compared to RBTLs (based on human health and ecological risk screening levels) as well as background metals soil values obtained from NSWC's Basewide Background Soil Investigation (January 2001).

The RBTLs used in the soils investigation included the lowest value taken from U.S. EPA Region 9 Preliminary Remediation Goals for exposure to soils (residential land use), IDEM Tier I Default Closure Levels for soils for residential land use, U.S. EPA Soil Screening Levels for Soil Ingestion, Transfer from Soils to Air, Migration from Soils to Groundwater, or U.S. EPA Region 5 Ecological Data Quality Levels (EDQLs). Soils were screened against the lowest human health or ecological risk based criteria.

Antimony, arsenic, chromium, iron, manganese, and vanadium were the only inorganics detected at concentrations exceeding risk-based human health screening levels. Other inorganics exceeded ecological risk screening values. U.S. EPA Region 5 typically utilizes screening levels based on the U.S. EPA Region 9 PRGs. The screening value used for non-carcinogenic chemicals is one-tenth of the Region 9 PRG to account for the potential cumulative effects of multiple compounds affecting the same target organ. When chemical constituents are found to exceed screening levels, the U.S. EPA also requires an evaluation of cumulative cancer risk and non-cancer (Hazard Index (HI) risk from the potential exposure to the presence of multiple chemicals. Two human receptors (the hypothetical future resident and typical industrial worker) were evaluated for health risks potentially resulting from exposure to these metals. The results of the cumulative risk evaluations were calculated using a 95% Upper Confidence Limit value on sample results as the exposure point concentration of the chemical for human receptors.

U.S. EPA typically considers sites with a calculated HI value below 1 and a cancer risk estimate range between 10^{-4} and 10^{-6} as generally not requiring additional remediation. The calculated cumulative cancer risk for both receptors falls within U.S. EPA's acceptable risk range. The metal driving the cancer risk above the low end of the acceptable risk range (10^{-6}) is arsenic. Although the arsenic concentrations found in the soils at the Landfarm exceed basewide background concentrations, arsenic is a naturally occurring metal.

The Hazard Index was calculated above 1 for all Landfarm soils. This Hazard Index value was determined by adding the individual Hazard Quotients (HQ) calculated for non-carcinogenic chemicals to

determine their cumulative effects. The non-carcinogenic risk driver (HQ) found to be pushing the HI over 1 was Iron. For the purposes of a human health risk assessment, EPA recognizes that iron is a naturally occurring constituent and an essential nutrient. For the soil data at the Landfarm, the 95% UCL concentration of 34,800 mg/kg iron corresponds to an estimated HQ of 1.5 after comparison to the residential PRG value. This result can be interpreted to mean that chronic ingestion of this soil would add approximately 0.45 mg/kg-day to an individual's diet. This is not significantly higher than the provisional EPA No Observed Adverse Effect Level of 0.3 mg/kg-day and would correspond to an approximate doubling or tripling of the National Academy of Science Recommended Daily Allowance (RDA) for iron. This increase would not be expected to result in the onset of chronic adverse effects in typical individuals who display normal homeostatic control over iron accumulation and protein binding. Based on EPA's human health risk assessment guidance, the observations that iron is a naturally occurring constituent, an essential nutrient, and that the highest HQ of 1.5 should not be associated with chronic adverse health effects, the total HIs accounting for all other metals present in Landfarm soils fall below 1.

Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, silver, vanadium, and zinc were detected at concentrations exceeding the U.S. EPA Region 5 EDQLs for ecological receptors and basewide background soil concentrations. Similar to human health risk based values, chemical concentrations above an EDQL would not automatically designate a site as "dirty" or trigger a response action. However, exceeding an EDQL suggests that further evaluation of the potential ecological risks that may be posed by site contaminants is appropriate. Because EDQLs represent the lowest screening levels found in the literature for any receptor, they are not always applicable to site-specific receptors and conditions. As a next step, NSWC evaluated these chemicals against alternative ecological screening levels which may be more applicable (e.g., Canadian Soil Quality Guidelines). A comparison of the sampling concentrations to the various applicable screening levels as well as soil background concentrations indicates that there is a low probability of unacceptable ecological risk.

As of the date of this final RFI Report (October 2004), based on all of the information described above and the information contained in the Administrative Record, EPA Region 5 has determined that there are no unacceptable present or potential future human health or ecological risks at SWMU #30/00. They have also determined that there is no further action required at SWMU #30/00. However, this determination does not preclude U.S. EPA or IDEM from requiring further action in the future if more information is obtained indicating that such action is needed to protect human health or the environment. Nothing in this report or in the Statement of Basis (prepared by EPA) should be interpreted as prohibiting EPA or IDEM from taking any actions necessary to protect human health and the environment, including ordering additional corrective action if necessary.

1.0 INTRODUCTION

This Phase II RCRA Facility Investigation (RFI) and Ground Water Monitoring Report for the Solid Waste Management Unit 30 (SWMU 30) located at the Naval Surface Warfare Center Crane, Crane, Indiana (NSWC Crane) was prepared for the U.S. Department of the Navy (Navy) Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFAC) by Tetra Tech NUS, Inc. (TtNUS) under the Comprehensive Long-Term Environmental Action Navy (CLEAN), Contract Number N62467-94-D-0888, Contract Task Order 0019 (CTO 19).

1.1 REPORT ORGANIZATION

This report has been prepared in the following format to address the specific requirements for a Phase II Ground Water RFI at SWMU 30. Section 1.0 of the report is this introduction including the project scope, objectives, and background information. Section 2.0 describes field sampling activities associated with the five rounds of data collection. Section 3.0 presents and evaluates the nature and extent of contamination based on analytical results from sampling rounds 1 through 5 conducted between October 1999 and October 2000. Section 4.0 presents the statistical methodology and evaluation of the data collected. Section 5.0 presents the risk screening that was conducted as part of this RFI. Section 6.0 presents conclusions and recommendations formulated after review of all of the data collected on the Landfarm. Supporting documentation for this report is attached as Appendices A through N.

This document has been prepared in accordance with the Navy Installation Restoration Laboratory Quality Assurance Guide (Interim Guidance) of the Naval Facilities Engineering Service Center, (NFESC, 1996).

1.2 OBJECTIVES AND SCOPE

The objective of this project is to determine the presence or absence of contaminants in the ground water at SWMU 30, as well as the nature and extent of any such ground water contamination. SWMU 30 is commonly referred to as the "Landfarm" and sometimes as the Sludge Application Site (SAS). The work is being conducted to meet the requirements of a Phase II Ground Water Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI).

Seven ground water monitoring wells were installed around the perimeter of SWMU 30 (the Landfarm) during a previous U.S. Army Corps of Engineers Waterways Experiment Station (USACEWES) project, but these wells had not been sampled prior to this investigation. The scope of the current investigation

involves five tasks, including sampling the seven on-site ground water monitoring wells five times over a 12-month duration, laboratory analysis, analytical data validation, data management, and reporting.

1.3 BACKGROUND INFORMATION

1.3.1 Base Description

The NSWC Crane is located in Crane, Indiana, approximately 75 miles southwest of Indianapolis and 71 miles northwest of Louisville, Kentucky (Figure 1-1). The facility encompasses approximately 98 square miles (64,463 acres) in southern Indiana (Figure 1-2). NSWC Crane provides materiel, technical, and logistical support to the Navy for equipment, weapons systems, and expendable and nonexpendable ordnance items. The facility was opened in 1941 as the Naval Ammunition Depot (NAD), Burns City, to serve as an inland munitions production and storage center. In 1943, the name was changed to NAD Crane in honor of Commodore William Montgomery Crane, the first chief of the Navy's Bureau of Ordnance. The name changed again in 1975 to Naval Weapons Support Center to reflect the facility's growing involvement in high-technology weapons system. In 1977, the Secretary of Defense decided to combine all conventional ammunition acquisition under the responsibility of a single service. The ammunition production and storage function was given to the Army, and the Crane Army Ammunition Activity was established as a Crane tenant to accomplish this task for Naval ammunition. In 1992, based on changing missions and alignment, the name was changed again to the Naval Surface Warfare Center Crane. The Army has assumed ordnance production, storage, and related responsibilities under the single-service management directive. All environmental activities on the installation, including permitting activities, remain the responsibility of the Navy. Although ordnance production and storage still resides on Base, Crane serves a modern and sophisticated Navy as a recognized leader in diverse and highly technical product lines, such as microwave devices, acoustic sensors, small arms, microelectronic technology, and more. The Army currently exists as a Tenant Activity on the Base.

1.3.2 Site Description and History

The Landfarm (SWMU 30) is located in the west central part of the NSWC Crane, approximately 1 mile south of Burns City, Indiana (Figure 1-2) at the northeastern intersection of Highway 161 and Highway 200. Above ground, high-voltage power lines cross the site from east to west.

Within the facility, NSWC Crane operates a wastewater treatment plant that generates sludges. NSWC Crane has historically used land application for the disposal of sludge from its main on-site sewage treatment plant. These sludges are from the processing of domestic and process wastewater sources. Process sources included wastewater from metal finishing operations; surface coating operations; the

loading, assembly, and packing of ordnance; water treatment plant backwash; boiler blowdowns; and industrial laundry.

In October 1980, NSWC Crane filed a RCRA Section 3010 Notification and a Part A (interim status) permit application to operate as a treatment, storage, or disposal facility. The application for the Part A permit was approved, and the facility was allowed to operate as though it had a permit. In December 1983, NSWC Crane applied for and obtained a sludge application permit to spray sludges from its wastewater treatment plant along approximately 18 miles of roadside near the western boundary of the facility. On April 13, 1988, NSWC Crane was issued a permit (effective May 6, 1988) to apply sludge to a 2.5-acre site (the Landfarm, Figure 1-2) located near an existing sanitary landfill. Sludges from the on-site wastewater treatment facility were applied to this site from November 16, 1988 through March 1995. In June of 1994, NSWC Crane began applying sludges to eight new land-application-permitted sites located south and southeast of the Landfarm (see Figure 1-2, C1 to C8).

On December 20, 1989, a joint federal and state RCRA storage permit was issued to the Navy. The federal portion of the permit established the Hazardous and Solid Waste Amendments (HSWA) Corrective Actions Requirements and Compliance Schedules (RCRA 3004). The compliance schedule obligated NSWC Crane to perform an RFI at each on-site SWMU. A corrective measures study (CMS) and implementation of corrective measures are to be initiated if contamination is identified at a SWMU during the RFI process. The State of Indiana obtained pre-HSWA authorization and issued the Navy the state portion of the permit.

In 1992, the U.S. Environmental Protection Agency (U.S. EPA) became concerned that the sludges from the on-site treatment plant should be characterized as F006 waste (wastewater treatment sludges from electroplating operations). U.S. EPA contended that wastewater discharging from the electroplating shop pretreatment plants (Buildings 38 and 3064) were mixing with other wastewater in the sewer system prior to arrival at the main sewage treatment plant. In response to U.S. EPA concerns, NSWC Crane implemented measures to prevent the discharge of wastes from the plating shops and resulting mixing with other wastewater. In 1995, U.S. EPA renewed and modified the NSWC Crane permit to include the Landfarm as SWMU 30 to settle the enforcement issue concerning F006 and to modify the HSWA corrective action requirements and schedule. U.S. EPA had already required NSWC Crane to conduct an RFI at the Landfarm as part of the 1989 permit to determine if the previous application of sludges possibly contaminated with plating wastes had adversely affected the shallow ground water regime.

1.3.3 Site Topography

The Landfarm is approximately 2.5 acres in area. Topographically the site is relatively flat. Ground (surface) elevations for the monitoring wells at the Landfarm are presented in Table 1-1. The tops of monitoring well casings (TOC) at the Landfarm varied in elevation from 706.25 feet above mean sea level (ftMSL) at location 30-7 to 721.02 ftMSL at location 30-3 (Figure 1-3).

A hill located north-northeast of the site has an elevation of 741.1 ftMSL. This hill slopes gently toward the Landfarm. The elevation at the intersection of Highways 200 and 161 which is close to the southwest corner of the Landfarm is 705.7 ftMSL. Therefore, the topography across the Landfarm slopes southwest at an average gradient of approximately 0.02 feet per feet (ft/ft).

1.3.4 Natural and Manmade Features

The Landfarm is located directly beneath two high-voltage power lines (Figure 1-3). The site is lightly vegetated and is bound on the north and south by forested areas. The Landfarm is bound to the west by Highway 161 and to the east by an unnamed road. William's Cemetery is located on top of the hill north-northeast of the site. The Landfarm is located northeast of the intersection of Highways 161 and 200.

1.3.5 Site Geology

The soils underlying the site were observed to be silty clay and ranged in thickness from 12 to 16 feet (USACEWES, 1995). These soils were classified under the Unified Soil Classification System (USCS) as being silt to silty clay (ML to CL). The soils were dry to moist and commonly were slightly to moderately plastic.

The rock underlying the Landfarm is Pennsylvanian in age and consists of 0 to 14 feet of interbedded soft clay, gray to black shale, coal, and sandstone (USACEWES, 1995). These strata overlie a massively bedded, predominantly brown, noncalcareous, quartzitic, fine- to medium-grained sandstone that becomes coarser and more friable with depth. An upper interbedded shale and sandstone sequence that was observed in most borings was absent in the easternmost boring, (30-2). The sandstone was observed to be jointed along bedding planes. An east-west cross section was constructed to show the geology across the site and is presented as Figure 1-4. The location of the cross-section line is presented on Figure 1-3.

1.3.6 Site Hydrogeology

Based on information collected by the USACEWES, the first indication of saturated subsurface conditions was noted within the sandstone bedrock at between 30 and 42 feet below ground level (USACEWES, 1995). This shallow ground water regime is suspected to be confined or semiconfined based on the observed increase in the subsequent water-level elevation data upon completion of drilling and monitoring well installation. Water levels in completed monitoring wells were approximately 26 feet below the surface. This is believed to be due to a gradational change in the character of the sandstone at depth and the presence of a clayey overburden soil (Figure 1-4). Prior to this RFI, it was anticipated that the potentiometric surface of the shallow ground water regime at the site would parallel the surface topography and that ground water flow within the shallow regime would reflect surface topography, with flow from the north-northeast to south-southwest. The actual ground water flow direction was found to vary somewhat from this direction (refer to Section 3.1).

Seven ground water monitoring wells were installed in the shallow bedrock ground water regime during the USACEWES investigation (Figure 1-3). These seven monitoring wells are designated 30-1 through 30-7. The geologic and well construction diagrams for these monitoring wells are presented in Appendix A. Two monitoring wells were installed hydraulically upgradient of the site (30-1 and 30-3); one was installed hydraulically cross-gradient to the site (30-2), and four were installed hydraulically downgradient of the site (30-4, 30-5, 30-6 and 30-7). These seven wells are screened within the uppermost water-bearing zone.

1.3.7 Previous Investigations

NSWC Crane subcontracted USACEWES to install seven ground water monitoring wells around the Landfarm in the Fall of 1993 (Figure 1-3). The seven wells were identified as four downgradient, one cross-gradient, and two upgradient ground water monitoring wells at this site. These seven ground water monitoring wells were designated 30-1 through 30-7. The original well logs and reformatted well logs and well construction diagrams are presented in Appendix A.

As a result of discussions with the USACEWES, it was decided that the seven wells should be resurveyed. This survey was conducted by a state-licensed surveyor during the Fall of 1999. Results of this survey can be found in Table 1-1.

Ground water samples were obtained from these seven wells during the initial sampling round conducted in October 1999 and subsequent quarterly sampling through October 2000. The only relevant data prior

to this consisted of quarterly analysis of the sludge since 1988. Although analytical data has been collected for the sludge since 1988, only data from 1990 through 1992 were available for this report.

Sludge samples were obtained before the sludge was loaded into the spreader truck. The available quarterly analyses of sludges destined for the Landfarm were performed by Anacon Laboratories in 1990, 1991, and 1992 (Table 1-2), and by Heritage Laboratories in 1992 (Table 1-3). The Anacon analytical data was for a limited analysis that included a modified metals analysis, polychlorinated biphenyls (PCBs), ammonia, nitrate, total Kjeldahl nitrogen (TKN), and phosphorus. The Heritage analyses were limited to include only a modified metals analysis, cyanide, toxicity characteristic leaching procedure (TCLP) analysis for volatile and semivolatile organic compounds, sulfide, and pH. The available historic sludge analytical results (1990 through 1992) are presented in Tables 1-2 and 1-3.

TABLE 1-1

MONITORING WELL INFORMATION AND DATA
NSWC CRANE, CRANE, INDIANA
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Well Identification	30-1	30-2	30-3	30-4	30-5	30-6	30-7
Alias	WES 30-01-93 Landfarm 30-01 GW-001	WES 30-02-93 Landfarm 30-02 GW-002	WES 30-03-93 Landfarm 30-03 GW-003	WES 30-04-93 Landfarm 30-04 GW-004	WES 30-05-93 Landfarm 30-05 GW-005	WES 30-06-93 Landfarm 30-06 GW-006	WES 30-07-93 Landfarm 30-07 GW-007
Date Installed	9/17/93	9/21/93	9/24/93	9/27/93	9/28/93	9/29/93	10/8/93
East Coord.	3009637	3010049	3009939	3009424	3009423	3009822	3009612
North Coord.	1296463	1296256	1296565	1296220	1269318	1296128	1296127
Total Depth	45.5	50.3	51.6	39.8	42.5	42.8	45.5
Surface Elevation	709.38	715.56	718.57	704.59	706.26	706.53	703.87
Elevation at "v"-notch	711.52	717.92	720.89	706.90	708.51	708.61	706.12
Depth to water from v-notch	30.51	38.00	40.28	25.93	27.28	28.59	25.72
Elevation of ground water	681.01	679.92	680.61	680.97	681.23	680.02	680.40
Elevation TOC	711.80	718.05	721.02	707.02	708.63	708.74	706.25
Elevation TOS	668.88	670.36	677.17	674.89	673.76	673.73	671.07
Elevation BOS	663.88	665.36	667.17	664.89	663.76	663.73	661.07
Screened Interval	40.5 to 45.5	45.2 to 50.2	41.4 to 51.4	29.7 to 39.7	32.5 to 42.5	32.8 to 42.8	32.8 to 42.8
Screen Length	5.0	5.0	10.0	10.0	10.0	10.0	10.0
Formation	Upper Penn Mansfield	Upper Penn Mansfield	Upper Penn Mansfield	Upper Penn Mansfield	Upper Penn Mansfield	Upper Penn Mansfield	Upper Penn Mansfield
Lithologic Unit Screened	lower sandstone *	lower sandstone *	lower sandstone *	lower sandstone *	lower sandstone *	lower sandstone *	lower sandstone *
Well Construction	2" sch. 40 PVC	2" sch. 40 PVC	2" sch. 40 PVC	2" sch. 40 PVC	2" sch. 40 PVC	2" sch. 40 PVC	2" sch. 40 PVC
Surface Finish	3" steel casing/cap	3" steel casing/cap	3" steel casing/cap	3" steel casing/cap	3" steel casing/cap	3" steel casing/cap	3" steel casing/cap

TABLE 1-1

MONITORING WELL INFORMATION AND DATA
NSWC CRANE, CRANE, INDIANA

Note: Units are in feet where not indicated.
All horizontal survey measurements were tied into the Indiana State Plane Coordinates and the 1983 North American Datum (NAD83).
All vertical survey measurements were referenced to the 1988 National Geodetic Vertical Datum (NGVD) and mean sea level (msl).

TOC = top of cap
TOS = top of screen
BOS = bottom of screen

* As defined in Kvale, 1994. Bedrock Facies Controls on Potential Constituent Migration – Pathways and Barriers, Landfill and Sludge Application Sites, December, 1994.

TABLE 1-2

HISTORICAL ANALYTICAL RESULTS FROM SLUDGE SAMPLES
ANACON ANALYTICAL AND CONSULTING LABORATORIES, INC.
NSWC CRANE, CRANE, INDIANA

Analyte	1/11/90	1/11/90	4/3/91	4/3/91	9/17/90	9/17/90	12/27/90	12/27/90	4/3/91	4/3/91	4/17/91	4/17/91	6/26/91	6/26/91	10/3/91	10/3/91	12/19/91	12/19/91	1/9/92	4/4/92	4/4/92	7/2/92	7/2/92
	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L
Ammonia	2.7	76													10.85		3.6		1.84	2.13	68.71	29.4	1838
PCB	<0.1	<1													<0.1		<0.01		<0.01	<0.01	<1.0	<0.001	<0.1
TKN																				410	13226	12.6	788
Phosphorus	62	1750													16.5		0.44		0.31	256	8259	6.03	377
Total Nitrogen	170	4760													18.35				18.3				
Nitrate	8.2	230													n/a		17		9.1	<0.1	<5		
% Total Solids	3.53	n/a	0.99	n/a	1.16	n/a	0.93	n/a	0.99	n/a	0.56	n/a	2.2	n/a	0.87	n/a	0.03 to 0.59		0.21	0.32	n/a	1.4 to	n/a
Cadmium			0.1583	15.45	0.5	43.1	0.1	10.8	0.153	15.45	0.215	38.5	0.004	0.19	0.169	19.4	14	23.7		0.036	11.3	0.368	26.3
Chromium			1.25	126	2.01	173			1.25	126	1.222	219	0.009	0.4	0.46	52.9	0.58	98		0.16	50		
Copper			4.25	429	12.7	1096	4.15	446	4.25	429	5.167	924	0.14	6.24	2.05	235	2.47	417		0.63	197	3.02	216
Lead			0.91	92	8.33	718	<0.50	<0.50	0.91	92	0.006	1.074	0.003	0.014	<0.10	<1.0	<0.05	<5.0		<0.05	<0.5	<0.05	<0.50
Nickel			0.63	64	1.33	115	0.52	55.9	0.63	64	0.645	115	0.034	1.53	0.35	40.25	0.27	45.6		0.48	26.3	0.45	32.1
Silver			0.05	<1	<0.05	<2.5			0.05	<1	<0.05	<1.00	<0.05	<0.5	0.45	<1.0	4.04	682		<0.0001	26.3		
Zinc			8.3	838	15.15	1306	6.88	740	8.3	838	9.597	1719	0.293	13.2	5.63	647	0.09	15.2		1.41	438	7.99	571
Mercury			<0.0001	<0.01					<0.000	<0.01					<0.01	<1	0.008	1.35					
Potassium					30	2586	25	2688			30.4	3170			16.6	1909	30.4	5152		18.4	5750	56.7	4050

Notes:

- mg/L milligrams per liter (wet sludge)
- mg/kg milligrams per kilogram (dried sample)
- PCB polychlorinated biphenyl
- TKN total Kjeldahl nitrogen
- < less than
- n/a not available

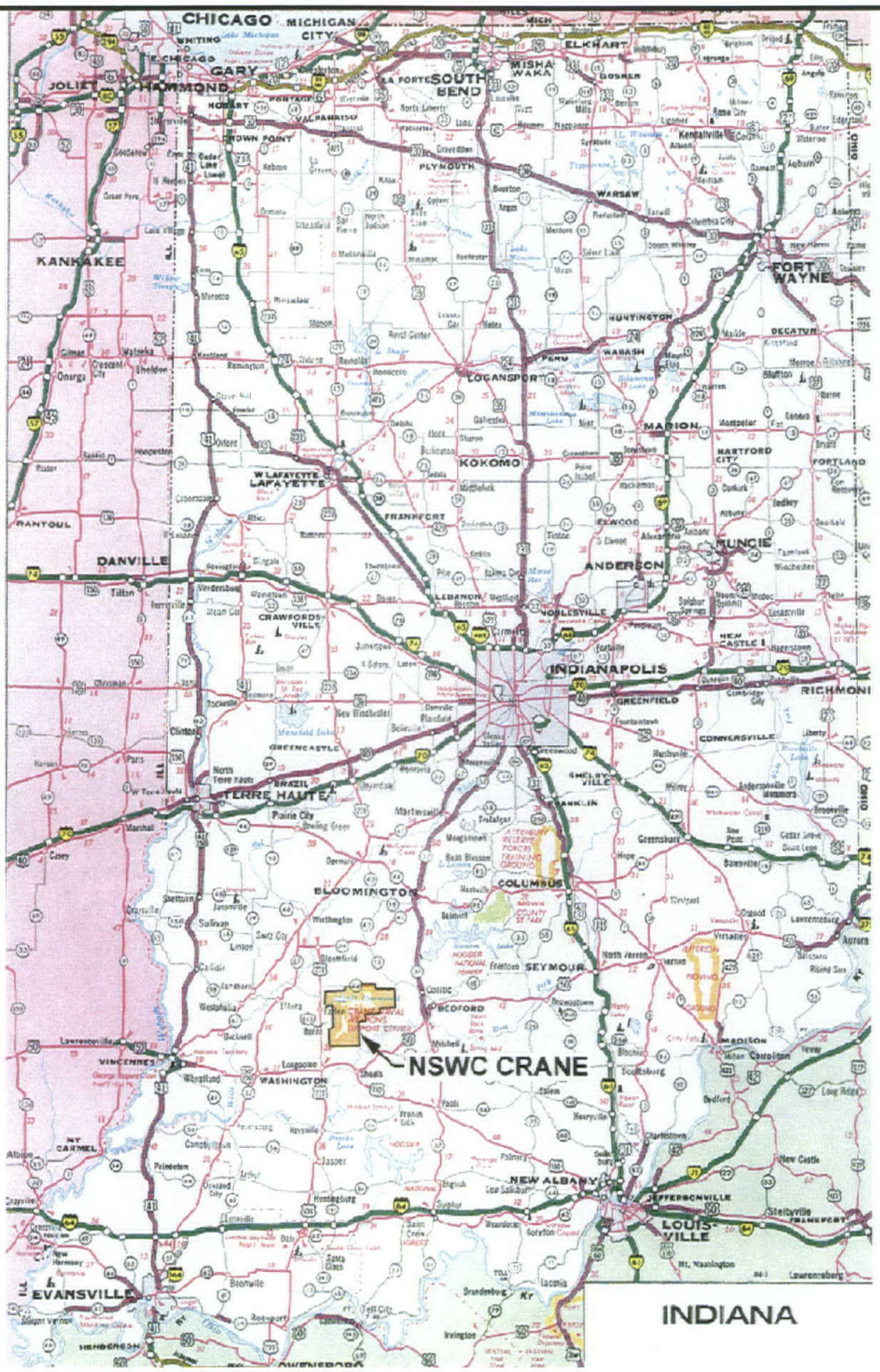
TABLE 1-3

HISTORICAL ANALYTICAL RESULTS FROM SLUDGE SAMPLES
HERITAGE LABORATORIES, INC.
NSWC CRANE, CRANE, INDIANA

Analyte	5/18/92 mg/L	5/26/92 mg/L	6/17/92 mg/kg
Percent Total Solids	51		
Barium	0.78	0.64	
Cadmium	430	<0.02	
Chromium	41	<0.05	2600
Lead	<0.2	<0.20	
Silver	<0.04	<0.04	
Arsenic		<0.005	
Selenium		<0.005	
Mercury		<0.0050	
Copper		3.7	
Zinc		0.81	
TCLP Analysis			
1,4-Dichlorobenzene		<50 ug/L	
2,4-Dinotrotoluene		<50 ug/L	
Hexachlorobenzene		<50 ug/L	
Hexachlorobutadiene		<50 ug/L	
Hexachloroethane		<50 ug/L	
Nitrobenzene		<50 ug/L	
Pyridine		<250 ug/L	
2-Methyl Phenol		<50 ug/L	
3-Methyl Phenol		<50 ug/L	
3-Methyl Phenol		<50 ug/L	
Pentachlorophenol		<250 ug/L	
2,4,5-Trichlorophenol		<50 ug/L	
2,4,6-Trichlorophenol		<50 ug/L	
Benzene		<50 ug/L	
Carbon Tetrachloride		<50 ug/L	
Chlorobenzene		<50 ug/L	
1,2-Dichloroethane		<50 ug/L	
1,1-Dichloroethylene		<50 ug/L	
Methyl Ethyl Ketone		<100 ug/L	
Tetrachloroethylene		<50 ug/L	
Trichloroethylene		<50 ug/L	
Vinyl Chloride		<100 ug/L	
pH		4.9	
Total Cyanide		<0.1 mg/kg	1600
Sulfide		<10 mg/kg	

Notes:

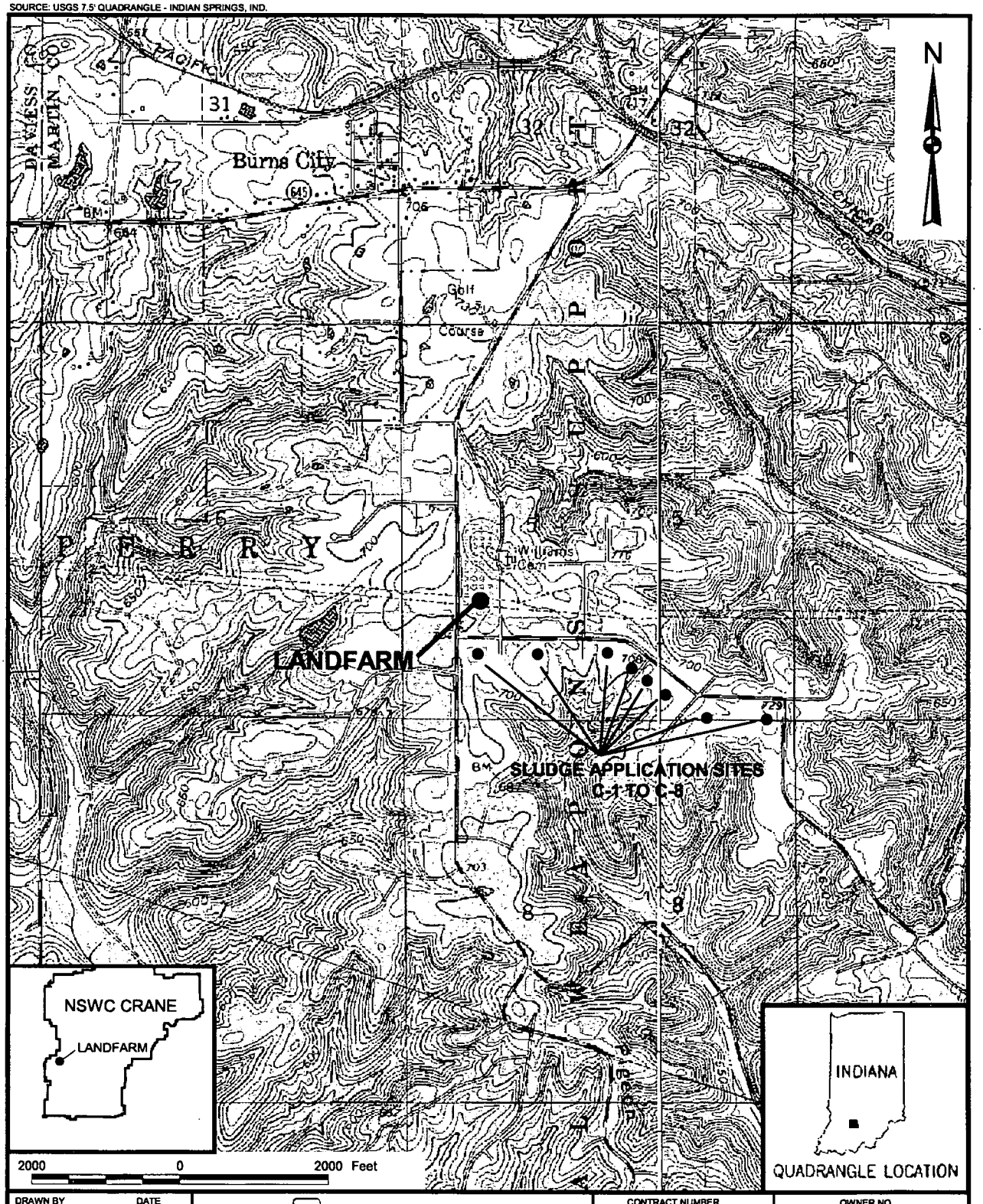
mg/L milligrams per liter
mg/kg milligrams per kilogram
µg/L micrograms per liter



DRAWN BY	DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER	OWNER NO.
D. PERRY	1/29/99		7393	0019
CHECKED BY	DATE	LOCATION MAP NSWC CRANE, CRANE, INDIANA	APPROVED BY	DATE
J. LAMEY	3/20/00		M. FRANCIS	3/20/00
COST/SCHEDULE-AREA			APPROVED BY	DATE
			R. CLARK	3/20/00
SCALE			DRAWING NO.	REV
AS NOTED			FIGURE 1-1	0

P:\GIS\NSWC_CRANE\CRANE.APR LOCATION MAP LAYOUT 3/20/00 JAL

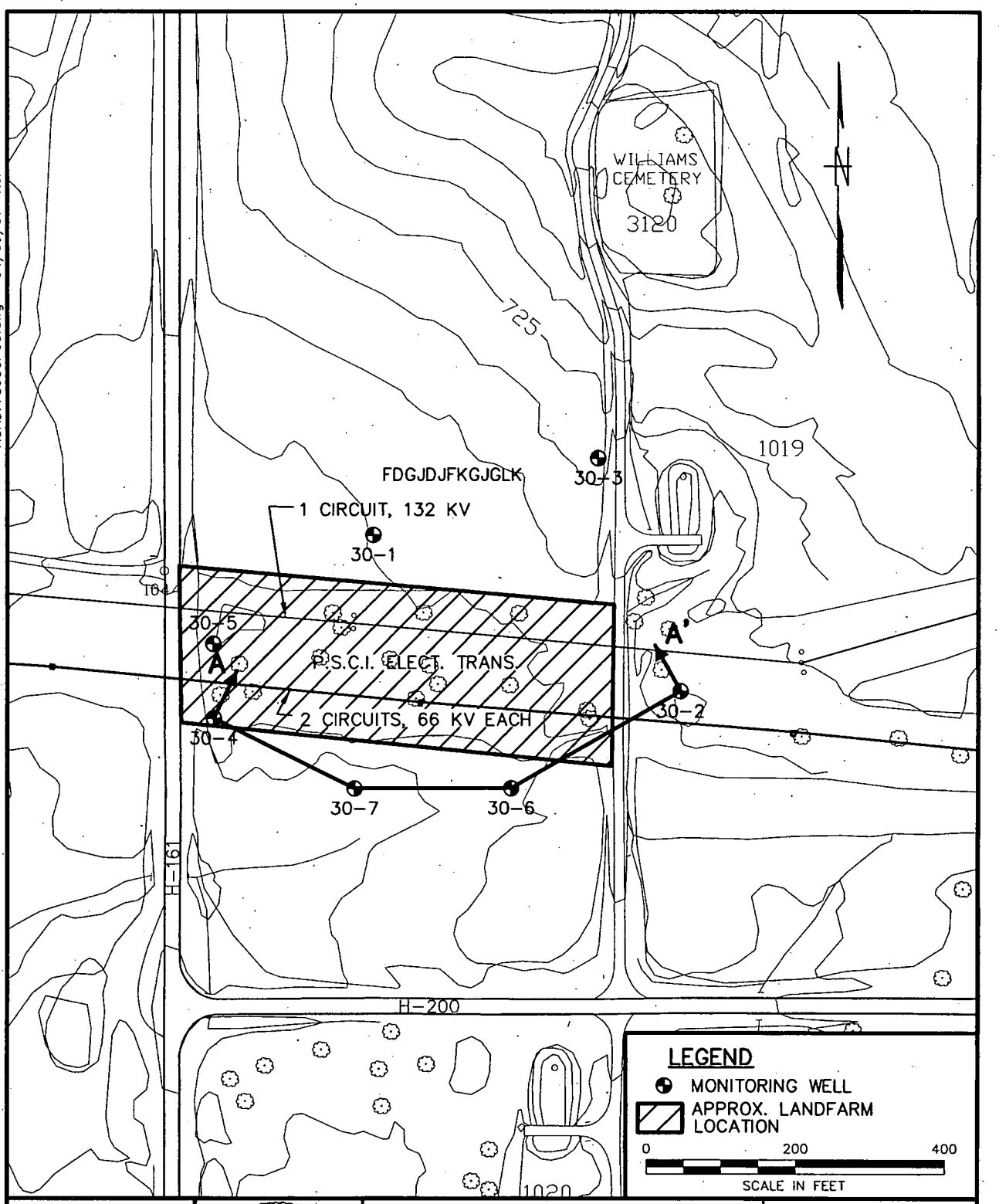
SOURCE: USGS 7.5' QUADRANGLE - INDIAN SPRINGS, IND.



DRAWN BY D. PERRY — DATE 29-JAN-99	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7393	OWNER NO. 0019
CHECKED BY J. LAMEY — DATE 3/20/00	LOCATION OF LANDFARM NSWC CRANE, CRANE, INDIANA	APPROVED BY M. FRANCIS — DATE 3/20/00	
COST/SCHEDULE-AREA		APPROVED BY R. CLARK — DATE 3/20/00	
SCALE AS NOTED		DRAWING NO. FIGURE 1-2	REV 0

P:\GIS\NSWC_CRANE\CRANE.APR 3/20/00 JAL LOCATION OF LANDFARM LAYOUT

ACAD: 7393GP03.dwg 04/06/01 HJP



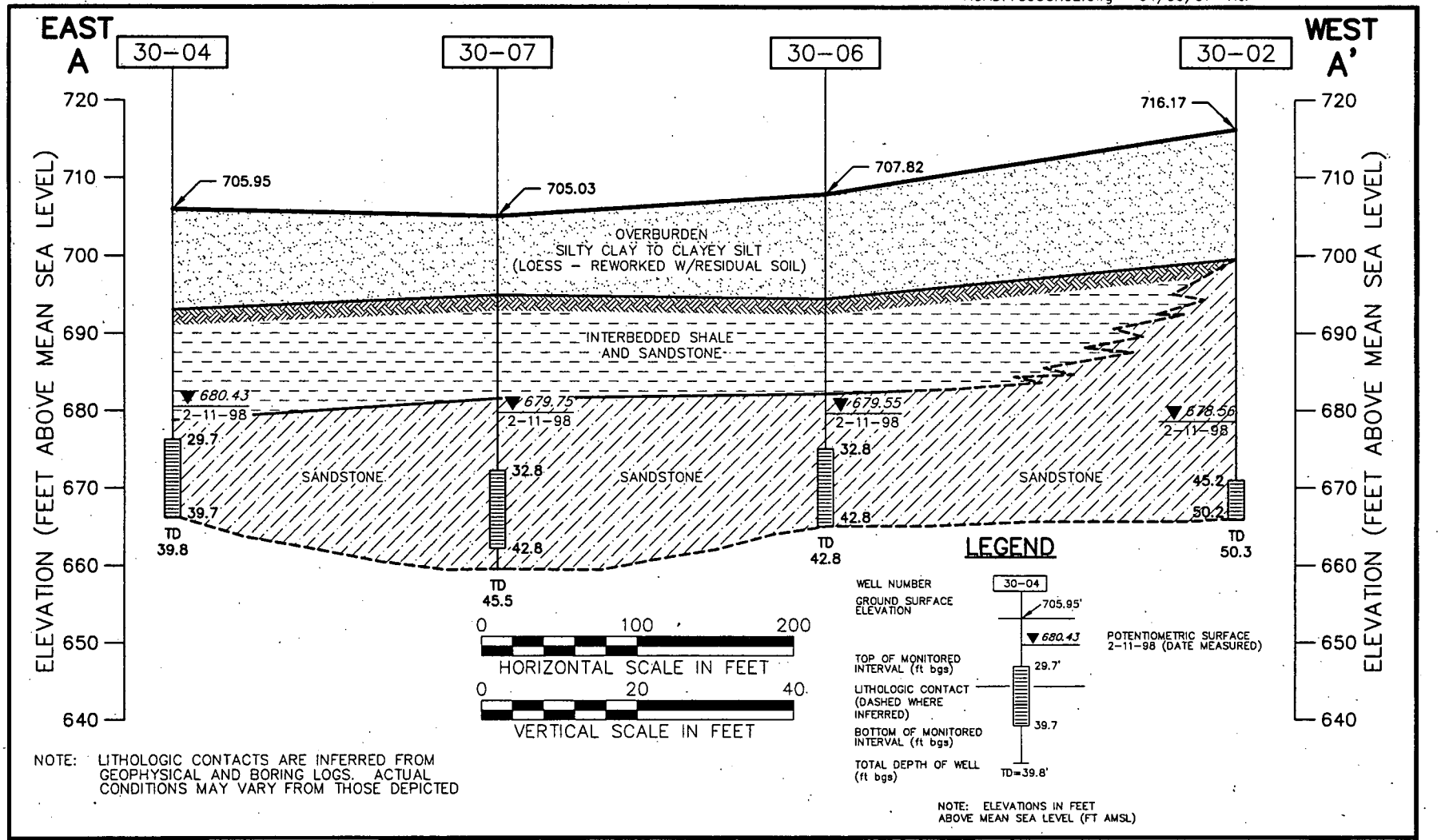
DRAWN BY HJP DATE 4/6/01			CONTRACT NO. 7393
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-3 / REV. 0

DEPARTMENT OF THE NAVY ★ CINCLANTFLT ★ SOUTHERN DIV FACILITIES ENGINEERING COMD

SITE MAP
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

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

ACAD: 7393GX02.dwg 04/06/01 HJP



NOTE: LITHOLOGIC CONTACTS ARE INFERRED FROM GEOPHYSICAL AND BORING LOGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED

DRAWN BY HJP DATE 4/6/01	DEPARTMENT OF THE NAVY · SOUTHERN DIV FACILITIES ENGINEERING COMD	GENERALIZED GEOLOGIC CROSS SECTION A-A' SWMU 30, LANDFARM SITE NSWC - CRANE, CRANE, INDIANA	CONTRACT NO. 7393
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-4 REV. 0

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

2.0 FIELD INVESTIGATION ACTIVITIES

Field investigation activities conducted as part of ground water monitoring for rounds one through five included ground water level measurements and sampling of seven monitoring wells. These activities were performed in accordance with the procedures and methodologies described in Section 2.0 of the project Work Plan (TtNUS, 1999a) and the Quality Assurance Project Plan (QAPP) (TtNUS, 1999b). A copy of the field activity log book for these rounds is provided in Appendix B. Summaries of field activities for all rounds are provided in Appendix C.

2.1 WATER-LEVEL MEASUREMENTS

Water levels were measured in seven monitoring wells prior to each ground water purging and sampling. Table 2-1 summarizes the ground water measurements for each round conducted to date. Figures 2-1 through 2-5 illustrate the potentiometric surface maps for the ground water in the shallow aquifer for each round of sampling. Ground water level measurement data for all rounds can be found in Appendix D.

2.2 GROUND WATER SAMPLING

Seven monitoring wells were sampled during all five rounds of ground water monitoring using low-flow purging and sampling techniques, in accordance TtNUS SOP SA-1.1 Section 5.7, found in Appendix C of the Work Plan (TtNUS, 1999a).

Monitoring Well Development

The seven monitoring wells at the site were developed prior to purging and sampling. The development was completed during a previous field effort conducted in September 1999, in accordance with TtNUS SOP SA-1.1 found in Appendix C of the Work Plan (TtNUS, 1999a). Each monitoring well was developed by surge block and submersible pump. After initial water levels were taken, a two-inch surge block was inserted into the well and the well was then surged over the length of the saturated screen for a minimum of five minutes. Immediately after surging, a 12-volt submersible pump was lowered into the well and the well was pumped for approximately one hour. Water quality parameters, pump rate, volume of ground water removed and water levels were recorded during development. Monitoring well development records for each well can be found in Appendix F. All purge fluids were containerized and held in a 300-gallon tank mounted on a pickup truck. Section 2.3 describes the disposal of all IDW including development fluids.

Monitoring Well Purging And Sampling

The wells were purged prior to sampling using the dedicated bladder pumps with bottled nitrogen gas as the power source. A copy of each pump's certification is provided in Appendix E. Ground water quality parameters, including pH, specific conductivity, turbidity, temperature, dissolved oxygen, and ORP were measured during purging at 5 to 10 minute intervals using a YSI Model 6820 multi-parameter water quality meter. Calibration log sheets for all meters are found in Appendix G. Water levels were also measured during purging at 5 to 10 minute intervals. Purging continued until a minimum of one well volume was removed and the above parameters stabilized, as per Section 2.3.2 of the Work Plan. Copies of the ground water sample log sheets, and low-flow purge data sheets are provided in Appendix H.

Following purging, samples were collected directly from the discharge end of the Teflon®-lined pump tubing. For Rounds one and two, the ground water samples were collected and analyzed for energetics (explosives), Appendix IX metals - dissolved and total, ammonia, cyanide, hexavalent chromium, nitrate/nitrite, total and dissolved phosphorus, total kjeldahl nitrogen, and Appendix IX VOCs with 25ml purge. For Rounds three through five (see Section 3.2 for explanation of reduced analytical suite), the ground water samples were collected and analyzed for Appendix IX metals - dissolved and total, ammonia, cyanide, hexavalent chromium, nitrate/nitrite, total and dissolved phosphorus, and total kjeldahl nitrogen. Samples were filtered for dissolved metals using 0.45 micron filters. The holding time for hexavalent chromium is very short (24 hours from sample collection to laboratory preparation) as compared to other analytes for analysis. Because of the lag time between the time of sample collection and the sample arriving at the selected analytical laboratory, it was decided (and acknowledged in the Work Plan) to analyze for hexavalent chromium in the field. Field chemical analysis for hexavalent chromium was conducted on site for all monitoring wells sampled and for all rounds. A HACH brand portable colorimeter was used for the field chemical analysis of all samples. Analytical results of the samples are discussed in Section 3.0. Field analysis hexavalent chromium forms for all rounds are provided in Appendix I. Chain-of-custody records for all rounds are provided in Appendix J.

2.3 DECONTAMINATION AND INVESTIGATION-DERIVED WASTE

All water quality and water-level meters were decontaminated by rinsing with de-ionized water prior to and after use. All seven wells were fitted with a dedicated, certified clean, bladder pump (refer to Appendix E for manufacturer's pump certification), which eliminated the need for decontamination of sampling equipment.

There were three types of investigation-derived waste (IDW) generated during these field sampling events, personal protective equipment (PPE), development/purge fluids (ground water) and equipment decontamination fluids. All PPE was doubled bagged and placed in trash receptacles at the facility.

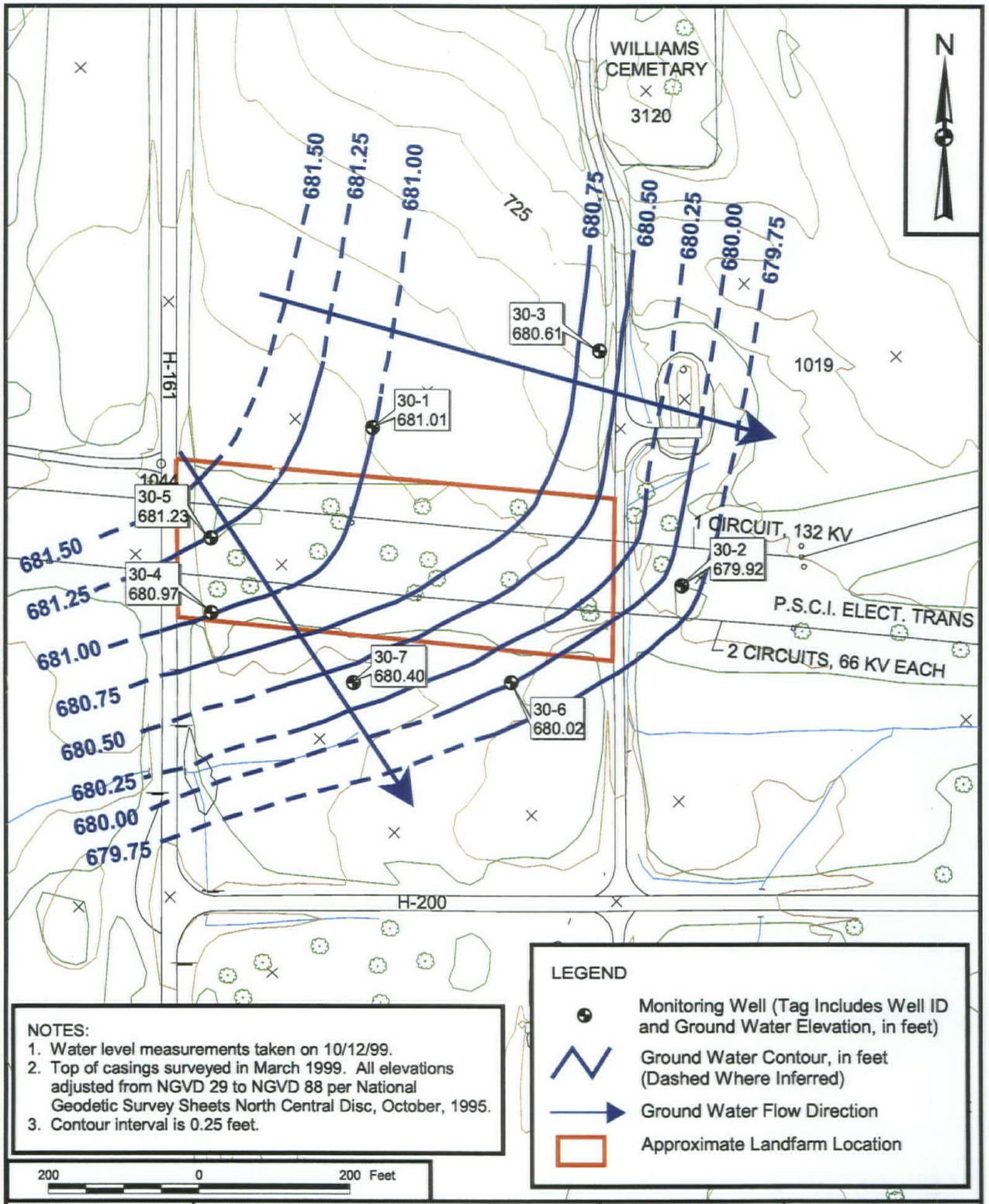
All development/purge fluids and decontamination fluids (IDW) were containerized and transported via 8-gallon containers to a 300-gallon holding tank, located at the field trailer. The holding tank liquid was sampled at the completion of the ground water purging and sampling for Round 1. The analytical results for the IDW sample were forwarded to the Mr. Tom Brent of the Crane Environmental Department for a review of the contents prior to disposal. A copy of these results can be found in Appendix K. The analytical results confirmed the IDW as non-hazardous and the Crane Environmental Department granted permission to discharge the IDW fluids to the NSWC-permitted sanitary sewer system.

TABLE 2-1

GROUND WATER ELEVATION MEASUREMENTS
NSWC CRANE, CRANE, INDIANA

Well Identification	30-1	30-2	30-3	30-4	30-5	30-6	30-7
Alias	WES 30-01-93 Landfarm 30-01	WES 30-02-93 Landfarm 30-02	WES 30-03-93 Landfarm 30-03	WES 30-04-93 Landfarm 30-04	WES 30-05-93 Landfarm 30-05	WES 30-06-93 Landfarm 30-06	WES 30-07-93 Landfarm 30-07
Elevation at "v-notch"	711.52	717.92	720.89	706.9	708.51	708.61	706.12
1st Round GW Elevation 10/12/99	681.01	679.92	680.61	680.97	681.23	680.02	680.4
2nd Round GW Elevation 01/11/00	681.49	680.38	681.07	681.54	681.8	680.49	680.96
3rd Round GW Elevation 04/17/00	681.36	680.33	681.04	681.22	681.53	680.39	680.76
4th Round GW Elevation 7/25/00	681.30	680.11	680.82	681.01	681.26	680.14	680.47
5th Round GW Elevation 10/17/00	681.10	680.07	680.76	681.05	681.33	680.16	680.52

Note: Units are in feet where not indicated.



DRAWN BY J. LAMEY	DATE 1/5/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7393 / OWNER NO. 0019
CHECKED BY —	DATE —	FIRST ROUND GROUND WATER CONTOUR MAP OCTOBER 1999 LAND FARM NSWC CRANE, CRANE, INDIANA	APPROVED BY M. FRANCIS / DATE 3/20/00
COST/SCHEDULE-AREA			APPROVED BY R. CLARK / DATE 3/20/00
SCALE AS NOTED			DRAWING NO. FIGURE 2-1 / REV —

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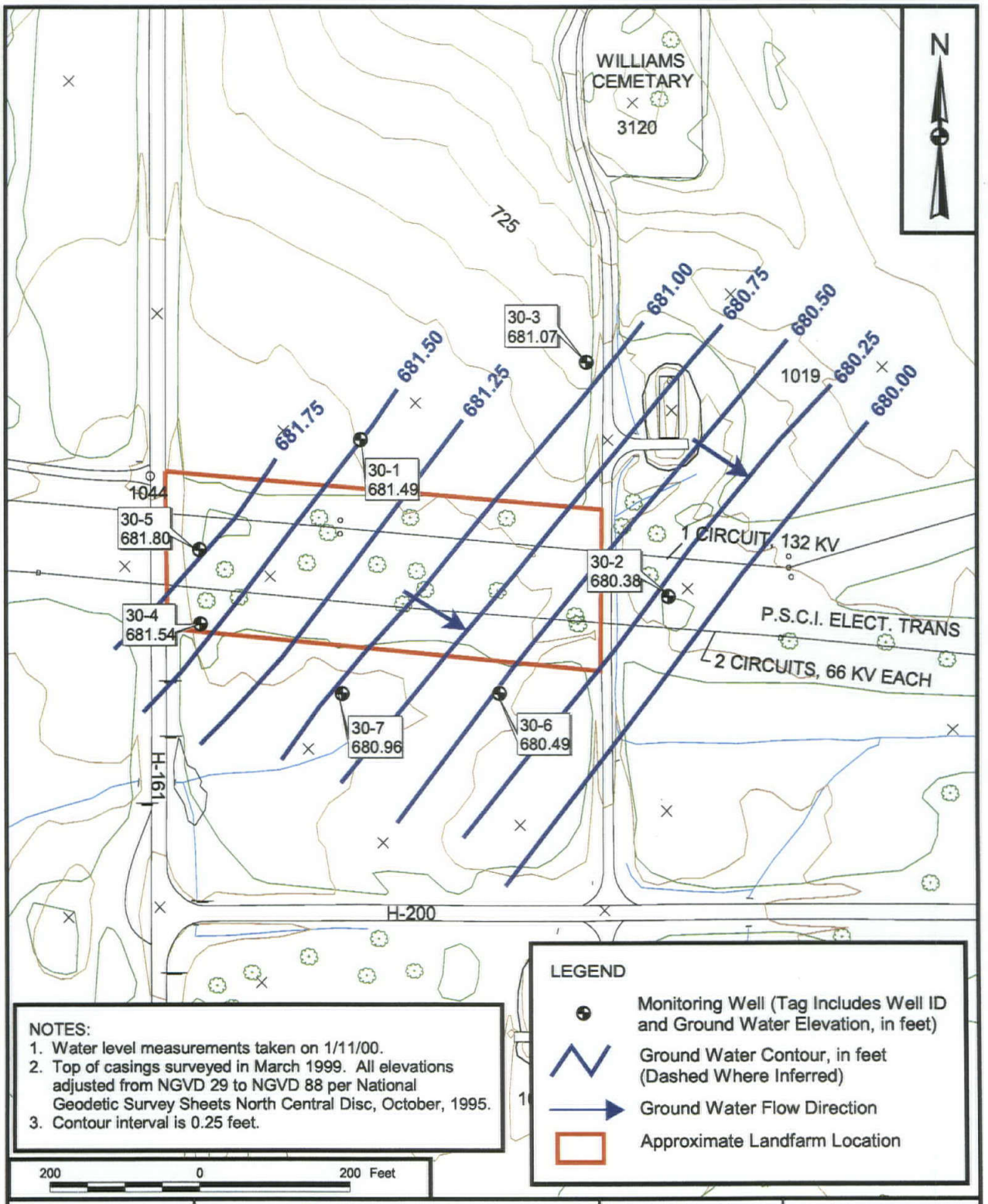

DRAWN BY J. LAMEY — DATE 3/20/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7393	OWNER NO. 0019
CHECKED BY — DATE —	SECOND ROUND GROUND WATER CONTOUR MAP JANUARY 2000 LANDFARM NSWC CRANE, CRANE, INDIANA	APPROVED BY M. FRANCIS — DATE 3/20/00	
COST/SCHEDULE-AREA		APPROVED BY R. CLARK — DATE 3/20/00	
SCALE AS NOTED		DRAWING NO. FIGURE 2-2	REV –

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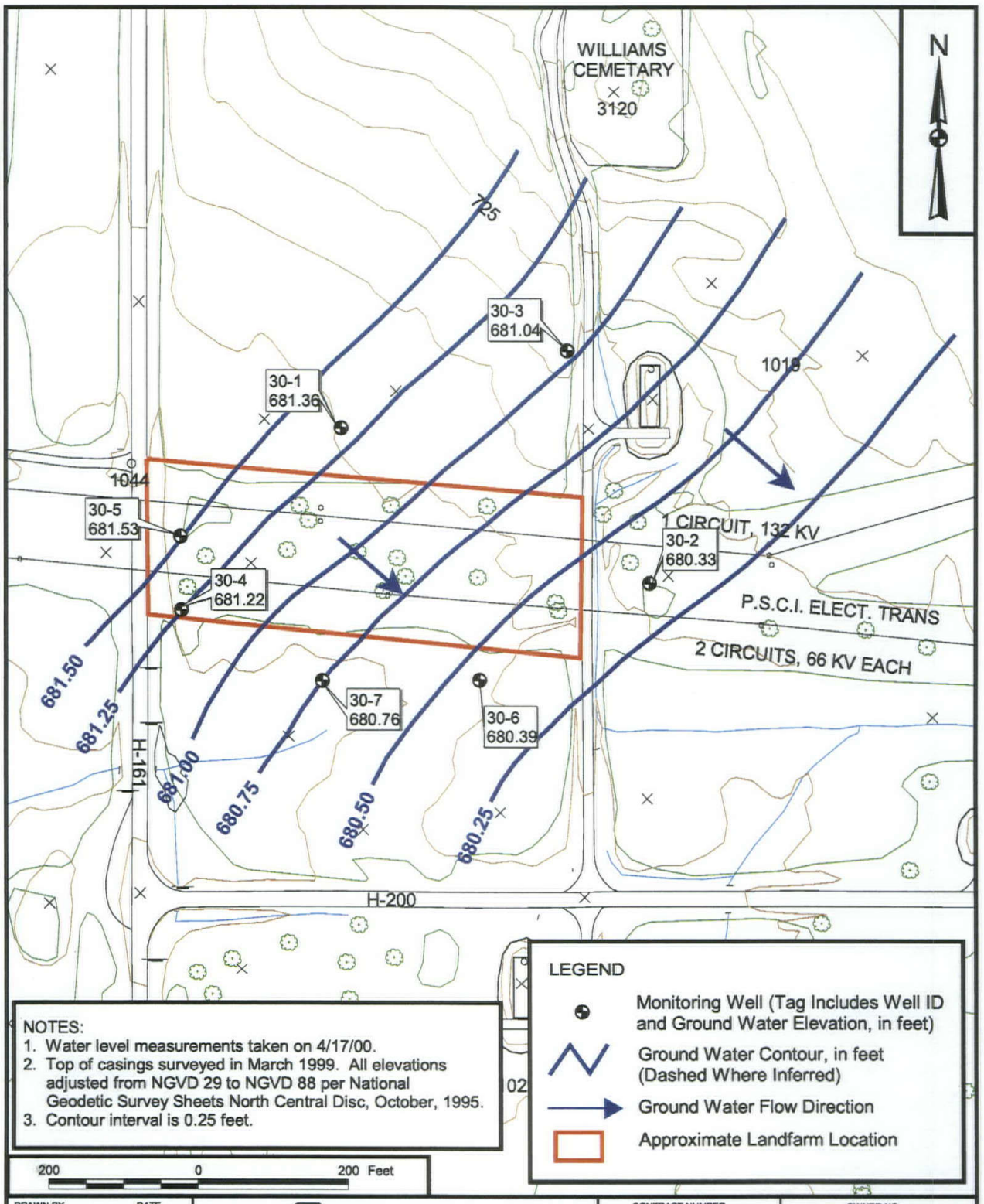

NOTES:
1. Water level measurements taken on 4/17/00.
2. Top of casings surveyed in March 1999. All elevations adjusted from NGVD 29 to NGVD 88 per National Geodetic Survey Sheets North Central Disc, October, 1995.
3. Contour interval is 0.25 feet.

DRAWN BY: J. LAMEY — DATE: 5/18/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER: N7393	OWNER NO.: 0019
CHECKED BY: — — DATE: —	THIRD ROUND GROUND WATER CONTOUR MAP APRIL 17, 2000 LANDFARM NSWC CRANE, CRANE, INDIANA	APPROVED BY: M. FRANCIS — DATE: 5/19/00	
COST/SCHEDULE-AREA		APPROVED BY: R. CLARK — DATE: 5/19/00	
SCALE: AS NOTED		DRAWING NO.: FIGURE 2-3	REV: _

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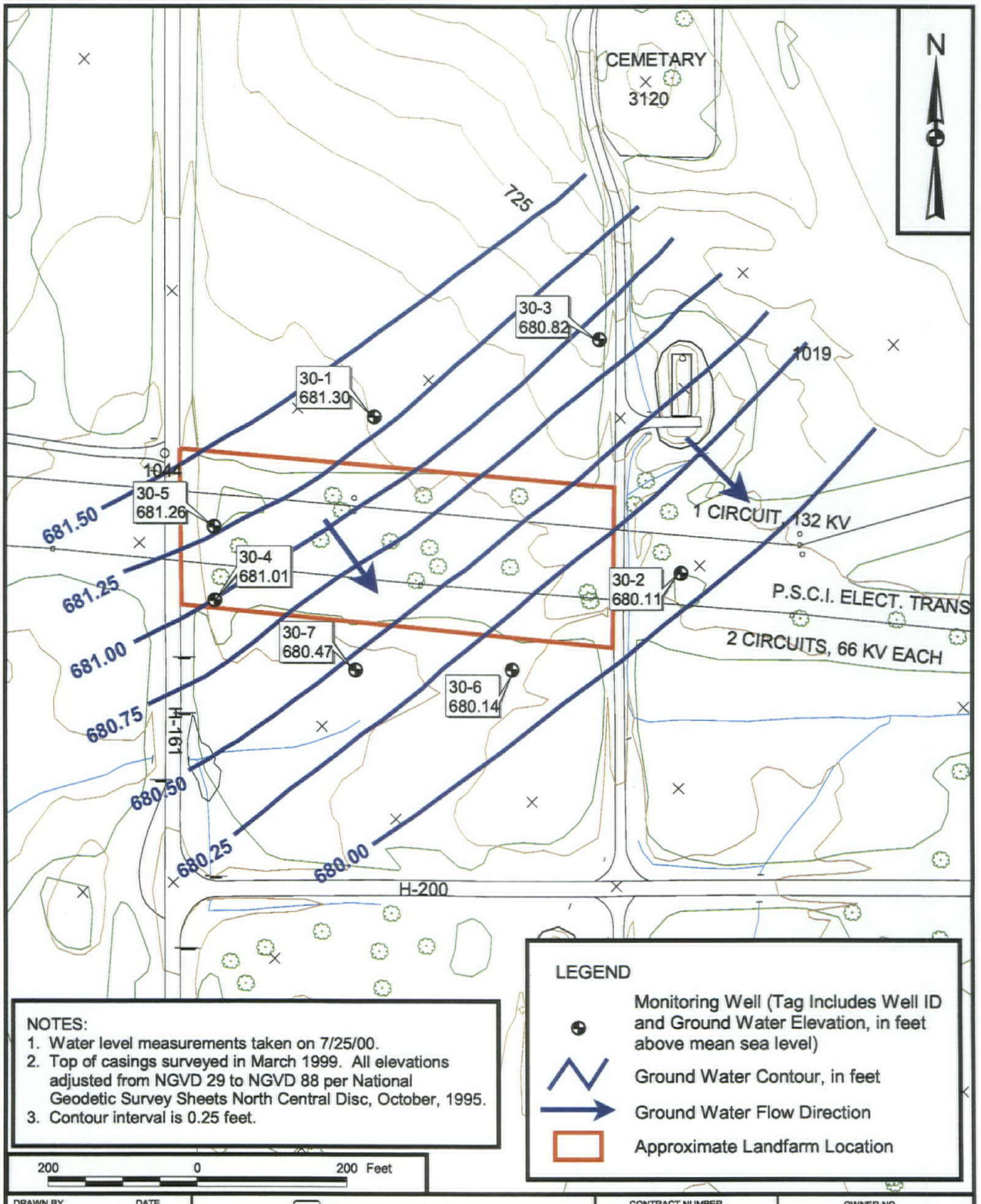

NOTES:
1. Water level measurements taken on 7/25/00.
2. Top of casings surveyed in March 1999. All elevations adjusted from NGVD 29 to NGVD 88 per National Geodetic Survey Sheets North Central Disc, October, 1995.
3. Contour interval is 0.25 feet.

DRAWN BY J. LAMEY	DATE 9/13/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7393 / OWNER NO. 0019
CHECKED BY —	DATE —	FOURTH ROUND GROUND WATER CONTOUR MAP JULY 25, 2000 LANDFARM NSWC CRANE, CRANE, INDIANA	APPROVED BY M. FRANCIS / DATE 9/14/00
COST/SCHEDULE-AREA			APPROVED BY R. CLARK / DATE 9/14/00
SCALE AS NOTED			DRAWING NO. FIGURE 2-4 / REV 0

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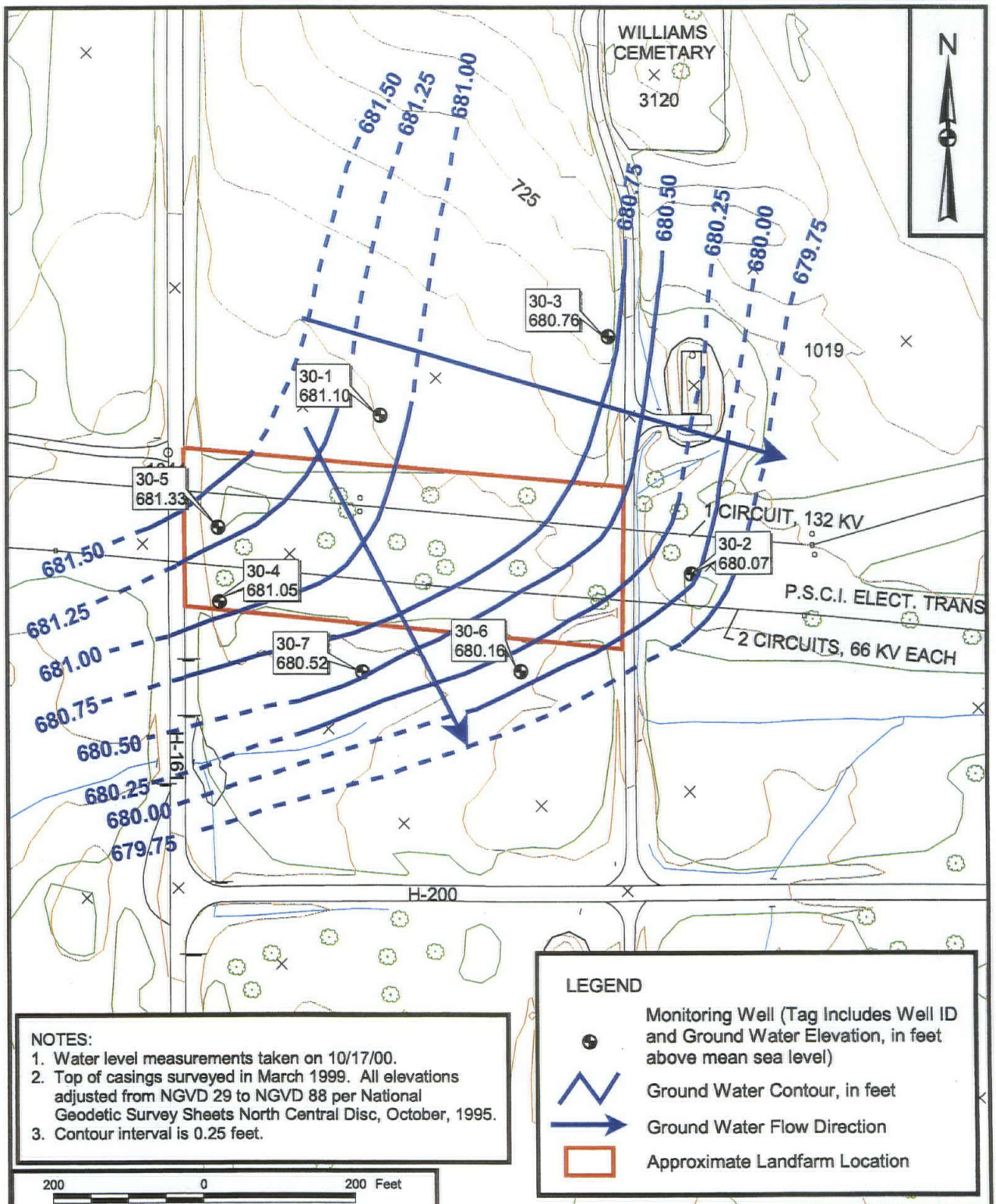

NOTES:
1. Water level measurements taken on 10/17/00.
2. Top of casings surveyed in March 1999. All elevations adjusted from NGVD 29 to NGVD 88 per National Geodetic Survey Sheets North Central Disc, October, 1995.
3. Contour interval is 0.25 feet.

DRAWN BY J. LAMEY	DATE 4/3/01	Tetra Tech NUS, Inc.	CONTRACT NUMBER N7393 / OWNER NO. 0019
CHECKED BY —	DATE —	FIFTH ROUND GROUND WATER CONTOUR MAP OCTOBER 17, 2000 LANDFARM NSWC CRANE, CRANE, INDIANA	APPROVED BY M. FRANCIS / DATE 4/3/01
COST/SCHEDULE-AREA			APPROVED BY R. CLARK / DATE 4/3/01
SCALE AS NOTED			DRAWING NO. FIGURE 2-5 / REV 0

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3.0 MONITORING RESULTS

3.1 WATER TABLE ELEVATION AND GROUND WATER FLOW DIRECTION

The elevation of the water table was measured prior to each sampling event. This was accomplished using an electronic water-level instrument which measured the distance from a notch on the well (located at the surface) to the surface of the water. Results of these measurements were used to calculate the change in the height of the water table at each well throughout the year, and also to establish the gradient of the water table surface (potentiometric surface). Based on the data collected from October 1999 to October 2000, the overall fluctuation of the water table is generally less than six-tenths of a foot (0.6') vertically. This relatively stable water table is not unusual for this part of southwestern Indiana.

The seven ground water monitoring wells at the Landfarm were resurveyed in the Fall of 1999. Based on this survey and the water-level measurements collected during the first through fifth rounds of data collection, ground water underneath SWMU 30 flows generally toward the southeast at a gradient of approximately 0.0025. Figures 2-1 through 2-5 present the ground water elevation contours and predominant ground water flow directions at the Landfarm based on measurements collected during Rounds 1 through 5, respectively. The general ground water flow direction in the immediate vicinity of the site is somewhat contrary to the surface topography. In the immediate vicinity of the site, surface topography slopes toward the southwest (away from the high at Williams Cemetery to the low at the intersection of Highways 161 and 200).

During initial evaluation of the first round ground water level measurements, it was evident that the previous designation of well 30-2 as a cross-gradient well (as defined in the approved TtNUS 1999 Work Plan, Table 2-2) was not appropriate. To verify that this apparent discrepancy was not based on seasonal variation, it was agreed that it would be appropriate to wait for an evaluation of water-level measurements from Round 2 before well 30-2 was redesignated as a downgradient well. Evaluation of water-level measurements obtained for the second round of data collection on January 11, 2000, confirmed that the predominant ground water flow direction (Figure 2-2) was the same as indicated in the first round and that well 30-2 was not cross-gradient, but rather downgradient of the Landfarm. Based on this evaluation, well 30-2 was redesignated as downgradient of the Landfarm. Water-Level measurements for the third through fifth rounds shown in Figures 2-3 through 2-5 confirm the conclusions presented from the first two rounds. Wells 30-1 and 30-3 will be the remaining upgradient wells for this SWMU as shown in Table 2-2 of the approved, final Work Plan (TtNUS, 1999a).

3.2 ANALYTICAL RESULTS

Ground water samples were collected from monitoring wells 30-1, 30-2, 30-3, 30-4, 30-5, 30-6, and 30-7 as described in the Work Plan and QAPP (TtNUS, 1999a and 1999b). These samples were analyzed for the parameters identified in Section 2.2. Table 3-1 lists the monitored chemicals in each fraction analyzed, detection limits, and the Risk-Based Target Level (RBTL) for each. Analytical results are summarized in several tables at the end of this section as described below. These tables are formatted with one well per page and Rounds 1 to 5 presented from left to right.

Table 3-2 presents all of the analytical data for all rounds of sampling, including the duplicate sample results. Descriptive statistics are also provided for these data including the frequency of detection, minimum positive detection, maximum positive detection, average of all results, and average of positive detections.

Table 3-3 presents the positive detections for monitored chemicals in all the wells sampled. Metals (dissolved and total), ammonia, nitrate/nitrite, TKN, and total and dissolved phosphorous were the parameters reported with at least one positive detection. Descriptive statistics are also provided for these positive detections including the frequency of detection, minimum positive detection, maximum positive detection, average of all results, and average of positive detections.

Based on an evaluation of the data from the first two rounds, NSWC Crane submitted a request to EPA Region 5 (Brent, 2000) that VOCs and explosives be dropped from Rounds 3 through 5 of monitoring. The request was made because none of the VOCs or energetics analyzed were detected in any of the wells in Round 1 or Round 2. EPA agreed with this request and made a decision to eliminate these fractions from the last three Rounds (April, July and October, 2000) of sampling (Ramanauskas, 2000). Appendix L contains a copy of the letter from EPA documenting this decision. As stipulated in the Work Plan, metals were analyzed during all remaining sampling rounds, regardless of results in Rounds 1 and 2.

Table 3-4 presents those chemicals with positive results exceeding their applicable RBTL (noted by dark shading). Four parameters, arsenic, cadmium, nickel, and thallium exceeded their respective RBTLs in detectable quantities in at least one sample. Two of these parameters, arsenic and thallium exceeded their RBTLs in an upgradient well (30-1). Arsenic exceeded its' RBTL in that well in Rounds 1, 2, and 3. Thallium's single upgradient exceedance occurred in well 30-1 during Round 4.

In downgradient wells, four parameters exceeded RBTLs. The maximum arsenic RBTL exceedance was in sample 30-GW-002 during Round 3 (5.3 µg/L vs. RBTL of 2.0 µg/L). Cadmium marginally exceeded

the RBTL in sample 30-GW-006-04 (5.3 µg/L vs. RBTL of 5.0 µg/L). Nickel also marginally exceeded the RBTL in sample 30-GW-006-04 (108 µg/L vs. RBTL of 100 µg/L). Thallium marginally exceeded the RBTL in sample 30-GW-002-04 (2.7J µg/L vs. RBTL of 2.0 µg/L). Statistical analyses of these ground water results presented in Section 4 show no statistically significant increase in downgradient concentrations for any monitored parameters. Descriptive statistics are also provided for these data in Table 3-4 including the frequency of detection, minimum positive detection, maximum positive detection, average of all results, and average of positive detections.

Table 3-5 presents the results for the field, rinsate, and trip blanks (where appropriate) associated with the first and second rounds. Because all sampling equipment was dedicated and there were no organics sampled during Rounds 3 to 5, trip, field and rinsate blanks were not necessary for those rounds.

Tables 3-2, 3-3, and 3-4 also present hexavalent chromium (Cr^{+6}) results (direct-reading field method) for all rounds of sampling. The results of all field-derived Cr^{+6} data presented in Table 3-4 were below the RBTL. The detection limit for the Hach DR-850 Colorimeter for hexavalent chromium was 10 µg/L.

The data validation letters for all analyses conducted during the five rounds of sampling are attached to this report in Appendix N.

TABLE 3-1

MONITORED CHEMICALS, LIMITS OF DETECTION, AND RISK-BASED TARGET LEVELS
NSWC CRANE, CRANE, INDIANA

Chemical	Laboratory MDL/IDL[1] (ug/L)	Laboratory RL[1] (ug/L)	Risk-Based Target Level[2] (ug/L)	Source
EXPLOSIVES (SW-846 METHOD 8330)				
1,3,5-Trinitrobenzene	0.41	0.65	1100	prg
1,3-Dinitrobenzene	0.41	0.65	3.7	prg
2,4,6-Trinitrotoluene (TNT)	0.57	0.65	2.2 ca	prg
2,4-Dinitrotoluene	0.57	0.65	73	prg
2,6-Dinitrotoluene	0.83	0.65	37	prg
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.38	0.65	1800	prg
2-Nitrotoluene	0.48	0.65	370	prg
3-Nitrotoluene	0.48	0.65	370	prg
4-Nitrotoluene	0.48	0.65	370	prg
4-Amino-2,6-dinitrotoluene	0.35	0.65	--[3]	
2-Amino-4,6-dinitrotoluene	0.34	0.65	--	
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	0.29	0.65	370	prg
Nitrobenzene	0.22	0.65	3.4	prg
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.35	0.61[4]	0.61 ca	prg
APPENDIX IX METALS (SW-846 METHOD 6020 ICP/MS, UNLESS OTHERWISE NOTED)				
Antimony	1.0	1.0	6	mcl
Arsenic	1.0	1.0	2	[5]
Barium	0.5	1.0	2000	mcl
Beryllium	0.5	1.0	4 ca	[5]
Cadmium	0.5	1.0	5	mcl
Chromium (total)	0.5	5.0	100	mcl
Cobalt	0.5	3.0	2200	prg
Copper	0.5	2.0	1300	mcl
Lead	0.5	1.0	4	prg
Mercury (SW-846 Method 7470A)	0.06	0.2	200	mcl
Nickel	0.5	10	100[6]	mcl
Selenium	1.0	1.0	50	mcl
Silver	0.5	3.0	100 smcl	mcl
Thallium	0.5	1.0	2	mcl
Tin	0.1	10	22000	prg
Vanadium	0.5	2.0	260	prg
Zinc	5.0	10	11000	prg
MISCELLANEOUS PARAMETERS				
Ammonia (EPA Method 350.1)	6.4	10	[3]	
Cyanide (SW-846 Method 9012A)	2.4	10	200	mcl
Hexavalent Chromium (fixed Hach test kit method 8023)	[7]	[7]	180	prg
Nitrate/Nitrite (EPA Method 353.2)	2	10	10000	mcl
Phosphorus (Total and Dissolved) (EPA Method 365.2)	31.2	100	[3]	
Total Kjeldahl Nitrogen (EPA Method 351.2)	120	300	[3]	
APPENDIX IX VOLATILE ORGANIC COMPOUNDS[8] (SW-846 METHOD 8260B WITH 25 ML PURGE)				
1,1,1,2-Tetrachloroethane	0.13	1	5 ca	[5]
1,1,1-Trichloroethane	0.17	1	200	mcl
1,1,2,2-Tetrachloroethane	0.10	1	5 ca	[5]
1,1,2-Trichloroethane	0.14	1	5 ca	[5]
1,1-Dichloroethane	0.17	1	810	prg
1,1-Dichloroethene	0.12	1	5 ca	[5]
1,2,3-Trichloropropane	0.54	1[4]*	0.0016 ca	prg
1,2-Dibromo-3-chloropropane	0.30	1	1 ca**	[5]
1,2-Dibromoethane	0.13	1	1 ca**	[5]
1,2-Dichloroethane	0.14	1	1 ca**	[5]
1,2-Dichloropropane	0.14	0.5*	0.16 ca**	[5]
2-Butanone	0.86	5	1900	prg
2-Hexanone	0.92	5	[3]	
4-Methyl-2-pentanone	0.52	5	160	prg
Acetone	1.8	5	610	prg
Acrolein	4.6	10*	4	[5]
Acrylonitrile	1.3	5*	3.7 ca**	
Allyl chloride (3-chloro-1-propene)	0.22	10	1800	prg
Benzene	0.013	1	5 ca	[5]
Bromodichloromethane	0.13	1	100 ca	[5]
Bromoform	0.18	1	8.5 ca**	prg
Bromomethane	0.59	1[4]	8.7	prg
Carbon disulfide	0.13	1	1000	prg
Carbon tetrachloride	0.17	0.3[4]*	0.17 ca**	prg
Chlorobenzene	0.18	1	39	prg
Chloroethane (ethyl chloride)	0.21	1	8600	prg
Chloroform	0.14	0.3*	0.16 ca	prg

TABLE 3-1

MONITORED CHEMICALS, LIMITS OF DETECTION, AND RISK-BASED TARGET LEVELS
NSWC CRANE, CRANE, INDIANA

Chemical	Laboratory MDL/IDL[1] (ug/L)	Laboratory RL[1] (ug/L)	Risk-Based Target Level[2] (ug/L)	Source
Chloromethane	0.17	1	1.5 ca	prg
cis-1,3-Dichloropropene	0.16	1	[3]	
Dibromochloromethane	0.10	1	1 ca	prg
Dibromomethane	0.19	1	370	prg
Dichlorodifluoromethane	0.18	1	390	prg
Ethyl methacrylate	0.31	10	550	prg
Ethylbenzene	0.076	1	700	mcl
Methacrylonitrile	0.15	1	1	prg
Methyl iodide	0.28	10	--	
Methyl methacrylate	0.29	10	1400	prg
Methylene chloride (dichloromethane)	0.19	1	4.3 ca	prg
Styrene	0.10	1	100	mcl
Tetrachloroethene	0.16	1	1.1 ca	prg
Toluene	0.04	1	720	prg
Total Xylenes	0.18	1	1400 (m&o)	prg
trans-1,2-Dichloroethene (trans-1,2-dichloroethylene)	0.10	1	100	[5]
trans-1,3-Dichloropropene	0.10	0.5	0.5[9] ca	[5]
trans-1,4-Dichloro-2-butene	0.34	10	10[10] ca	[5]
Trichloroethene	0.12	1	1.6 ca**	prg
Trichlorofluoromethane (fluorotrichloromethane)	0.14	1	1300	prg
Vinyl acetate	0.21	10	410	prg
Vinyl chloride	0.20	1	2 ca	[5]
2-Chloro-1,3-butadiene (chloroprene)	0.40	10	14	prg

ug/L micrograms per liter

* Asterisks indicate those chemicals for which the laboratory reporting limit (RL) exceeds the risk-based target level for the project.

1 Method detection limits (MDLs) (all parameters except metals), instrument detection limits (IDLs) (metals only), and reporting limits (RLs) as provided by Laucks Testing Laboratories, Inc. These values may change as laboratory MDLs and IDLs are updated.

2 Value is based on human health risk-based criteria or practical quantitation limits (PQLs) for common laboratory analytical methods.

3 Risk-based target level is not provided, because human health risk-based criteria are not available for this chemical.

4 Laucks Testing Laboratories is confident that it can reliably report to this PQL, even though this value is less than two times the MDL.

5 Developed using U.S. EPA Region 5 support. Risk-based target level numbers based on conversations with Crane (Paul Freed/Carol Witt-Smith fax dated 9/12/97). The value is based on human health criteria or practical quantitation limits (PQLs) for common analytical methods.

6 Being remanded.

7 Hexavalent chromium (Cr^{+6}) will be analyzed in the field using a Hach test kit, Method 8023 (see Appendix E fo the Work Plan). Powder pillows or AccuVac ampuls will be used. Detection limits for both methods are 10 ug/L.

8 1,4-Dioxane, acetonitrile, isobutyl alcohol, and propionitrile exluded from Appendix IX volatile target list because these compounds cannot be accurately analyzed using SW-846 Method 8260B, and they are not expected to be present at the Landfarm based on generator knowledge.

9 1,3-Dichloropropene

10 1,4-Dichloro-2-butene

prg - Region 9 preliminary remedial goal (PRG) for tap water, expiration 5/1/99.

mcl - Maximum contaminant level, Drinking Water and Health Advisories, October 1996.

smcl Secondary maximum contaminant level (for taste, odor, etc.)

ca Cancer PRG

ca ** (where: non-carcinogenic (nc) <100X ca)

ca *** (where: nc<10Xca)

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-001	GW-001	GW-001	GW-001	GW-001					
round	01	02	03	04	05					
nsample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05					
sample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05					
sample_dat	10/13/99	01/12/00	04/18/00	07/26/00	10/18/00					
qc_type	NM	NM	NM	NM	NM					
sacode	DUP	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT					
dups										
Total Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
ARSENIC	4.3	3.1	3.8 J	1.1 U	1.4	4/5	1.4	4.3	2.63	3.15
BARIUM	7.2	7.2	7.7	10.8 J	7.6 J	5/5	7.2	10.8	8.10	8.10
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/5	---	---	2.80	---
CHROMIUM, HEXAVALENT - FIELD	10	10	10 U	10	10	4/5	10	10	9.00	10.00
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	10.2	2.2 U	2.3	2.2 U	2/5	2.3	10.2	3.16	6.25
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
SELENIUM	5.6 U	2 U	5.6 U	5.6 U	5.6 U	0/5	---	---	2.67	---
SILVER	3.3 U	3.3 U	3.3 UJ	3.3 U	3.3 UJ	0/5	---	---	1.65	---
THALLIUM	1.1 U	1.1 U	1.1 U	2.8 J	1.1 U	1/5	2.8	2.8	1.01	2.80
TIN	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	0/5	---	---	1.10	---
ZINC	13.3	11.1 U	11.1 U	12.9	13.8	3/5	12.9	13.8	10.22	13.33
Dissolved Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
ARSENIC	3.1	3.2	6.8	1 U	1.6	4/5	3.1	6.8	3.04	3.68
BARIUM	7.7	7.4	7.7	8.6 J	7.5	5/5	7.4	8.6	7.78	7.78
BERYLLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	11.4	16.3	2/5	11.4	16.3	7.22	13.85
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.60	---
COPPER	2.2 U	9.2	2.2 U	2.2	2 U	2.5	2.2	9.2	2.92	5.70
LEAD	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
SELENIUM	5.6 U	1.1 UJ	5.6 U	12.5 U	15.1	1/5	15.1	15.1	5.50	15.10
SILVER	3.3 U	3.3 U	3.3 UJ	3 U	3 U	0/5	---	---	1.59	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.4	1 U	1/5	1.4	1.4	0.71	1.40
TIN	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
VANADIUM	2.2 U	2.2 U	2.2 U	2 U	2 U	0/5	---	---	1.06	---
ZINC	13.2	11.1 U	11.1 U	12.3	11.4	3/5	11.4	13.2	9.60	12.30
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.07 J	0.01 U	1/5	0.07	0.07	0.02	0.07
CYANIDE	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UR	0/4	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---
NITRATE/NITRITE, AS N	1	1.3 J	1.3	1.5 J	1.6	5/5	1	1.6	1.34	1.34
TOTAL KJELDAHL NITROGEN	0.4	0.8 U	0.3	0.4 J	0.3 UJ	3/5	0.3	0.4	0.33	0.37
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/6	---	---	0.05	---
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,1-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
1,2,3-TRICHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMOETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,2-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-001	GW-001	GW-001	GW-001	GW-001					
round	01	02	03	04	05					
nsample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05					
sample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05					
sample_dat	10/13/99	01/12/00	04/18/00	07/26/00	10/18/00					
qc_type	NM	NM	NM	NM	NM					
sacode	DUP	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT					
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
1,2-DICHLOROPROPANE	0.5 U	0.5 U				0/2	---	---	0.25	---
2-BUTANONE	10 UR	5 UR				0/0	---	---	---	---
2-HEXANONE	10 UR	5 UR				0/0	---	---	---	---
4-METHYL-2-PENTANONE	10 UR	5 UR				0/0	---	---	---	---
ACETONE	10 UR	5 UR				0/0	---	---	---	---
ACROLEIN	10 UR	10 UR				0/0	---	---	---	---
ACRYLONITRILE	3 UR	5 UR				0/0	---	---	---	---
ALLYL CHLORIDE	10 U	10 U				0/2	---	---	5.00	---
BENZENE	0.5 U	1 U				0/2	---	---	0.38	---
BROMODICHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
BROMOFORM	0.5 U	1 U				0/2	---	---	0.38	---
BROMOMETHANE	1 U	1 U				0/2	---	---	0.50	---
CARBON DISULFIDE	0.5 U	1 U				0/2	---	---	0.38	---
CARBON TETRACHLORIDE	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
CHLOROETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROFORM	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROMETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROPRENE	3 U	10 UJ				0/2	---	---	3.25	---
CIS-1,3-DICHLOROPROPENE	0.3 U	1 U				0/2	---	---	0.33	---
DIBROMOCHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DIBROMOMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DICHLORODIFLUOROMETHANE	0.5 U	1 UJ				0/2	---	---	0.38	---
ETHYL METHACRYLATE	1 U	10 U				0/2	---	---	2.75	---
ETHYLBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
METHACRYLONITRILE	1 UR	1 UR				0/0	---	---	---	---
METHYL IODIDE		10 U				0/1	---	---	5.00	---
METHYL METHACRYLATE	2 UR	10 UR				0/0	---	---	---	---
METHYLENE CHLORIDE	3 U	1 U				0/2	---	---	1.00	---
STYRENE	0.5 U	1 U				0/2	---	---	0.38	---
TETRACHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TOLUENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,2-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U				0/2	---	---	0.25	---
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR				0/0	---	---	---	---
TRICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRICHLOROFLUOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
VINYL ACETATE	0.5 U	10 UJ				0/2	---	---	2.63	---
VINYL CHLORIDE	0.5 U	1 U				0/2	---	---	0.38	---
XYLENES, TOTAL	1 U	1 U				0/2	---	---	0.50	---
Energetics (ug/L)										
1,3,5-TRINITROBENZENE	0.27 U	1.4 U				0/2	---	---	0.42	---
1,3-DINITROBENZENE	0.27 U	1.4 U				0/2	---	---	0.42	---
2,4,6-TRINITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
2,4-DINITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
2,6-DINITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
2-AMINO-4,6-DINITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
2-NITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
3-NITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
4-AMINO-2,6-DINITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
4-NITROTOLUENE	0.27 U	1.4 U				0/2	---	---	0.42	---
HMX	0.27 U	1.4 U				0/2	---	---	0.42	---
NITROBENZENE	0.27 U	1.4 U				0/2	---	---	0.42	---
RDX	0.26 U	1.4 U				0/2	---	---	0.42	---
TETRYL	0.27 U	1.4 U				0/2	---	---	0.42	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-002	GW-002	GW-002	GW-002	GW-002					
round	01	02	03	04	05					
nsample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05					
sample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05					
sample_dat	10/12/99	01/12/00	04/18/00	07/26/00	10/17/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups										
Total Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
ARSENIC	3.4	1.7	3.1 J	1.1 U	1.1 U	3/5	1.7	3.4	1.86	2.73
BARIUM	7.6	6.2	6.6	15.9 J	6.6 J	5/5	6.2	15.9	8.58	8.58
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CADMIUM	1.1 U	1.1 U	1.1 U	2.1	1.1 U	1/5	2.1	2.1	0.86	2.10
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/5	---	---	2.80	---
CHROMIUM, HEXAVALENT - FIELD	20	10	10 U	20	10 U	3/5	10	20	12.00	16.67
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	8.9	2.2 U	2.2 U	2.2 U	1/5	8.9	8.9	2.66	8.90
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.3	11.1 U	1/5	11.3	11.3	6.70	11.30
SELENIUM	8.4	7.3 U	8.1	7.7	9.8	4/5	7.7	9.8	7.53	8.50
SILVER	3.3 U	3.3 U	3.3 UJ	3.3 U	3.3 UJ	0/5	---	---	1.65	---
THALLIUM	1.1 U	1.1 U	1.1 U	2.7 J	1.1 U	1/5	2.7	2.7	0.98	2.70
TIN	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	0/5	---	---	1.10	---
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
Dissolved Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
ARSENIC	2.9	2.2	5.3	1 U	1.1	4/5	1.1	5.3	2.40	2.88
BARIUM	7	6.7	6.7	8.1 J	6.7	5/5	6.7	8.1	7.04	7.04
BERYLLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5 U	10.6	1/5	10.6	10.6	4.30	10.60
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.59	---
COPPER	2.2 U	8.7	2.2 U	2 U	2 U	1/5	8.7	8.7	2.58	8.70
LEAD	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.3	10 U	1/5	11.3	11.3	6.59	11.30
SELENIUM	7.9	6.9 U	9.7	8.5	23.9	4/5	7.9	23.9	10.69	12.50
SILVER	3.3 U	3.3 U	3.3 UJ	3 U	3 U	0/5	---	---	1.59	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.5	1 U	1/5	1.5	1.5	0.73	1.50
TIN	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
VANADIUM	2.2 U	2.2 U	2.2 U	2 U	2 U	0/5	---	---	1.06	---
ZINC	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.010 U	0.01 U	0.06 J	0.01 U	1/5	0.06	0.06	0.02	0.06
CYANIDE	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UR	0/4	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.15	0.1 U	0.1 U	1/5	0.15	0.15	0.07	0.15
NITRATE/NITRITE, AS N	1	0.97 J	1	1.1 J	0.98	5/5	0.97	1.1	1.01	1.01
TOTAL KJELDAHL NITROGEN	0.3	0.6 U	0.3	0.5 J	0.4 U	3/5	0.3	0.5	0.32	0.37
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1	0.1 U	1/5	0.1	0.1	0.06	0.10
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,1-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
1,2,3-TRICHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMOETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,2-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---

J = Detected results considered to be an estimate based on technical noncompliances.
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UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-002	GW-002	GW-002	GW-002	GW-002					
round	01	02	03	04	05					
nsample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05					
sample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05					
sample_dat	10/12/99	01/12/00	04/18/00	07/26/00	10/17/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
1,2-DICHLOROPROPANE	0.5 U	0.5 U				0/2	---	---	0.25	---
2-BUTANONE	10 UR	5 UR				0/0	---	---	---	---
2-HEXANONE	10 UR	5 UR				0/0	---	---	---	---
4-METHYL-2-PENTANONE	10 UR	5 UR				0/0	---	---	---	---
ACETONE	10 UR	5 UR				0/0	---	---	---	---
ACROLEIN	10 UR	10 UR				0/0	---	---	---	---
ACRYLONITRILE	3 UR	5 UR				0/0	---	---	---	---
ALLYL CHLORIDE	10 U	10 U				0/2	---	---	5.00	---
BENZENE	0.5 U	1 U				0/2	---	---	0.38	---
BROMODICHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
BROMOFORM	0.5 U	1 U				0/2	---	---	0.38	---
BROMOMETHANE	1 U	1 U				0/2	---	---	0.50	---
CARBON DISULFIDE	0.5 U	1 U				0/2	---	---	0.38	---
CARBON TETRACHLORIDE	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
CHLOROETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROFORM	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROMETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROPRENE	3 U	10 UJ				0/2	---	---	3.25	---
CIS-1,3-DICHLOROPROPENE	0.3 U	1 U				0/2	---	---	0.33	---
DIBROMOCHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DIBROMOMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DICHLORODIFLUOROMETHANE	0.5 U	1 UJ				0/2	---	---	0.38	---
ETHYL METHACRYLATE	1 U	10 U				0/2	---	---	2.75	---
ETHYLBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
METHACRYLONITRILE	1 UR	1 UR				0/0	---	---	---	---
METHYL IODIDE		10 U				0/1	---	---	5.00	---
METHYL METHACRYLATE	2 UR	10 UR				0/0	---	---	---	---
METHYLENE CHLORIDE	3 U	1 U				0/2	---	---	1.00	---
STYRENE	0.5 U	1 U				0/2	---	---	0.38	---
TETRACHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TOLUENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,2-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U				0/2	---	---	0.25	---
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR				0/0	---	---	---	---
TRICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRICHLOROFLUOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
VINYL ACETATE	0.5 U	10 UJ				0/2	---	---	2.63	---
VINYL CHLORIDE	0.5 U	1 U				0/2	---	---	0.38	---
XYLENES, TOTAL	1 U	1 U				0/2	---	---	0.50	---
Energetics (ug/L)										
1,3,5-TRINITROBENZENE	0.73 U	1.6 U				0/2	---	---	0.58	---
1,3-DINITROBENZENE	0.73 U	1.6 U				0/2	---	---	0.58	---
2,4,6-TRINITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
2,4-DINITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
2,6-DINITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
2-AMINO-4,6-DINITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
2-NITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
3-NITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
4-AMINO-2,6-DINITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
4-NITROTOLUENE	0.73 U	1.6 U				0/2	---	---	0.58	---
HMX	0.73 U	1.6 U				0/2	---	---	0.58	---
NITROBENZENE	0.73 U	1.6 U				0/2	---	---	0.58	---
RDX	0.68 U	1.6 U				0/2	---	---	0.57	---
TETRYL	0.73 U	1.6 U				0/2	---	---	0.58	---

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UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-003	GW-003	GW-003	GW-003	GW-003					
round	01	02	03	04	05					
nsample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05					
sample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05					
sample_dat	10/13/99	01/13/00	04/18/00	07/25/00	10/17/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT					
dups										
Total Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1 U	1.1 U	0/5	---	---	0.54	---
ARSENIC	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
BARIUM	22.7	17.2	16.7	24.9 J	15.5 J	5/5	15.5	24.9	19.40	19.40
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/5	---	---	2.80	---
CHROMIUM, HEXAVALENT - FIELD	10	10	10	10 U	10 U	3/5	10	10	8.00	10.00
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	9.2	2.2 U	2.2 U	2.2 U	1/5	9.2	9.2	2.72	9.20
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.6	11.1 U	1/5	11.6	11.6	6.76	11.60
SELENIUM	5.6 U	4.4 U	5.6 U	6.1	8.4	2/5	6.1	8.4	4.46	7.25
SILVER	3.3 U	3.3 U	3.3 UJ	3.3 U	3.3 UJ	0/5	---	---	1.65	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
TIN	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	0/5	---	---	1.10	---
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
Dissolved Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
ARSENIC	1.1 U	1.1 U	1.7	1 U	1 U	1/5	1.7	1.7	0.76	1.70
BARIUM	19.2	17.2	17.8	18.6 J	16	5/5	16	19.2	17.76	17.76
BERYLLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5 U	13.8	1/5	13.8	13.8	4.94	13.80
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.59	---
COPPER	2.2 U	9.4	2.7	4.2	2.3	4/5	2.3	9.4	3.94	4.65
LEAD	1.1 U	1.1 U	2.2	1.2	1 U	2/5	1.2	2.2	1.00	1.70
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	12.0	10.8	10 U	2/5	10.8	12	7.78	11.40
SELENIUM	5.6 U	4.7 U	5.6 U	8.2	30.9	2/5	8.2	30.9	9.41	19.55
SILVER	3.3 U	3.3 U	3.3 UJ	3 U	3 U	0/5	---	---	1.59	---
THALLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
TIN	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
VANADIUM	2.2 U	2.2 U	2.2 U	2 U	2 U	0/5	---	---	1.06	---
ZINC	11.1 U	11.1 U	66.3	74.8	11.8	3/5	11.8	74.8	32.80	50.97
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.03 J	0.01 U	1/5	0.03	0.03	0.01	0.03
CYANIDE	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UR	0/4	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0/5	---	---	0.06	---
NITRATE/NITRITE, AS N	0.42	0.65 J	0.56	0.76 J	1.1	5/5	0.42	1.1	0.70	0.70
TOTAL KJELDAHL NITROGEN	0.4	0.8 U	0.5	0.3 U	0.3 UJ	2/5	0.4	0.5	0.32	0.45
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,1-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
1,2,3-TRICHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMOETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,2-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-003	GW-003	GW-003	GW-003	GW-003					
round	01	02	03	04	05					
nsample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05					
sample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05					
sample_dat	10/13/99	01/13/00	04/18/00	07/25/00	10/17/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT					
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
1,2-DICHLOROPROPANE	0.5 U	0.5 U				0/2	---	---	0.25	---
2-BUTANONE	10 UR	5 UR				0/0	---	---	---	---
2-HEXANONE	10 UR	5 UR				0/0	---	---	---	---
4-METHYL-2-PENTANONE	10 UR	5 UR				0/0	---	---	---	---
ACETONE	10 UR	5 UR				0/0	---	---	---	---
ACROLEIN	10 UR	10 UR				0/0	---	---	---	---
ACRYLONITRILE	3 UR	5 UR				0/0	---	---	---	---
ALLYL CHLORIDE	10 U	10 U				0/2	---	---	5.00	---
BENZENE	0.5 U	1 U				0/2	---	---	0.38	---
BROMODICHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
BROMOFORM	0.5 U	1 U				0/2	---	---	0.38	---
BROMOMETHANE	1 U	1 U				0/2	---	---	0.50	---
CARBON DISULFIDE	0.5 U	1 U				0/2	---	---	0.38	---
CARBON TETRACHLORIDE	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
CHLOROETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROFORM	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROMETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROPRENE	3 U	10 UJ				0/2	---	---	3.25	---
CIS-1,3-DICHLOROPROPENE	0.3 U	1 U				0/2	---	---	0.33	---
DIBROMOCHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DIBROMOMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DICHLORODIFLUOROMETHANE	0.5 U	1 UJ				0/2	---	---	0.38	---
ETHYL METHACRYLATE	1 U	10 U				0/2	---	---	2.75	---
ETHYLBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
METHACRYLONITRILE	1 UR	1 UR				0/0	---	---	---	---
METHYL IODIDE		10 U				0/1	---	---	5.00	---
METHYL METHACRYLATE	2 UR	10 UR				0/0	---	---	---	---
METHYLENE CHLORIDE	3 U	1 U				0/2	---	---	1.00	---
STYRENE	0.5 U	1 U				0/2	---	---	0.38	---
TETRACHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TOLUENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,2-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U				0/2	---	---	0.25	---
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR				0/0	---	---	---	---
TRICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRICHLOROFLUOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
VINYL ACETATE	0.5 U	10 UJ				0/2	---	---	2.63	---
VINYL CHLORIDE	0.5 U	1 U				0/2	---	---	0.38	---
XYLENES, TOTAL	1 U	1 U				0/2	---	---	0.50	---
Energetics (ug/L)										
1,3,5-TRINITROBENZENE	1.2 U	1.9 U				0/2	---	---	0.78	---
1,3-DINITROBENZENE	1.2 U	1.9 U				0/2	---	---	0.78	---
2,4,6-TRINITROTOLUENE	1.2 U	1.9 UJ				0/2	---	---	0.78	---
2,4-DINITROTOLUENE	1.2 U	1.9 U				0/2	---	---	0.78	---
2,6-DINITROTOLUENE	1.2 U	1.9 U				0/2	---	---	0.78	---
2-AMINO-4,6-DINITROTOLUENE	1.2 U	1.9 U				0/2	---	---	0.78	---
2-NITROTOLUENE	1.2 U	1.9 U				0/2	---	---	0.78	---
3-NITROTOLUENE	1.2 U	1.9 U				0/2	---	---	0.78	---
4-AMINO-2,6-DINITROTOLUENE	1.2 U	1.9 U				0/2	---	---	0.78	---
4-NITROTOLUENE	1.2 U	1.9 U				0/2	---	---	0.78	---
HMX	1.2 U	1.9 UJ				0/2	---	---	0.78	---
NITROBENZENE	1.2 U	1.9 U				0/2	---	---	0.78	---
RDX	1.1 U	1.9 U				0/2	---	---	0.75	---
TETRYL	1.2 U	1.9 U				0/2	---	---	0.78	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-004	GW-004	GW-004	GW-004	GW-004	GW-004					
round	01	02	03	03	04	05					
nsample	030-GW-004-01	030-GW-004-02	030-GW-004-03	030-GW-004-03-D	030-GW-004-04	030-GW-004-05					
sample	030-GW-004-01	030-GW-004-02	030-GW-004-03	DUP-GW-001-03	030-GW-004-04	030-GW-004-05					
sample_dat	10/13/99	01/11/00	04/18/00	04/18/00	07/27/00	10/17/00					
qc_type	NM	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups				030-GW-004-03							
Total Metals (ug/L)											
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/6	---	---	0.55	---
ARSENIC	2.8	2.6	3.4 J	4.0 J	1.4	1.8	6/6	1.4	4	2.67	2.67
BARIUM	23.8	24.3	22.3	21.3	26.4 J	16.5 J	6/6	16.5	26.4	22.43	22.43
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/6	---	---	0.55	---
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	3.6	1.1 U	1/6	3.6	3.6	1.06	3.60
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/6	---	---	2.80	---
CHROMIUM, HEXAVALENT - FIELD	20	10	10	10	10	10	6/6	10	20	11.67	11.67
COBALT	8.7	8.4	8.0	8.1	7.6	7.8	6/6	7.6	8.7	8.10	8.10
COPPER	4.1	12.2	3.2	2.2	2.8	6.8	6/6	2.2	12.2	5.22	5.22
LEAD	1.1 U	1.1 U	2.4	1.1 U	1.1 U	1.1 U	1/6	2.4	2.4	0.86	2.40
MERCURY	0.2 U	0.2 U	0.22 U	0.22 U	0.2 U	0.2 U	0/6	---	---	0.10	---
NICKEL	21.3	23	31.7	23.0	35.2	31.4	6/6	21.3	35.2	27.60	27.60
SELENIUM	5.6 U	3 U	5.6 U	5.6 U	6.4	5.6 U	1/6	6.4	6.4	3.18	6.40
SILVER	3.3 U	3.3 U	3.3 UJ	3.3 UJ	3.3 U	3.3 UJ	0/6	---	---	1.65	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.4 J	1.1 U	1/6	1.4	1.4	0.69	1.40
TIN	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/6	---	---	5.55	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	0/6	---	---	1.10	---
ZINC	40.8	28.7	78.0 J	28.3 J	32.2	47.9	6/6	28.3	78	42.65	42.65
Dissolved Metals (ug/L)											
ANTIMONY	11.7 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	1.42	---
ARSENIC	3.1	2.8	3.9	4.9	1.8	2.7	6/6	1.8	4.9	3.20	3.20
BARIUM	29.2	23.7	21.4	22.3	22.6 J	17.2	6/6	17.2	29.2	22.73	22.73
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
CADMIUM	1.2	1.1 U	1.1 U	1.1 U	1.8 U	1 U	1/6	1.2	1.2	0.71	1.20
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	7.5	8.2	2/6	7.5	8.2	4.48	7.85
COBALT	9.4	8.3	7.9	7.8	7.8	7.4	6/6	7.4	9.4	8.10	8.10
COPPER	5.3	11.2	2.2 U	2.9	2.6	2 U	4/6	2.6	11.2	4.02	5.50
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
MERCURY	0.2 U	0.2 U	0.22 U	0.22 U	0.2 U	0.2 U	0/6	---	---	0.10	---
NICKEL	24.3	22.3	20.1	21.8	35.8	27.9	6/6	20.1	35.8	25.37	25.37
SELENIUM	5.6 U	1.9 U	5.6 U	5.6 U	5 U	7.4	1/6	7.4	7.4	3.21	7.40
SILVER	3.3 U	3.3 U	3.3 UJ	3.3 UJ	3 U	3 U	0/6	---	---	1.60	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
TIN	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	0/6	---	---	5.37	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2 U	2 U	0/6	---	---	1.07	---
ZINC	45.4	26.7	28.0	30.0	31.8	32	6/6	26.7	45.4	32.32	32.32
Miscellaneous Parameters (mg/L)											
AMMONIA, AS NITROGEN	0.14	0.11 J	0.12	0.13	0.11 J	0.14 J	6/6	0.11	0.14	0.13	0.13
CYANIDE	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U	0.01 UR	0/5	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	1/6	0.1	0.1	0.06	0.10
NITRATE/NITRITE, AS N	0.03	0.03 U	0.06	0.06	0.02	1.6	5/6	0.02	1.6	0.30	0.35
TOTAL KJELDAHL NITROGEN	1.1	1.7 J	1.2	1.3	1.5 J	1.4 U	5/6	1.1	1.7	1.25	1.36
TOTAL PHOSPHORUS AS P	0.1 U	0.16 J	0.1 U	0.1 U	0.1 U	0.1 U	1/6	0.16	0.16	0.07	0.16
Volatile Organics (ug/L)											
1,1,1,2-TETRACHLOROETHANE	0.5 U	1 U					0/2	---	---	0.38	---
1,1,1-TRICHLOROETHANE	0.5 U	1 U					0/2	---	---	0.38	---
1,1,2,2-TETRACHLOROETHANE	0.5 U	1 U					0/2	---	---	0.38	---
1,1,2-TRICHLOROETHANE	0.5 U	1 U					0/2	---	---	0.38	---
1,1-DICHLOROETHANE	0.5 U	1 U					0/2	---	---	0.38	---
1,1-DICHLOROETHENE	0.5 U	1 U					0/2	---	---	0.38	---
1,2,3-TRICHLOROPROPANE	1 U	1 U					0/2	---	---	0.50	---
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U					0/2	---	---	0.50	---
1,2-DIBROMOETHANE	0.5 U	1 U					0/2	---	---	0.38	---
1,2-DICHLOROETHANE	0.5 U	1 U					0/2	---	---	0.38	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-004	GW-004	GW-004	GW-004	GW-004	GW-004					
round	01	02	03	03	04	05					
nsample	030-GW-004-01	030-GW-004-02	030-GW-004-03	030-GW-004-03-D	030-GW-004-04	030-GW-004-05					
sample	030-GW-004-01	030-GW-004-02	030-GW-004-03	DUP-GW-001-03	030-GW-004-04	030-GW-004-05					
sample_dat	10/13/99	01/11/00	04/18/00	04/18/00	07/27/00	10/17/00					
qc_type	NM	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups				030-GW-004-03							
1,2-DICHLOROPROPANE	0.5 U	0.5 U					0/2	---	---	0.25	---
2-BUTANONE	10 UR	5 UR					0/0	---	---	---	---
2-HEXANONE	10 UR	5 UR					0/0	---	---	---	---
4-METHYL-2-PENTANONE	10 UR	5 UR					0/0	---	---	---	---
ACETONE	10 UR	5 UR					0/0	---	---	---	---
ACROLEIN	10 UR	10 UR					0/0	---	---	---	---
ACRYLONITRILE	3 U	5 UR					0/1	---	---	1.50	---
ALLYL CHLORIDE	10 U	10 U					0/2	---	---	5.00	---
BENZENE	0.5 U	1 U					0/2	---	---	0.38	---
BROMODICHLOROMETHANE	0.5 U	1 U					0/2	---	---	0.38	---
BROMOFORM	0.5 U	1 U					0/2	---	---	0.38	---
BROMOMETHANE	1 U	1 U					0/2	---	---	0.50	---
CARBON DISULFIDE	0.5 U	1 U					0/2	---	---	0.38	---
CARBON TETRACHLORIDE	0.3 U	0.3 U					0/2	---	---	0.15	---
CHLOROBENZENE	0.5 U	1 U					0/2	---	---	0.38	---
CHLOROETHANE	0.5 UJ	1 U					0/2	---	---	0.38	---
CHLOROFORM	0.3 U	0.3 U					0/2	---	---	0.15	---
CHLOROMETHANE	0.5 UJ	1 U					0/2	---	---	0.38	---
CHLOROPRENE	3 U	10 UJ					0/2	---	---	3.25	---
CIS-1,3-DICHLOROPROPENE	0.3 U	1 U					0/2	---	---	0.33	---
DIBROMOCHLOROMETHANE	0.5 U	1 U					0/2	---	---	0.38	---
DIBROMOMETHANE	0.5 U	1 U					0/2	---	---	0.38	---
DICHLORODIFLUOROMETHANE	0.5 U	1 UJ					0/2	---	---	0.38	---
ETHYL METHACRYLATE	1 U	10 U					0/2	---	---	2.75	---
ETHYLBENZENE	0.5 U	1 U					0/2	---	---	0.38	---
METHACRYLONITRILE	1 UR	1 UR					0/0	---	---	---	---
METHYL IODIDE		10 U					0/1	---	---	5.00	---
METHYL METHACRYLATE	2 UR	10 UR					0/0	---	---	---	---
METHYLENE CHLORIDE	3 U	1 U					0/2	---	---	1.00	---
STYRENE	0.5 U	1 U					0/2	---	---	0.38	---
TETRACHLOROETHENE	0.5 U	1 U					0/2	---	---	0.38	---
TOLUENE	0.5 U	1 U					0/2	---	---	0.38	---
TRANS-1,2-DICHLOROETHENE	0.5 U	1 U					0/2	---	---	0.38	---
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U					0/2	---	---	0.25	---
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR					0/0	---	---	---	---
TRICHLOROETHENE	0.5 U	1 U					0/2	---	---	0.38	---
TRICHLOROFLUOROMETHANE	0.5 U	1 U					0/2	---	---	0.38	---
VINYL ACETATE	0.5 U	10 UJ					0/2	---	---	2.63	---
VINYL CHLORIDE	0.5 U	1 U					0/2	---	---	0.38	---
XYLENES, TOTAL	1 U	1 U					0/2	---	---	0.50	---
Energetics (ug/L)											
1,3,5-TRINITROBENZENE	1.4 U	1.4 U					0/2	---	---	0.70	---
1,3-DINITROBENZENE	1.4 U	1.4 U					0/2	---	---	0.70	---
2,4,6-TRINITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
2,4-DINITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
2,6-DINITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
2-AMINO-4,6-DINITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
2-NITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
3-NITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
4-AMINO-2,6-DINITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
4-NITROTOLUENE	1.4 U	1.4 U					0/2	---	---	0.70	---
HMX	1.4 U	1.4 U					0/2	---	---	0.70	---
NITROBENZENE	1.4 U	1.4 U					0/2	---	---	0.70	---
RDX	1.3 U	1.4 U					0/2	---	---	0.68	---
TETRYL	1.4 U	1.4 U					0/2	---	---	0.70	---

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UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-005	GW-005	GW-005	GW-005	GW-005					
round	01	02	03	04	05					
nsample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05					
sample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05					
sample_dat	10/14/99	01/11/00	04/19/00	07/27/00	10/18/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
dups										
Total Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
ARSENIC	2.2	1.3	3.0 J	1.1 U	1.1 U	3/5	1.3	3	1.52	2.17
BARIUM	27.7	24.9	22.9	27.7 J	18.4 J	5/5	18.4	27.7	24.32	24.32
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CADMIUM	1.1 U	1.1 U	1.1 U	1.9	1.1 U	1/5	1.9	1.9	0.82	1.90
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/5	---	---	2.80	---
CHROMIUM, HEXAVALENT - FIELD	10	20	10 U	10 U	10	3/5	10	20	10.00	13.33
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	9.6	2.2 U	2.2 U	2.2 U	1/5	9.6	9.6	2.80	9.60
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
SELENIUM	5.6 U	1.1 UJ	5.6 U	5.6 U	5.6 U	0/5	---	---	2.35	---
SILVER	3.3 U	3.3 U	3.3 UJ	3.3 U	3.3 UJ	0/5	---	---	1.65	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
TIN	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	0/5	---	---	1.10	---
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
Dissolved Metals (ug/L)										
ANTIMONY	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
ARSENIC	1.7	1.6	3.6	1 U	1 U	3/5	1.6	3.6	1.58	2.30
BARIUM	23.3	23.9	22.9	24.8 J	19.2	5/5	19.2	24.8	22.82	22.82
BERYLLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5 U	13.6	1/5	13.6	13.6	4.90	13.60
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.59	---
COPPER	2.2 U	8.8	2.2 U	2 U	2 U	1/5	8.8	8.8	2.60	8.80
LEAD	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
MERCURY	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/5	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
SELENIUM	5.6 U	1.1 U	5.6 U	5 U	12.8	1/5	12.8	12.8	4.29	12.80
SILVER	3.3 U	3.3 U	3.3 UJ	3 U	3 U	0/5	---	---	1.59	---
THALLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
TIN	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
VANADIUM	2.2 U	2.2 U	2.2 U	2 U	2 U	0/5	---	---	1.06	---
ZINC	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.05 J	0.01 U	1/5	0.05	0.05	0.01	0.05
CYANIDE	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UR	0/4	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---
NITRATE/NITRITE, AS N	7.2	6.9 J	7.9	8.1	7.4	5/5	6.9	8.1	7.50	7.50
TOTAL KJELDAHL NITROGEN	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0/5	---	---	0.15	---
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---
Volatile Organics (ug/L)										
1,1,1,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,1-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2,2-TETRACHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1,2-TRICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,1-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
1,2,3-TRICHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U				0/2	---	---	0.50	---
1,2-DIBROMOETHANE	0.5 U	1 U				0/2	---	---	0.38	---
1,2-DICHLOROETHANE	0.5 U	1 U				0/2	---	---	0.38	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-005	GW-005	GW-005	GW-005	GW-005					
round	01	02	03	04	05					
nsample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05					
sample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05					
sample_dat	10/14/99	01/11/00	04/19/00	07/27/00	10/18/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
1,2-DICHLOROPROPANE	0.5 U	0.5 U				0/2	---	---	0.25	---
2-BUTANONE	10 UR	5 UR				0/0	---	---	---	---
2-HEXANONE	10 UR	5 UR				0/0	---	---	---	---
4-METHYL-2-PENTANONE	10 UR	5 UR				0/0	---	---	---	---
ACETONE	10 UR	5 UR				0/0	---	---	---	---
ACROLEIN	10 UR	10 UR				0/0	---	---	---	---
ACRYLONITRILE	3 U	5 UR				0/1	---	---	1.50	---
ALLYL CHLORIDE	10 U	10 U				0/2	---	---	5.00	---
BENZENE	0.5 U	1 U				0/2	---	---	0.38	---
BROMODICHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
BROMOFORM	0.5 U	1 U				0/2	---	---	0.38	---
BROMOMETHANE	1 U	1 U				0/2	---	---	0.50	---
CARBON DISULFIDE	0.5 U	1 U				0/2	---	---	0.38	---
CARBON TETRACHLORIDE	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
CHLOROETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROFORM	0.3 U	0.3 U				0/2	---	---	0.15	---
CHLOROMETHANE	0.5 UJ	1 U				0/2	---	---	0.38	---
CHLOROPRENE	3 U	10 UJ				0/2	---	---	3.25	---
CIS-1,3-DICHLOROPROPENE	0.3 U	1 U				0/2	---	---	0.33	---
DIBROMOCHLOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DIBROMOMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
DICHLORODIFLUOROMETHANE	0.5 U	1 UJ				0/2	---	---	0.38	---
ETHYL METHACRYLATE	1 U	10 U				0/2	---	---	2.75	---
ETHYLBENZENE	0.5 U	1 U				0/2	---	---	0.38	---
METHACRYLONITRILE	1 UR	1 UR				0/0	---	---	---	---
METHYL IODIDE		10 U				0/1	---	---	5.00	---
METHYL METHACRYLATE	2 UR	10 UR				0/0	---	---	---	---
METHYLENE CHLORIDE	3 U	1 U				0/2	---	---	1.00	---
STYRENE	0.5 U	1 U				0/2	---	---	0.38	---
TETRACHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TOLUENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,2-DICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U				0/2	---	---	0.25	---
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR				0/0	---	---	---	---
TRICHLOROETHENE	0.5 U	1 U				0/2	---	---	0.38	---
TRICHLOROFLUOROMETHANE	0.5 U	1 U				0/2	---	---	0.38	---
VINYL ACETATE	0.5 U	10 UJ				0/2	---	---	2.63	---
VINYL CHLORIDE	0.5 U	1 U				0/2	---	---	0.38	---
XYLENES, TOTAL	1 U	1 U				0/2	---	---	0.50	---
Energetics (ug/L)										
1,3,5-TRINITROBENZENE	0.83 U	1 U				0/2	---	---	0.46	---
1,3-DINITROBENZENE	0.83 U	1 U				0/2	---	---	0.46	---
2,4,6-TRINITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
2,4-DINITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
2,6-DINITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
2-AMINO-4,6-DINITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
2-NITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
3-NITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
4-AMINO-2,6-DINITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
4-NITROTOLUENE	0.83 U	1 U				0/2	---	---	0.46	---
HMX	0.83 U	1 U				0/2	---	---	0.46	---
NITROBENZENE	0.83 U	1 U				0/2	---	---	0.46	---
RDX	0.78 U	1 U				0/2	---	---	0.45	---
TETRYL	0.83 U	1 U				0/2	---	---	0.46	---

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UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-006	GW-006	GW-006	GW-006	GW-006	GW-006					
round	01	02	02	03	04	05					
nsample	030-GW-006-01	030-GW-006-02	030-GW-006-02-D	030-GW-006-03	030-GW-006-04	030-GW-006-05					
sample	030-GW-006-01	030-GW-006-02	DUP-GW-001-02	030-GW-006-03	030-GW-006-04	030-GW-006-05					
sample_dat	10/14/99	01/13/00	01/13/00	04/19/00	07/26/00	10/18/00					
qc_type	NM	NM	NM	NM	NM	NM					
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups			030-GW-006-02								
Total Metals (ug/L)											
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/6	---	---	0.55	---
ARSENIC	2.2	1.3	1.3	2.3 J	1.1 U	1.1 U	4/6	1.3	2.3	1.37	1.78
BARIUM	5.4	6.2	5.2	5.1	15.9 J	4.7 J	6/6	4.7	15.9	7.08	7.08
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/6	---	---	0.55	---
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	5.3	1.1 U	1/6	5.3	5.3	1.34	5.30
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/6	---	---	2.80	---
CHROMIUM, HEXAVALENT - FIELD	20	10	20	10	10	10	6/6	10	20	13.33	13.33
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/6	---	---	1.65	---
COPPER	2.4	10.7	9.1	2.2 U	2.2 U	2.2	4/6	2.2	10.7	4.43	6.10
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/6	---	---	0.55	---
MERCURY	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/6	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	108	11.1 U	1/6	108	108	22.63	108.00
SELENIUM	12.6	11.2 J	11.2 J	11.8	12.1	12.2	6/6	11.2	12.6	11.85	11.85
SILVER	3.3 U	3.3 U	3.3 U	3.3 UJ	3.3 U	3.3 UJ	0/6	---	---	1.65	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.6 J	1.1 U	1/6	1.6	1.6	0.73	1.60
TIN	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/6	---	---	5.55	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	0/6	---	---	1.10	---
ZINC	13	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	1/6	13	13	6.79	13.00
Dissolved Metals (ug/L)											
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
ARSENIC	1.6	1.4	1.3	3.8	1 U	1 U	4/6	1.3	3.8	1.52	2.03
BARIUM	6	6.9	7.1	6.0	7.3 J	5	6/6	5	7.3	6.38	6.38
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.7	18.4	2/6	5.7	18.4	5.88	12.05
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3 U	3 U	0/6	---	---	1.60	---
COPPER	2.2 U	8.7	8.7	2.2 U	2 U	2 U	2/6	8.7	8.7	3.60	8.70
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
MERCURY	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0/6	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	0/6	---	---	5.37	---
SELENIUM	15.4	10.8 J	10.7 J	13.0	5.1	31.2	6/6	5.1	31.2	14.37	14.37
SILVER	3.3 U	3.3 U	3.3 U	3.3 UJ	3 U	3 U	0/6	---	---	1.60	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.3	1 U	1/6	1.3	1.3	0.67	1.30
TIN	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	0/6	---	---	5.37	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2 U	2 U	0/6	---	---	1.07	---
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	0/6	---	---	5.37	---
Miscellaneous Parameters (mg/L)											
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U	0.01 U	0/6	---	---	0.01	---
CYANIDE	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UR	0/5	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/6	---	---	0.05	---
NITRATE/NITRITE, AS N	5.2	4.9 J	5.0 J	5.7	4.6	5.5	6/6	4.6	5.7	5.15	5.15
TOTAL KJELDAHL NITROGEN	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0/6	---	---	0.15	---
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/6	---	---	0.05	---
Volatile Organics (ug/L)											
1,1,1,2-TETRACHLOROETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
1,1,1-TRICHLOROETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
1,1,2,2-TETRACHLOROETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
1,1,2-TRICHLOROETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
1,1-DICHLOROETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
1,1-DICHLOROETHENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
1,2,3-TRICHLOROPROPANE	1 U	1 U	1 U				0/3	---	---	0.50	---
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U	1 U				0/3	---	---	0.50	---
1,2-DIBROMOETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
1,2-DICHLOROETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported-- should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-006	GW-006	GW-006	GW-006	GW-006	GW-006					
round	01	02	02	03	04	05					
nsample	030-GW-006-01	030-GW-006-02	030-GW-006-02-D	030-GW-006-03	030-GW-006-04	030-GW-006-05					
sample	030-GW-006-01	030-GW-006-02	DUP-GW-001-02	030-GW-006-03	030-GW-006-04	030-GW-006-05					
sample_dat	10/14/99	01/13/00	01/13/00	04/19/00	07/26/00	10/18/00					
qc_type	NM	NM	NM	NM	NM	NM					
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups			030-GW-006-02				FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
1,2-DICHLOROPROPANE	0.5 U	0.5 U	0.5 U				0/3	---	---	0.25	---
2-BUTANONE	10 UR	5 UR	5 UR				0/0	---	---	---	---
2-HEXANONE	10 UR	5 UR	5 UR				0/0	---	---	---	---
4-METHYL-2-PENTANONE	10 UR	5 UR	5 UR				0/0	---	---	---	---
ACETONE	10 UR	5 UR	5 UR				0/0	---	---	---	---
ACROLEIN	10 UR	10 UR	10 UR				0/0	---	---	---	---
ACRYLONITRILE	3 U	5 UR	5 UR				0/1	---	---	1.50	---
ALLYL CHLORIDE	10 U	10 U	10 U				0/3	---	---	5.00	---
BENZENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
BROMODICHLOROMETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
BROMOFORM	0.5 U	1 U	1 U				0/3	---	---	0.42	---
BROMOMETHANE	1 U	1 U	1 U				0/3	---	---	0.50	---
CARBON DISULFIDE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
CARBON TETRACHLORIDE	0.3 U	0.3 U	0.3 U				0/3	---	---	0.15	---
CHLOROBENZENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
CHLOROETHANE	0.5 UJ	1 U	1 U				0/3	---	---	0.42	---
CHLOROFORM	0.3 U	0.3 U	0.3 U				0/3	---	---	0.15	---
CHLOROMETHANE	0.5 UJ	1 U	1 U				0/3	---	---	0.42	---
CHLOROPRENE	3 U	10 UJ	10 UJ				0/3	---	---	3.83	---
CIS-1,3-DICHLOROPROPENE	0.3 U	1 U	1 U				0/3	---	---	0.38	---
DIBROMOCHLOROMETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
DIBROMOMETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
DICHLORODIFLUOROMETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
ETHYL METHACRYLATE	1 U	10 U	10 U				0/3	---	---	3.50	---
ETHYLBENZENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
METHACRYLONITRILE	1 UR	1 UR	1 UR				0/0	---	---	---	---
METHYL IODIDE		10 U	10 U				0/2	---	---	5.00	---
METHYL METHACRYLATE	2 UR	10 UR	10 UR				0/0	---	---	---	---
METHYLENE CHLORIDE	3 U	1 U	1 U				0/3	---	---	0.83	---
STYRENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
TETRACHLOROETHENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
TOLUENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
TRANS-1,2-DICHLOROETHENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U				0/3	---	---	0.25	---
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR	10 UR				0/0	---	---	---	---
TRICHLOROETHENE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
TRICHLOROFLUOROMETHANE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
VINYL ACETATE	0.5 U	10 UJ	10 UJ				0/3	---	---	3.42	---
VINYL CHLORIDE	0.5 U	1 U	1 U				0/3	---	---	0.42	---
XYLENES, TOTAL	1 U	1 U	1 U				0/3	---	---	0.50	---
Energetics (ug/L)											
1,3,5-TRINITROBENZENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
1,3-DINITROBENZENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
2,4,6-TRINITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
2,4-DINITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
2,6-DINITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
2-AMINO-4,6-DINITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
2-NITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
3-NITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
4-AMINO-2,6-DINITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
4-NITROTOLUENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
HMX	1 U	1.3 U	1 U				0/3	---	---	0.55	---
NITROBENZENE	1 U	1.3 U	1 U				0/3	---	---	0.55	---
RDX	0.94 U	1.3 U	1 U				0/3	---	---	0.54	---
TETRYL	1 U	1.3 U	1 U				0/3	---	---	0.55	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007					
round	01	01	02	03	04	04	05	05					
nsample	030-GW-007-01	030-GW-007-01-D	030-GW-007-02	030-GW-007-03	030-GW-007-04	030-GW-007-04-D	030-GW-007-05	030-GW-007-05-D					
sample	030-GW-007-01	030-GW-007-01	030-GW-007-02	030-GW-007-03	030-GW-007-04	DUP-GW-001-04	030-GW-007-05	DUP-GW-001-05					
sample_dat	10/12/99	10/12/99	01/12/00	04/19/00	07/26/00	07/26/00	10/17/00	10/17/00					
qc_type	NM	NM	NM	NM	NM	NM	NM	NM					
sacode	DUP	DUP	NORMAL	NORMAL	DUP	DUP	DUP	DUP					
matrix	GW	GW	GW	GW	GW	GW	GW	GW					
validated	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
dups		030-GW-007-01				030-GW-007-04		030-GW-007-05					
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	0/8	---	---	0.55	---
ARSENIC	1.1	1.6	1.8	1.7 J	1.1 U	1.1 U	1.1 U	1.1 U	4/8	1.1	1.8	1.05	1.55
BARIUM	14.1	14.1	14.3	10.7	14.3 J	14.5 J	8.1 J	8.1 J	8/8	8.1	14.5	12.27	12.27
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	0/8	---	---	0.55	---
CADMIUM	1.1 U	1 U	1.1 U	1.1 U	1.3	1.7	1.1 U	1.1 U	2/8	1.3	1.7	0.79	1.50
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	0/8	---	---	2.80	---
CHROMIUM, HEXAVALENT - FIELD	10	10	10	10	20	10	10 U	10 U	6/8	10	20	10.00	11.67
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	0/8	---	---	1.65	---
COPPER	2.2 U	2.2 U	10.1	2.2 U	2.2 U	2.2 U	2.2	2.2 U	2/8	2.2	10.1	2.36	6.15
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	0/8	---	---	0.55	---
MERCURY	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0/8	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.2	11.1 U	11.1 U	1/8	11.2	11.2	5.63	11.20
SELENIUM	5.6 U	5.6 U	1.1 UJ	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/8	---	---	2.52	---
SILVER	3.3 U	3.3 U	3.3 U	3.3 UJ	3.3 U	3.3 U	3.3 UJ	3.3 UJ	0/8	---	---	1.65	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.6 J	1.3 J	1.1 U	1.1 U	2/8	1.3	1.6	0.78	1.45
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	0/8	---	---	5.55	---
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	0/8	---	---	1.10	---
ZINC	17.2	15.6	11.4	14.3 J	15.3	15.3	15.6	15.4	8/8	11.4	17.2	15.01	15.01
Dissolved Metals (ug/L)													
ANTIMONY	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0/8	---	---	0.55	---
ARSENIC	1.3	1.3	1.8	2.4	1 U	1 U	1 U	1 U	4/8	1.3	2.4	1.10	1.70
BARIUM	13	13.1	13.6	15.2	9.8 J	10.4 J	7.9	8.1	8/8	7.9	15.2	11.39	11.39
BERYLLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0/8	---	---	0.55	---
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0/8	---	---	0.55	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	11.4	7.8	15.9	19.6	4/8	7.8	19.6	8.23	13.68
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3 U	3 U	3 U	3 U	0/8	---	---	1.58	---
COPPER	2.2 U	2.2 U	10.6	2.2 U	2.2	2.3	2 U	2 U	3/8	2.2	10.6	2.55	5.03
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0/8	---	---	0.55	---
MERCURY	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0/8	---	---	0.10	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	12.3	11.4	10 U	10 U	2/8	11.4	12.3	6.99	11.85
SELENIUM	5.6 U	5.6 U	1.1 UJ	5.6 U	5.7	14.7	15.3	18.4	4/8	5.7	18.4	7.88	13.53
SILVER	3.3 U	3.3 U	3.3 U	3.3 UJ	3 U	3 U	3 U	3 U	0/8	---	---	1.58	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1	1 U	1 U	1 U	1/8	1.1	1.1	0.60	1.10
TIN	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	10 U	10 U	0/8	---	---	5.28	---
VANADIUM	2.2 U	2.2 U	2.2 U	2.2 U	2 U	2 U	2 U	2 U	0/8	---	---	1.05	---
ZINC	12.9	12.9	32.2	12.1	14.2	14.3	13.3	14.3	8/8	12.1	32.2	15.75	15.75
Miscellaneous Parameters (mg/L)													
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.01 U	0.03 J	0.03 J	0.01 U	0.02 J	3/8	0.02	0.03	0.01	0.03
CYANIDE	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 UR	0.01 UR	0/6	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.17	0.15	0.1 U	0.1 U	0.1 U	2/8	0.15	0.17	0.08	0.16
NITRATE/NITRITE, AS N	0.3	0.32	0.4 J	0.54	0.48 J	0.44	0.51	0.62	8/8	0.3	0.62	0.45	0.45
TOTAL KJELDAHL NITROGEN	0.3 U	0.4	0.6 U	0.3 U	0.3 U	0.3 U	0.4 U	0.3 UJ	1/8	0.4	0.4	0.21	0.40
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.13 J	0.18	0.1 U	0.1	0.1 U	0.26	4/8	0.1	0.26	0.11	0.17
Volatile Organics (ug/L)													
1,1,1,2-TETRACHLOROETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
1,1-DICHLOROETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
1,1-DICHLOROETHENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
1,2,3-TRICHLOROPROPANE	1 U	1 U	1 U						0/3	---	---	0.50	---
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U	1 U						0/3	---	---	0.50	---
1,2-DIBROMOETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
1,2-DICHLOROETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-2

ROUNDS 1-5
GROUND WATER DATA
NSWC CRANE, INDIANA

location	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007					
round	01	01	02	03	04	04	05	05					
nsample	030-GW-007-01	030-GW-007-01-D	030-GW-007-02	030-GW-007-03	030-GW-007-04	030-GW-007-04-D	030-GW-007-05	030-GW-007-05-D					
sample	030-GW-007-01	030-GW-007-01	030-GW-007-02	030-GW-007-03	030-GW-007-04	DUP-GW-001-04	030-GW-007-05	DUP-GW-001-05					
sample_dat	10/12/99	10/12/99	01/12/00	04/19/00	07/26/00	07/26/00	10/17/00	10/17/00					
qc_type	NM	NM	NM	NM	NM	NM	NM	NM					
sacode	DUP	DUP	NORMAL	NORMAL	DUP	DUP	DUP	DUP					
matrix	GW	GW	GW	GW	GW	GW	GW	GW					
validated	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups		030-GW-007-01				030-GW-007-04		030-GW-007-05	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
1,2-DICHLOROPROPANE	0.5 U	0.5 U	0.5 U						0/3	---	---	0.25	---
2-BUTANONE	10 UR	10 UR	5 UR						0/0	---	---	---	---
2-HEXANONE	10 UR	10 UR	5 UR						0/0	---	---	---	---
4-METHYL-2-PENTANONE	10 UR	10 UR	5 UR						0/0	---	---	---	---
ACETONE	10 UR	10 UR	5 UR						0/0	---	---	---	---
ACROLEIN	10 UR	10 UR	10 UR						0/0	---	---	---	---
ACRYLONITRILE	3 U	3 UR	5 UR						0/1	---	---	1.50	---
ALLYL CHLORIDE	10 U	10 U	10 U						0/3	---	---	5.00	---
BENZENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
BROMODICHLOROMETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
BROMOFORM	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
BROMOMETHANE	1 U	1 U	1 U						0/3	---	---	0.50	---
CARBON DISULFIDE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
CARBON TETRACHLORIDE	0.3 U	0.3 U	0.3 U						0/3	---	---	0.15	---
CHLOROBENZENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
CHLOROETHANE	0.5 UJ	0.5 UJ	1 U						0/3	---	---	0.33	---
CHLOROFORM	0.3 U	0.3 U	0.3 U						0/3	---	---	0.15	---
CHLOROMETHANE	0.5 UJ	0.5 UJ	1 U						0/3	---	---	0.33	---
CHLOROPRENE	3 U	3 U	10 UJ						0/3	---	---	2.67	---
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	1 U						0/3	---	---	0.33	---
DIBROMOCHLOROMETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
DIBROMOMETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
DICHLORODIFLUOROMETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
ETHYL METHACRYLATE	1 U	1 U	10 U						0/3	---	---	3.00	---
ETHYLBENZENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
METHACRYLONITRILE	1 UR	1 UR	1 UR						0/0	---	---	---	---
METHYL IODIDE			10 U						0/1	---	---	5.00	---
METHYL METHACRYLATE	2 UR	2 UR	10 UR						0/0	---	---	---	---
METHYLENE CHLORIDE	3 U	3 U	1 U						0/3	---	---	1.16	---
STYRENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
TETRACHLOROETHENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
TOLUENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
TRANS-1,2-DICHLOROETHENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U						0/3	---	---	0.25	---
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR	10 UR						0/0	---	---	---	---
TRICHLOROETHENE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
TRICHLOROFLUOROMETHANE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
VINYL ACETATE	0.5 U	0.5 U	10 UJ						0/3	---	---	1.83	---
VINYL CHLORIDE	0.5 U	0.5 U	1 U						0/3	---	---	0.33	---
XYLENES, TOTAL	1 U	1 U	1 U						0/3	---	---	0.50	---
Energetics (ug/L)													
1,3,5-TRINITROBENZENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
1,3-DINITROBENZENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
2,4,6-TRINITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
2,4-DINITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
2,6-DINITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
2-AMINO-4,6-DINITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
2-NITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
3-NITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
4-AMINO-2,6-DINITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
4-NITROTOLUENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
HMX	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
NITROBENZENE	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---
RDX	1.2 U	1.3 U	1.4 U						0/3	---	---	0.67	---
TETRYL	1.2 U	1.4 U	1.4 U						0/3	---	---	0.67	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-3

ROUNDS 1-5
RESULTS WITH AT LEAST ONE POSITIVE DETECTION
NSWC CRANE, INDIANA

location	GW-001	GW-001	GW-001	GW-001	GW-001					
round	01	02	03	04	05					
nsample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05					
sample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05					
sample_dat	10/13/99	01/12/00	04/18/00	07/26/00	10/18/00					
qc_type	NM	NM	NM	NM	NM					
sacode	DUP	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT					
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
Total Metals (ug/L)										
ARSENIC	4.3	3.1	3.8 J	1.1 U	1.4	4/5	1.4	4.3	2.63	3.15
BARIUM	7.2	7.2	7.7	10.8 J	7.6 J	5/5	7.2	10.8	8.10	8.10
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CHROMIUM, HEXAVALENT - FIELD	10	10	10 U	10	10	4/5	10	10	9.00	10.00
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	10.2	2.2 U	2.3	2.2 U	2/5	2.3	10.2	3.16	6.25
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
SELENIUM	5.6 U	2 U	5.6 U	5.6 U	5.6 U	0/5	---	---	2.67	---
THALLIUM	1.1 U	1.1 U	1.1 U	2.8 J	1.1 U	1/5	2.8	2.8	1.01	2.80
ZINC	13.3	11.1 U	11.1 U	12.9	13.8	3/5	12.9	13.8	10.22	13.33
Dissolved Metals (ug/L)										
ARSENIC	3.1	3.2	6.8	1 U	1.6	4/5	3.1	6.8	3.04	3.68
BARIUM	7.7	7.4	7.7	8.6 J	7.5	5/5	7.4	8.6	7.78	7.78
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	11.4	16.3	2/5	11.4	16.3	7.22	13.85
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.60	---
COPPER	2.2 U	9.2	2.2 U	2.2	2 U	2.5	2.2	9.2	2.92	5.70
LEAD	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
NICKEL	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
SELENIUM	5.6 U	1.1 UJ	5.6 U	12.5 U	15.1	1/5	15.1	15.1	5.50	15.10
THALLIUM	1.1 U	1.1 U	1.1 U	1.4	1 U	1/5	1.4	1.4	0.71	1.40
ZINC	13.2	11.1 U	11.1 U	12.3	11.4	3/5	11.4	13.2	9.60	12.30
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.07 J	0.01 U	1/5	0.07	0.07	0.02	0.07
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---
NITRATE/NITRITE, AS N	1	1.3 J	1.3	1.5 J	1.6	5/5	1	1.6	1.34	1.34
TOTAL KJELDAHL NITROGEN	0.4	0.8 U	0.3	0.4 J	0.3 UJ	3/5	0.3	0.4	0.33	0.37
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/6	---	---	0.05	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-3

ROUNDS 1-5
RESULTS WITH AT LEAST ONE POSITIVE DETECTION
NSWC CRANE, INDIANA

location	GW-002	GW-002	GW-002	GW-002	GW-002					
round	01	02	03	04	05					
nsample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05					
sample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05					
sample_dat	10/12/99	01/12/00	04/18/00	07/26/00	10/17/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
dups										
Total Metals (ug/L)										
ARSENIC	3.4	1.7	3.1 J	1.1 U	1.1 U	3/5	1.7	3.4	1.86	2.73
BARIUM	7.6	6.2	6.6	15.9 J	6.6 J	5/5	6.2	15.9	8.58	8.58
CADMIUM	1.1 U	1.1 U	1.1 U	2.1	1.1 U	1/5	2.1	2.1	0.86	2.10
CHROMIUM, HEXAVALENT - FIELD	20	10	10 U	20	10 U	3/5	10	20	12.00	16.67
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	8.9	2.2 U	2.2 U	2.2 U	1/5	8.9	8.9	2.66	8.90
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
NICKEL	11.1 U	11.1 U	11.1 U	11.3	11.1 U	1/5	11.3	11.3	6.70	11.30
SELENIUM	8.4	7.3 U	8.1	7.7	9.8	4/5	7.7	9.8	7.53	8.50
THALLIUM	1.1 U	1.1 U	1.1 U	2.7 J	1.1 U	1/5	2.7	2.7	0.98	2.70
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
Dissolved Metals (ug/L)										
ARSENIC	2.9	2.2	5.3	1 U	1.1	4/5	1.1	5.3	2.40	2.88
BARIUM	7	6.7	6.7	8.1 J	6.7	5/5	6.7	8.1	7.04	7.04
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5 U	10.6	1/5	10.6	10.6	4.30	10.60
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.59	---
COPPER	2.2 U	8.7	2.2 U	2 U	2 U	1/5	8.7	8.7	2.58	8.70
LEAD	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
NICKEL	11.1 U	11.1 U	11.1 U	11.3	10 U	1/5	11.3	11.3	6.59	11.30
SELENIUM	7.9	6.9 U	9.7	8.5	23.9	4/5	7.9	23.9	10.69	12.50
THALLIUM	1.1 U	1.1 U	1.1 U	1.5	1 U	1/5	1.5	1.5	0.73	1.50
ZINC	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.010 U	0.01 U	0.06 J	0.01 U	1/5	0.06	0.06	0.02	0.06
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.15	0.1 U	0.1 U	1/5	0.15	0.15	0.07	0.15
NITRATE/NITRITE, AS N	1	0.97 J	1	1.1 J	0.98	5/5	0.97	1.1	1.01	1.01
TOTAL KJELDAHL NITROGEN	0.3	0.6 U	0.3	0.5 J	0.4 U	3/5	0.3	0.5	0.32	0.37
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1	0.1 U	1/5	0.1	0.1	0.06	0.10

J = Detected results considered to be an estimate based on technical noncompliances.
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UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-3

ROUNDS 1-5
RESULTS WITH AT LEAST ONE POSITIVE DETECTION
NSWC CRANE, INDIANA

location	GW-003	GW-003	GW-003	GW-003	GW-003					
round	01	02	03	04	05					
nsample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05					
sample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05					
sample_dat	10/13/99	01/13/00	04/18/00	07/25/00	10/17/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE					
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT					
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
Total Metals (ug/L)										
ARSENIC	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
BARIUM	22.7	17.2	16.7	24.9 J	15.5 J	5/5	15.5	24.9	19.40	19.40
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
CHROMIUM, HEXAVALENT - FIELD	10	10	10	10 U	10 U	3/5	10	10	8.00	10.00
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	9.2	2.2 U	2.2 U	2.2 U	1/5	9.2	9.2	2.72	9.20
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
NICKEL	11.1 U	11.1 U	11.1 U	11.6	11.1 U	1/5	11.6	11.6	6.76	11.60
SELENIUM	5.6 U	4.4 U	5.6 U	6.1	8.4	2/5	6.1	8.4	4.46	7.25
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
Dissolved Metals (ug/L)										
ARSENIC	1.1 U	1.1 U	1.7	1 U	1 U	1/5	1.7	1.7	0.76	1.70
BARIUM	19.2	17.2	17.8	18.6 J	16	5/5	16	19.2	17.76	17.76
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5 U	13.8	1/5	13.8	13.8	4.94	13.80
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.59	---
COPPER	2.2 U	9.4	2.7	4.2	2.3	4/5	2.3	9.4	3.94	4.65
LEAD	1.1 U	1.1 U	2.2	1.2	1 U	2/5	1.2	2.2	1.00	1.70
NICKEL	11.1 U	11.1 U	12.0	10.8	10 U	2/5	10.8	12	7.78	11.40
SELENIUM	5.6 U	4.7 U	5.6 U	8.2	30.9	2/5	8.2	30.9	9.41	19.55
THALLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
ZINC	11.1 U	11.1 U	66.3	74.8	11.8	3/5	11.8	74.8	32.80	50.97
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.03 J	0.01 U	1/5	0.03	0.03	0.01	0.03
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0/5	---	---	0.06	---
NITRATE/NITRITE, AS N	0.42	0.65 J	0.56	0.76 J	1.1	5/5	0.42	1.1	0.70	0.70
TOTAL KJELDAHL NITROGEN	0.4	0.8 U	0.5	0.3 U	0.3 UJ	2/5	0.4	0.5	0.32	0.45
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-3

ROUNDS 1-5
RESULTS WITH AT LEAST ONE POSITIVE DETECTION
NSWC CRANE, INDIANA

location	GW-004	GW-004	GW-004	GW-004	GW-004	GW-004					
round	01	02	03	03	04	05					
nsample	030-GW-004-01	030-GW-004-02	030-GW-004-03	030-GW-004-03-D	030-GW-004-04	030-GW-004-05					
sample	030-GW-004-01	030-GW-004-02	030-GW-004-03	DUP-GW-001-03	030-GW-004-04	030-GW-004-05					
sample_dat	10/13/99	01/11/00	04/18/00	04/18/00	07/27/00	10/17/00					
qc_type	NM	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
dups				030-GW-004-03							
Total Metals (ug/L)											
ARSENIC	2.8	2.6	3.4 J	4.0 J	1.4	1.8	6/6	1.4	4	2.67	2.67
BARIUM	23.8	24.3	22.3	21.3	26.4 J	16.5 J	6/6	16.5	26.4	22.43	22.43
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	3.6	1.1 U	1/6	3.6	3.6	1.06	3.60
CHROMIUM, HEXAVALENT - FIELD	20	10	10	10	10	10	6/6	10	20	11.67	11.67
COBALT	8.7	8.4	8.0	8.1	7.6	7.8	6/6	7.6	8.7	8.10	8.10
COPPER	4.1	12.2	3.2	2.2	2.8	6.8	6/6	2.2	12.2	5.22	5.22
LEAD	1.1 U	1.1 U	2.4	1.1 U	1.1 U	1.1 U	1/6	2.4	2.4	0.86	2.40
NICKEL	21.3	23	31.7	23.0	35.2	31.4	6/6	21.3	35.2	27.60	27.60
SELENIUM	5.6 U	3 U	5.6 U	5.6 U	6.4	5.6 U	1/6	6.4	6.4	3.18	6.40
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.4 J	1.1 U	1/6	1.4	1.4	0.69	1.40
ZINC	40.8	28.7	78.0 J	28.3 J	32.2	47.9	6/6	28.3	78	42.65	42.65
Dissolved Metals (ug/L)											
ARSENIC	3.1	2.8	3.9	4.9	1.8	2.7	6/6	1.8	4.9	3.20	3.20
BARIUM	29.2	23.7	21.4	22.3	22.6 J	17.2	6/6	17.2	29.2	22.73	22.73
CADMIUM	1.2	1.1 U	1.1 U	1.1 U	1.8 U	1 U	1/6	1.2	1.2	0.71	1.20
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	7.5	8.2	2/6	7.5	8.2	4.48	7.85
COBALT	9.4	8.3	7.9	7.8	7.8	7.4	6/6	7.4	9.4	8.10	8.10
COPPER	5.3	11.2	2.2 U	2.9	2.6	2 U	4/6	2.6	11.2	4.02	5.50
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
NICKEL	24.3	22.3	20.1	21.8	35.8	27.9	6/6	20.1	35.8	25.37	25.37
SELENIUM	5.6 U	1.9 U	5.6 U	5.6 U	5 U	7.4	1/6	7.4	7.4	3.21	7.40
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
ZINC	45.4	26.7	28.0	30.0	31.8	32	6/6	26.7	45.4	32.32	32.32
Miscellaneous Parameters (mg/L)											
AMMONIA, AS NITROGEN	0.14	0.11 J	0.12	0.13	0.11 J	0.14 J	6/6	0.11	0.14	0.13	0.13
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1	1/6	0.1	0.1	0.06	0.10
NITRATE/NITRITE, AS N	0.03	0.03 U	0.06	0.06	0.02	1.6	5/6	0.02	1.6	0.30	0.35
TOTAL KJELDAHL NITROGEN	1.1	1.7 J	1.2	1.3	1.5 J	1.4 U	5/6	1.1	1.7	1.25	1.36
TOTAL PHOSPHORUS AS P	0.1 U	0.16 J	0.1 U	0.1 U	0.1 U	0.1 U	1/6	0.16	0.16	0.07	0.16

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-3

ROUNDS 1-5
RESULTS WITH AT LEAST ONE POSITIVE DETECTION
NSWC CRANE, INDIANA

location	GW-005	GW-005	GW-005	GW-005	GW-005					
round	01	02	03	04	05					
nsample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05					
sample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05					
sample_dat	10/14/99	01/11/00	04/19/00	07/27/00	10/18/00					
qc_type	NM	NM	NM	NM	NM					
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups										
Total Metals (ug/L)										
ARSENIC	2.2	1.3	3.0 J	1.1 U	1.1 U	3/5	1.3	3	1.52	2.17
BARIUM	27.7	24.9	22.9	27.7 J	18.4 J	5/5	18.4	27.7	24.32	24.32
CADMIUM	1.1 U	1.1 U	1.1 U	1.9	1.1 U	1/5	1.9	1.9	0.82	1.90
CHROMIUM, HEXAVALENT - FIELD	10	20	10 U	10 U	10	3/5	10	20	10.00	13.33
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/5	---	---	1.65	---
COPPER	2.2 U	9.6	2.2 U	2.2 U	2.2 U	1/5	9.6	9.6	2.80	9.60
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
SELENIUM	5.6 U	1.1 UJ	5.6 U	5.6 U	5.6 U	0/5	---	---	2.35	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---
Dissolved Metals (ug/L)										
ARSENIC	1.7	1.6	3.6	1 U	1 U	3/5	1.6	3.6	1.58	2.30
BARIUM	23.3	23.9	22.9	24.8 J	19.2	5/5	19.2	24.8	22.82	22.82
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5 U	13.6	1/5	13.6	13.6	4.90	13.60
COBALT	3.3 U	3.3 U	3.3 U	3 U	3 U	0/5	---	---	1.59	---
COPPER	2.2 U	8.8	2.2 U	2 U	2 U	1/5	8.8	8.8	2.60	8.80
LEAD	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
NICKEL	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
SELENIUM	5.6 U	1.1 U	5.6 U	5 U	12.8	1/5	12.8	12.8	4.29	12.80
THALLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---
ZINC	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---
Miscellaneous Parameters (mg/L)										
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.05 J	0.01 U	1/5	0.05	0.05	0.01	0.05
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---
NITRATE/NITRITE, AS N	7.2	6.9 J	7.9	8.1	7.4	5/5	6.9	8.1	7.50	7.50
TOTAL KJELDAHL NITROGEN	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0/5	---	---	0.15	---
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/5	---	---	0.05	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-3

ROUNDS 1-5
RESULTS WITH AT LEAST ONE POSITIVE DETECTION
NSWC CRANE, INDIANA

location	GW-006	GW-006	GW-006	GW-006	GW-006	GW-006					
round	01	02	02	03	04	05					
nsample	030-GW-006-01	030-GW-006-02	030-GW-006-02-D	030-GW-006-03	030-GW-006-04	030-GW-006-05					
sample	030-GW-006-01	030-GW-006-02	DUP-GW-001-02	030-GW-006-03	030-GW-006-04	030-GW-006-05					
sample_dat	10/14/99	01/13/00	01/13/00	04/19/00	07/26/00	10/18/00					
qc_type	NM	NM	NM	NM	NM	NM					
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL					
matrix	GW	GW	GW	GW	GW	GW					
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups			030-GW-006-02								
Total Metals (ug/L)											
ARSENIC	2.2	1.3	1.3	2.3 J	1.1 U	1.1 U	4/6	1.3	2.3	1.37	1.78
BARIUM	5.4	6.2	5.2	5.1	15.9 J	4.7 J	6/6	4.7	15.9	7.08	7.08
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	5.3	1.1 U	1/6	5.3	5.3	1.34	5.30
CHROMIUM, HEXAVALENT - FIELD	20	10	20	10	10	10	6/6	10	20	13.33	13.33
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	0/6	---	---	1.65	---
COPPER	2.4	10.7	9.1	2.2 U	2.2 U	2.2	4/6	2.2	10.7	4.43	6.10
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/6	---	---	0.55	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	108	11.1 U	1/6	108	108	22.63	108.00
SELENIUM	12.6	11.2 J	11.2 J	11.8	12.1	12.2	6/6	11.2	12.6	11.85	11.85
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.6 J	1.1 U	1/6	1.6	1.6	0.73	1.60
ZINC	13	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	1/6	13	13	6.79	13.00
Dissolved Metals (ug/L)											
ARSENIC	1.6	1.4	1.3	3.8	1 U	1 U	4/6	1.3	3.8	1.52	2.03
BARIUM	6	6.9	7.1	6.0	7.3 J	5	6/6	5	7.3	6.38	6.38
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	5.7	18.4	2/6	5.7	18.4	5.88	12.05
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3 U	3 U	0/6	---	---	1.60	---
COPPER	2.2 U	8.7	8.7	2.2 U	2 U	2 U	2/6	8.7	8.7	3.60	8.70
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	0/6	---	---	5.37	---
SELENIUM	15.4	10.8 J	10.7 J	13.0	5.1	31.2	6/6	5.1	31.2	14.37	14.37
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.3	1 U	1/6	1.3	1.3	0.67	1.30
ZINC	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	0/6	---	---	5.37	---
Miscellaneous Parameters (mg/L)											
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U	0.01 U	0/6	---	---	0.01	---
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/6	---	---	0.05	---
NITRATE/NITRITE, AS N	5.2	4.9 J	5.0 J	5.7	4.6	5.5	6/6	4.6	5.7	5.15	5.15
TOTAL KJELDAHL NITROGEN	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0/6	---	---	0.15	---
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0/6	---	---	0.05	---

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-3

ROUNDS 1-5
RESULTS WITH AT LEAST ONE POSITIVE DETECTION
NSWC CRANE, INDIANA

location	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007					
round	01	01	02	03	04	04	05	05					
nsample	030-GW-007-01	030-GW-007-01-D	030-GW-007-02	030-GW-007-03	030-GW-007-04	030-GW-007-04-D	030-GW-007-05	030-GW-007-05-D					
sample	030-GW-007-01	030-GW-007-01	030-GW-007-02	030-GW-007-03	030-GW-007-04	DUP-GW-001-04	030-GW-007-05	DUP-GW-001-05					
sample_dat	10/12/99	10/12/99	01/12/00	04/19/00	07/26/00	07/26/00	10/17/00	10/17/00					
qc_type	NM	NM	NM	NM	NM	NM	NM	NM					
sacode	DUP	DUP	NORMAL	NORMAL	DUP	DUP	DUP	DUP					
matrix	GW	GW	GW	GW	GW	GW	GW	GW					
validated	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE					
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT					
dups		030-GW-007-01				030-GW-007-04		030-GW-007-05	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION
Total Metals (ug/L)													
ARSENIC	1.1	1.6	1.8	1.7 J	1.1 U	1.1 U	1.1 U	1.1 U	4/8	1.1	1.8	1.05	1.55
BARIUM	14.1	14.1	14.3	10.7	14.3 J	14.5 J	8.1 J	8.1 J	8/8	8.1	14.5	12.27	12.27
CADMIUM	1.1 U	1 U	1.1 U	1.1 U	1.3	1.7	1.1 U	1.1 U	2/8	1.3	1.7	0.79	1.50
CHROMIUM, HEXAVALENT - FIELD	10	10	10	10	20	10	10 U	10 U	6/8	10	20	10.00	11.67
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	0/8	---	---	1.65	---
COPPER	2.2 U	2.2 U	10.1	2.2 U	2.2 U	2.2 U	2.2	2.2 U	2/8	2.2	10.1	2.36	6.15
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	0/8	---	---	0.55	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.2	11.1 U	11.1 U	1/8	11.2	11.2	5.63	11.20
SELENIUM	5.6 U	5.6 U	1.1 UJ	5.6 U	5.6 U	5.6 U	5.6 U	5.6 U	0/8	---	---	2.52	---
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.6 J	1.3 J	1.1 U	1.1 U	2/8	1.3	1.6	0.78	1.45
ZINC	17.2	15.6	11.4	14.3 J	15.3	15.3	15.6	15.4	8/8	11.4	17.2	15.01	15.01
Dissolved Metals (ug/L)													
ARSENIC	1.3	1.3	1.8	2.4	1 U	1 U	1 U	1 U	4/8	1.3	2.4	1.10	1.70
BARIUM	13	13.1	13.6	15.2	9.8 J	10.4 J	7.9	8.1	8/8	7.9	15.2	11.39	11.39
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0/8	---	---	0.55	---
CHROMIUM	5.6 U	5.6 U	5.6 U	5.6 U	11.4	7.8	15.9	19.6	4/8	7.8	19.6	8.23	13.68
COBALT	3.3 U	3.3 U	3.3 U	3.3 U	3 U	3 U	3 U	3 U	0/8	---	---	1.58	---
COPPER	2.2 U	2.2 U	10.6	2.2 U	2.2	2.3	2 U	2 U	3/8	2.2	10.6	2.55	5.03
LEAD	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0/8	---	---	0.55	---
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	12.3	11.4	10 U	10 U	2/8	11.4	12.3	6.99	11.85
SELENIUM	5.6 U	5.6 U	1.1 UJ	5.6 U	5.7	14.7	15.3	18.4	4/8	5.7	18.4	7.88	13.53
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1	1 U	1 U	1 U	1/8	1.1	1.1	0.60	1.10
ZINC	12.9	12.9	32.2	12.1	14.2	14.3	13.3	14.3	8/8	12.1	32.2	15.75	15.75
Miscellaneous Parameters (mg/L)													
AMMONIA, AS NITROGEN	0.01 U	0.01 U	0.01 U	0.01 U	0.03 J	0.03 J	0.01 U	0.02 J	3/8	0.02	0.03	0.01	0.03
DISSOLVED PHOSPHORUS AS P	0.1 U	0.1 U	0.1 U	0.17	0.15	0.1 U	0.1 U	0.1 U	2/8	0.15	0.17	0.08	0.16
NITRATE/NITRITE, AS N	0.3	0.32	0.4 J	0.54	0.48 J	0.44	0.51	0.62	8/8	0.3	0.62	0.45	0.45
TOTAL KJELDAHL NITROGEN	0.3 U	0.4	0.6 U	0.3 U	0.3 U	0.3 U	0.4 U	0.3 UJ	1/8	0.4	0.4	0.21	0.40
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U	0.13 J	0.18	0.1 U	0.1	0.1 U	0.26	4/8	0.1	0.26	0.11	0.17

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result

TABLE 3 - 4

ROUNDS 1 - 5
CHEMICALS THAT EXCEED RISK-BASED TARGET LEVELS
NSWC CRANE, INDIANA

location	GW-001	GW-001	GW-001	GW-001	GW-001						
round	01	02	03	04	05						
nsample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05						
sample	030-GW-001-01	030-GW-001-02	030-GW-001-03	030-GW-001-04	030-GW-001-05						
sample_dat	10/13/99	01/12/00	04/18/00	07/26/00	10/18/00						
qc_type	NM	NM	NM	NM	NM						
sacode	DUP	NORMAL	NORMAL	NORMAL	NORMAL						
matrix	GW	GW	GW	GW	GW						
validated	TRUE	TRUE	TRUE	TRUE	TRUE						
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT						
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION	Risked Based Target Level (ug/L)
Total Metals (ug/L)											
ARSENIC	4.3	3.1	3.8 J	1.1 U	1.4	4/5	1.4	4.3	2.63	3.15	2
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---	5
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---	100
THALLIUM	1.1 U	1.1 U	1.1 U	2.8 J	1.1 U	1/5	2.8	2.8	1.01	2.80	2
Dissolved Metals (ug/L)											
ARSENIC	3.1	3.2	6.8	1 U	1.6	4/5	3.1	6.8	3.04	3.68	2
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---	5
NICKEL	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.4	1 U	1/5	1.4	1.4	0.71	1.40	2

Black-shaded cells are positive detections that exceed the Risk-based target levels.

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3 - 4

ROUNDS 1 - 5
CHEMICALS THAT EXCEED RISK-BASED TARGET LEVELS
NSWC CRANE, INDIANA

location	GW-002	GW-002	GW-002	GW-002	GW-002						
round	01	02	03	04	05						
nsample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05						
sample	030-GW-002-01	030-GW-002-02	030-GW-002-03	030-GW-002-04	030-GW-002-05						
sample_dat	10/12/99	01/12/00	04/18/00	07/26/00	10/17/00						
qc_type	NM	NM	NM	NM	NM						
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL						
matrix	GW	GW	GW	GW	GW						
validated	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION	Risked Based Target Level (ug/L)
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT						
dups											
Total Metals (ug/L)											
ARSENIC	**3.4**	1.7	**3.1 J**	1.1 U	1.1 U	3/5	1.7	3.4	1.86	2.73	2
CADMIUM	1.1 U	1.1 U	1.1 U	2.1	1.1 U	1/5	2.1	2.1	0.86	2.10	5
NICKEL	11.1 U	11.1 U	11.1 U	11.3	11.1 U	1/5	11.3	11.3	6.70	11.30	100
THALLIUM	1.1 U	1.1 U	1.1 U	**2.7 J**	1.1 U	1/5	2.7	2.7	0.98	2.70	2
Dissolved Metals (ug/L)											
ARSENIC	**2.9**	**2.2**	**5.3**	1 U	1.1	4/5	1.1	5.3	2.40	2.88	2
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---	5
NICKEL	11.1 U	11.1 U	11.1 U	11.3	10 U	1/5	11.3	11.3	6.59	11.30	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.5	1 U	1/5	1.5	1.5	0.73	1.50	2

Black-shaded cells are positive detections that exceed the Risk-based target levels.

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3 - 4

ROUNDS 1 - 5
CHEMICALS THAT EXCEED RISK-BASED TARGET LEVELS
NSWC CRANE, INDIANA

location	GW-003	GW-003	GW-003	GW-003	GW-003	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION	Risked Based Target Level (ug/L)
round	01	02	03	04	05						
nsample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05						
sample	030-GW-003-01	030-GW-003-02	030-GW-003-03	030-GW-003-04	030-GW-003-05						
sample_dat	10/13/99	01/13/00	04/18/00	07/25/00	10/17/00						
qc_type	NM	NM	NM	NM	NM						
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL						
matrix	GW	GW	GW	GW	GW						
validated	TRUE	TRUE	TRUE	TRUE	TRUE						
background	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT	UPGRADIENT						
dups											
Total Metals (ug/L)											
ARSENIC	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---	2
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---	5
NICKEL	11.1 U	11.1 U	11.1 U	11.6	11.1 U	1/5	11.6	11.6	6.76	11.60	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---	2
Dissolved Metals (ug/L)											
ARSENIC	1.1 U	1.1 U	1.7	1 U	1 U	1/5	1.7	1.7	0.76	1.70	2
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---	5
NICKEL	11.1 U	11.1 U	12.0	10.8	10 U	2/5	10.8	12	7.78	11.40	100
THALLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---	2

Black-shaded cells are positive detections that exceed the Risk-based target levels.

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result

TABLE 3 - 4

ROUNDS 1 - 5
CHEMICALS THAT EXCEED RISK-BASED TARGET LEVELS
NSWC CRANE, INDIANA

location	GW-004	GW-004	GW-004	GW-004	GW-004	GW-004						
round	01	02	03	03	04	05						
nsample	030-GW-004-01	030-GW-004-02	030-GW-004-03	030-GW-004-03-D	030-GW-004-04	030-GW-004-05						
sample	030-GW-004-01	030-GW-004-02	030-GW-004-03	DUP-GW-001-03	030-GW-004-04	030-GW-004-05						Risked Based Target Level (ug/L)
sample_dat	10/13/99	01/11/00	04/18/00	04/18/00	07/27/00	10/17/00						
qc_type	NM	NM	NM	NM	NM	NM						
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL						
matrix	GW	GW	GW	GW	GW	GW						
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION	
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT						
dups				030-GW-004-03								
Total Metals (ug/L)												
ARSENIC	2.8	2.6	3.4 J	4.0 J	1.4	1.8	6/6	1.4	4	2.67	2.67	2
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	3.6	1.1 U	1/6	3.6	3.6	1.06	3.60	5
NICKEL	21.3	23	31.7	23.0	35.2	31.4	6/6	21.3	35.2	27.60	27.60	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.4 J	1.1 U	1/6	1.4	1.4	0.69	1.40	2
Dissolved Metals (ug/L)												
ARSENIC	3.1	2.8	3.9	4.9	1.8	2.7	6/6	1.8	4.9	3.20	3.20	2
CADMIUM	1.2	1.1 U	1.1 U	1.1 U	1.8 U	1 U	1/6	1.2	1.2	0.71	1.20	5
NICKEL	24.3	22.3	20.1	21.8	35.8	27.9	6/6	20.1	35.8	25.37	25.37	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---	2

Black-shaded cells are positive detections that exceed the Risk-based target levels.

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3 - 4

ROUNDS 1 - 5
CHEMICALS THAT EXCEED RISK-BASED TARGET LEVELS
NSWC CRANE, INDIANA

location	GW-005	GW-005	GW-005	GW-005	GW-005						
round	01	02	03	04	05						
nsample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05						
sample	030-GW-005-01	030-GW-005-02	030-GW-005-03	030-GW-005-04	030-GW-005-05						
sample_dat	10/14/99	01/11/00	04/19/00	07/27/00	10/18/00						
qc_type	NM	NM	NM	NM	NM						
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL						
matrix	GW	GW	GW	GW	GW						
validated	TRUE	TRUE	TRUE	TRUE	TRUE						
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT						
dups						FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION	Risked Based Target Level (ug/L)
Total Metals (ug/L)											
ARSENIC	2.2	1.3	3.0 J	1.1 U	1.1 U	3/5	1.3	3	1.52	2.17	2
CADMIUM	1.1 U	1.1 U	1.1 U	1.9	1.1 U	1/5	1.9	1.9	0.82	1.90	5
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	0/5	---	---	5.55	---	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0/5	---	---	0.55	---	2
Dissolved Metals (ug/L)											
ARSENIC	1.7	1.6	3.6	1 U	1 U	3/5	1.6	3.6	1.58	2.30	2
CADMIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---	5
NICKEL	11.1 U	11.1 U	11.1 U	10 U	10 U	0/5	---	---	5.33	---	100
THALLIUM	1.1 U	1.1 U	1.1 U	1 U	1 U	0/5	---	---	0.53	---	2

Black-shaded cells are positive detections that exceed the Risk-based target levels.

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3 - 4

ROUNDS 1 - 5
CHEMICALS THAT EXCEED RISK-BASED TARGET LEVELS
NSWC CRANE, INDIANA

location	GW-006	GW-006	GW-006	GW-006	GW-006	GW-006						
round	01	02	02	03	04	05						
nsample	030-GW-006-01	030-GW-006-02	030-GW-006-02-D	030-GW-006-03	030-GW-006-04	030-GW-006-05						
sample	030-GW-006-01	030-GW-006-02	DUP-GW-001-02	030-GW-006-03	030-GW-006-04	030-GW-006-05						
sample_dat	10/14/99	01/13/00	01/13/00	04/19/00	07/26/00	10/18/00						
qc_type	NM	NM	NM	NM	NM	NM						
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL						
matrix	GW	GW	GW	GW	GW	GW						
validated	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE						
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT						
dups			030-GW-006-02									
Total Metals (ug/L)												
ARSENIC	2.2	1.3	1.3	2.3 J	1.1 U	1.1 U	4/6	1.3	2.3	1.37	1.78	2
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	5.3	1.1 U	1/6	5.3	5.3	1.34	5.30	5
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	108	11.1 U	1/6	108	108	22.63	108.00	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.6 J	1.1 U	1/6	1.6	1.6	0.73	1.60	2
Dissolved Metals (ug/L)												
ARSENIC	1.6	1.4	1.3	3.8	1 U	1 U	4/6	1.3	3.8	1.52	2.03	2
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	0/6	---	---	0.53	---	5
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	10 U	10 U	0/6	---	---	5.37	---	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.3	1 U	1/6	1.3	1.3	0.67	1.30	2

Black-shaded cells are positive detections that exceed the Risk-based target levels.

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3 - 4

ROUNDS 1 - 5
CHEMICALS THAT EXCEED RISK-BASED TARGET LEVELS
NSWC CRANE, INDIANA

location	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007	GW-007						
round	01	01	02	03	04	04	05	05						
nsample	030-GW-007-01	030-GW-007-01-D	030-GW-007-02	030-GW-007-03	030-GW-007-04	030-GW-007-04-D	030-GW-007-05	030-GW-007-05-D						
sample	030-GW-007-01	030-GW-007-01	030-GW-007-02	030-GW-007-03	030-GW-007-04	DUP-GW-001-04	030-GW-007-05	DUP-GW-001-05						
sample_dat	10/12/99	10/12/99	01/12/00	04/19/00	07/26/00	07/26/00	10/17/00	10/17/00						
qc_type	NM	NM	NM	NM	NM	NM	NM	NM						
sacode	DUP	DUP	NORMAL	NORMAL	DUP	DUP	DUP	DUP						
matrix	GW	GW	GW	GW	GW	GW	GW	GW						
validated	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE						
background	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT	DOWNGRADIENT						
dups		030-GW-007-01				030-GW-007-04		030-GW-007-05	FREQUENCY OF DETECTION	MINIMUM POSITIVE DETECTION	MAXIMUM POSITIVE DETECTION	AVERAGE OF ALL RESULTS	AVERAGE POSITIVE DETECTION	Risked Based Target Level (ug/L)
Total Metals (ug/L)														
ARSENIC	1.1	1.6	1.8	1.7 J	1.1 U	1.1 U	1.1 U	1.1 U	4/8	1.1	1.8	1.05	1.55	2
CADMIUM	1.1 U	1 U	1.1 U	1.1 U	1.3	1.7	1.1 U	1.1 U	2/8	1.3	1.7	0.79	1.50	5
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	11.1 U	11.2	11.1 U	11.1 U	1/8	11.2	11.2	5.63	11.20	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.6 J	1.3 J	1.1 U	1.1 U	2/8	1.3	1.6	0.78	1.45	2
Dissolved Metals (ug/L)														
ARSENIC	1.3	1.3	1.8	2.4	1 U	1 U	1 U	1 U	4/8	1.3	2.4	1.10	1.70	2
CADMIUM	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	1 U	1 U	0/8	---	---	0.55	---	5
NICKEL	11.1 U	11.1 U	11.1 U	11.1 U	12.3	11.4	10 U	10 U	2/8	11.4	12.3	6.99	11.85	100
THALLIUM	1.1 U	1.1 U	1.1 U	1.1 U	1.1	1 U	1 U	1 U	1/8	1.1	1.1	0.60	1.10	2

Black-shaded cells are positive detections that exceed the Risk-based target levels.

J = Detected results considered to be an estimate based on technical noncompliances.
U = Nondetected result reported - should not be considered present
UJ = Nondetected result considered to be an estimate.
UR = Rejected nondetected result .

TABLE 3-5

1ST and 2ND ROUND FIELD, RINSATE, AND TRIP BLANK RESULTS
NSWC CRANE, CRANE, INDIANA

nsample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample_dat	10/13/99	10/11/99	10/12/99	10/13/99	1/17/00	1/18/00
qc_type	FB	RB	TB	TB	TB	TB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW	GW
validated	Y	Y	Y	Y	Y	Y
background	QC	QC	QC	QC	QC	QC
dups						
Volatile Organics (ug/L)						
1,1,1,2-TETRACHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,1,1-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,1-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,1-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,2,3-TRICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE	10 UR	10 UR	10 UR	10 UR	5 UR	5 UR
2-HEXANONE	10 UR	10 UR	10 UR	10 UR	5 UR	5 UR
4-METHYL-2-PENTANONE	10 UR	10 UR	10 UR	10 UR	5 UR	5 UR
ACETONE	10 UR	10 UR	10 UR	10 UR	5 UR	5 UR
ACROLEIN	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
ACRYLONITRILE	3 UR	3 UR	3 UR	3 UR	5 UR	5 UR
ALLYL CHLORIDE	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
BROMODICHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
BROMOFORM	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
CARBON TETRACHLORIDE	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U

U = Nondetected result reported - should not be considered present.
UJ = Nondetected result considered to be estimated based on technical noncompliances.
UR = Nondetected, but was rejected based on calibration relative response factor noncompliances.

TABLE 3-5

1ST and 2ND ROUND FIELD, RINSATE, AND TRIP BLANK RESULTS
NSWC CRANE, CRANE, INDIANA

nsample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample_dat	10/13/99	10/11/99	10/12/99	10/13/99	1/17/00	1/18/00
qc_type	FB	RB	TB	TB	TB	TB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW	GW
validated	Y	Y	Y	Y	Y	Y
background	QC	QC	QC	QC	QC	QC
dups						
CHLOROBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
CHLOROETHANE	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	1 U	1 U
CHLOROFORM	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROMETHANE	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	1 U	1 U
CHLOROPRENE	3 U	3 U	3 U	3 U	10 UJ	10 UJ
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	0.3 U	0.3 U	1 U	1 U
DIBROMOCHLOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
DIBROMOMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
DICHLORODIFLUOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 UJ	1 U
ETHYL METHACRYLATE	1 U	1 U	1 U	1 U	10 U	10 U
ETHYLBENZENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
IODOMETHANE	NA	NA	NA	NA	10 U	10 U
METHACRYLONITRILE	1 UR	1 UR	1 UR	1 UR	1 UR	1 UR
METHYL METHACRYLATE	2 UR	2 UR	2 UR	2 UR	10 UR	10 UR
METHYLENE CHLORIDE	3 U	3 U	3 U	3 U	1.0 U	1 U
STYRENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
TETRACHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
TOLUENE	0.6	0.5 U	0.5 U	0.5 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,4-DICHLORO-2-BUTENE	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
TRICHLOROETHENE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
TRICHLOROFLUOROMETHANE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U
VINYL ACETATE	0.5 U	0.5 U	0.5 U	0.5 U	10 UJ	10 UJ
VINYL CHLORIDE	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U

U = Nondetected result reported - should not be considered present.
UJ = Nondetected result considered to be estimated based on technical noncompliances.
UR = Nondetected, but was rejected based on calibration relative response factor noncompliances.

TABLE 3-5

1ST and 2ND ROUND FIELD, RINSATE, AND TRIP BLANK RESULTS
NSWC CRANE, CRANE, INDIANA

nsample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample_dat	10/13/99	10/11/99	10/12/99	10/13/99	1/17/00	1/18/00
qc_type	FB	RB	TB	TB	TB	TB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW	GW
validated	Y	Y	Y	Y	Y	Y
background	QC	QC	QC	QC	QC	QC
dups						
XYLENES, TOTAL	1 U	1 U	1 U	1 U	1 U	1 U
Energetics (ug/L)						
1,3,5-TRINITROBENZENE	0.71 U	0.66 U				
1,3-DINITROBENZENE	0.71 U	0.66 U				
2,4,6-TRINITROTOLUENE	0.71 U	0.66 U				
2,4-DINITROTOLUENE	0.71 U	0.66 U				
2,6-DINITROTOLUENE	0.71 U	0.66 U				
2-AMINO-4,6-DINITROTOLUENE	0.71 U	0.66 U				
2-NITROTOLUENE	0.71 U	0.66 U				
3-NITROTOLUENE	0.71 U	0.66 U				
4-AMINO-2,6-DINITROTOLUENE	0.71 U	0.66 U				
4-NITROTOLUENE	0.71 U	0.66 U				
HMX	0.71 U	0.66 U				
NITROBENZENE	0.71 U	0.66 U				
RDX	0.67 U	0.62 U				
TETRYL	0.71 U	0.66 U				
Total Metals (ug/L)						
ANTIMONY	1.1 U	1.1 U				
ARSENIC	1.1 U	1.1 U				
BARIUM	1.1 U	1.1 U				
BERYLLIUM	1.1 U	1.1 U				
CADMIUM	1.1 U	1.1 U				
CHROMIUM	5.6 U	5.6 U				
COBALT	3.3 U	3.3 U				
COPPER	2.2 U	2.2 U				

U = Nondetected result reported - should not be considered present.
UJ = Nondetected result considered to be estimated based on technical noncompliances.
UR = Nondetected, but was rejected based on calibration relative response factor noncompliances.

TABLE 3-5

1ST and 2ND ROUND FIELD, RINSATE, AND TRIP BLANK RESULTS
NSWC CRANE, CRANE, INDIANA

nsample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample_dat	10/13/99	10/11/99	10/12/99	10/13/99	1/17/00	1/18/00
qc_type	FB	RB	TB	TB	TB	TB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW	GW
validated	Y	Y	Y	Y	Y	Y
background	QC	QC	QC	QC	QC	QC
dups						
LEAD	1.1 U	1.1 U				
MERCURY	0.2 U	0.2 U				
NICKEL	11.1 U	11.1 U				
SELENIUM	5.6 U	5.6 U				
SILVER	3.3 U	3.3 U				
THALLIUM	1.1 U	1.1 U				
TIN	11.1 U	11.1 U				
VANADIUM	2.2 U	2.2 U				
ZINC	11.1 U	11.1 U				
Dissolved 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				
LEAD		1.1 U				
MERCURY		0.2 U				
NICKEL		11.1 U				
SELENIUM		5.6 U				
SILVER		3.3 U				
THALLIUM		1.1 U				
TIN		11.1 U				

U = Nondetected result reported - should not be considered present.
UJ = Nondetected result considered to be estimated based on technical noncompliances.
UR = Nondetected, but was rejected based on calibration relative response factor noncompliances.

TABLE 3-5

1ST and 2ND ROUND FIELD, RINSATE, AND TRIP BLANK RESULTS
NSWC CRANE, CRANE, INDIANA

nsample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample	030-FB-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01	030-TB-001-02	030-TB-002-02
sample_dat	10/13/99	10/11/99	10/12/99	10/13/99	1/17/00	1/18/00
qc_type	FB	RB	TB	TB	TB	TB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
matrix	GW	GW	GW	GW	GW	GW
validated	Y	Y	Y	Y	Y	Y
background	QC	QC	QC	QC	QC	QC
dups						
VANADIUM		2.2 U				
ZINC		11.1 U				
Miscellaneous Parameters (mg/L)						
AMMONIA, AS NITROGEN	0.01	0.02				
CYANIDE	0.01 U	0.01 U				
NITRATE/NITRITE, AS N	0.01 U	0.01 U				
TOTAL KJELDAHL NITROGEN	5	0.3 U				
TOTAL PHOSPHORUS AS P	0.1 U	0.1 U				
TOTAL FILTERED PHOSPHORUS AS P		0.1 U				

NA = Not Analyzed

U = Nondetected result reported - should not be considered present.
UJ = Nondetected result considered to be estimated based on technical noncompliances.
UR = Nondetected, but was rejected based on calibration relative response factor noncompliances.

4.0 GROUND WATER MONITORING STATISTICAL ANALYSES

4.1 INTRODUCTION

Ground water monitoring was performed at SWMU 30 (Landfarm) at the Naval Surface Warfare Center in Crane, Indiana. This ground water monitoring employed two background wells (30-1 and 30-3) and five Point Of Compliance (POC) wells (30-2, 30-4, 30-5, 30-6, and 30-7) sampled over five quarters between October 1999 and October 2000. A statistical analysis was performed on the results from this ground water monitoring effort to determine if the unit has had a statistically significant impact on ground water at the site. The statistical methods used were in accordance with the Final Work Plan (TtNUS, 1999a) and the regulations specified in 40 CFR Section 264.97 General Ground Water Monitoring Requirements.

The specific tests conducted for data collected at the NSWC Crane site will be identified and described in the next section.

The statistical methods used to evaluate the ground water data are employed in order to:

1. Develop summary statistics (e.g., range, mean, standard deviation) which describe environmental contaminant concentrations at SWMU 30.

2. Allow comparisons of upgradient concentrations to those detected in site environmental samples (i.e., samples collected in areas potentially contaminated by waste disposal) at SWMU 30.

The statistical methods to evaluate these data presented are based on:

1. Cochran, William G. and Snedecor, George W. Statistical Methods. The Iowa State University Press. 1980.

2. Gilbert, Richard O., Statistical Methods for Environmental Pollution Monitoring. Van Nostrand Reinhold Company. New York, New York. 1987.

3. U.S. EPA 530/SW-89-026. "Guidance Document on the Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities." 1989.

4. U.S. EPA 530/R-93-003 "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance." July, 1992.

5. U.S. Code of Federal Regulations (CFR); TITLE 40--PROTECTION OF ENVIRONMENT PART 264--STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES; Subpart F--Releases From Solid Waste Management Units; Section. 264.97 General Ground Water Monitoring Requirements.

4.2 BASIC APPROACH OF THE COMPARISON OF POC WELLS TO THE UPGRADIENT WELLS

Downgradient data was compared to upgradient data using either parametric or non-parametric analysis. No correction for seasonal variability was required because all wells at the facility should be effected similarly and at least a full year of data was collected. The statistical methods described in the following paragraphs were used to determine if parameter concentrations detected in downgradient wells were significantly different, statistically speaking, from those detected in samples from the upgradient wells.

The Analysis of Variance or the ANOVA technique was the basic approach used to compare data from upgradient and downgradient monitoring well locations. The ANOVA technique was used to test whether there was statistically significant evidence of contamination associated with SWMU 30. There are two types of ANOVA: parametric and non-parametric. Parametric ANOVA methods make two important assumptions: 1) the data residuals are normally (or lognormally) distributed, and 2) the group variances are homogeneous.

If the analysis of the data demonstrated that these assumptions, critical to the parametric ANOVA, were violated, non-parametric ANOVA techniques were conducted using the ranks of the observations rather than the observations themselves (EPA, 1989). The Wilcoxon Rank-Sum test (also known as the Mann-Whitney U Test) was employed as the non-parametric ANOVA for comparing the downgradient wells to the upgradient wells.

4.2.1 Limit of Detection

In the chemical analysis of environmental samples, some analytes may be present at concentrations that are below the sample quantitation limit (SQL) of the analytical procedure. The results are generally reported as not detected (rather than zero), and the appropriate limit of detection is given. The amount of data that are below the detection limit plays an important role in selecting the method of addressing the

limit of detection problem. The nondetects found at SWMU 30 were replaced with the SQL divided by two prior to statistical analysis. Clearly, if all the observations are nondetect results, no statistical analysis is warranted. For this reason, statistical analyses were not performed on VOC and energetic fractions collected in Rounds 1 and 2 (all results were nondetects).

4.3 PARAMETRIC AND NONPARAMETRIC ANALYSIS OF VARIANCE (ANOVA)

4.3.1 Parametric Anova:

ANOVA is widely used in the examination of environmental data sets. A one-way classification ANOVA is used to determine whether or not the difference between average concentrations of a parameter detected in downgradient wells and upgradient concentrations is statistically significant. The data residuals are the values resulting from subtracting each measured value from the arithmetic mean. The assumptions that the residuals are drawn from an underlying normal (or lognormal) distribution and that the upgradient and downgradient data sets have homogeneous variances must be examined prior to employing a parametric ANOVA.

4.3.1.1 The Shapiro-Wilk "W-test" of Normality (n =50)

As stated above, the data residuals must be analyzed to determine whether they were drawn from an underlying normal, lognormal or undetermined distribution. A number of statistical evaluations may be used to determine which, if either, of the distributions are exhibited by a given data set. As recommended by the EPA, the Shapiro-Wilk "W-test" (for sample sets ≤50) and the Shapiro-Francia "W-test" (for sample sets >50) will be used to determine whether the data are normally or lognormally distributed (EPA, 1992). The sample set for SWMU 30 was 40, therefore the Shapiro-Wilk test was used.

The Shapiro-Wilk W-test (Gilbert, 1987) is an effective method for determining whether a data set has been drawn from an underlying normal (or lognormal) distribution. In addition, by conducting the Shapiro and Wilk W-test on the log-transformed data, the test may be used to determine whether the data have been drawn from an underlying lognormal distribution. The null hypothesis (H_0) that is tested is:

H_O *The population has a normal (or lognormal when the data is log-transformed) distribution.*

The alternate hypothesis (H_A) is:

H_A *The population does not have a normal (or lognormal when the data is log-transformed) distribution.*

If H_O is rejected, then H_A is accepted. If H_0 is not rejected, the data set is consistent with the H_0 distribution.

A "W" statistic (W_{calc}) is computed for a data set (or a log transformed data set) and compared to a test statistic (W_{test}). If $W_{calc} = W_{test}$, then the null hypothesis is not rejected (i.e. the data are assumed to be normally distributed [or lognormally distributed if log transformed data are tested]). If $W_{calc} < W_{test}$, then the null hypothesis is rejected and the alternative hypothesis is accepted (i.e., the data are not assumed to be normally distributed [or not lognormally distributed if log transformed data are tested]).

The following equations present a step-by-step procedure for conducting the W-test on the residuals (see sample calculations in Appendix M).

- Step 1. Group all of the data from each of the individual wells.

- Step 2. Calculate the mean for each of the *k* wells $\overline{x_j}$ by the equation

$$\overline{x_j} = \frac{\sum_{i=1}^{n} x_i}{n}$$

where *n* is the total number of samples in each well.

- Step 3. Calculate the residuals for each ith well and j^{th} sampling round by

$$R_{ij} = x_{ij} - \overline{x_i}$$

The equation for conducting the W-Test is:

$$W_{calc} = \left[\frac{b}{S_R\sqrt{n-1}}\right]^2$$

where

$$b = \sum_{i=1}^{k} a_i \left(R_{[n-i+1]} - R_i\right) = \sum_{i=1}^{k} b_i$$

and n is the total number of sampling rounds.

- Step 4. Order the n residuals from smallest to largest to obtain the sample order statistics:

$$x_1 \leq x_2 \leq x_3 \leq \cdots \leq x_n$$

- Step 5. Compute the standard deviation by:

$$S_R = \sqrt{\sum_{i=1}^{n} \frac{\left(R_{ij} - \overline{R}\right)^2}{(n-1)}}$$

- Step 6. Determine the coefficients $a_1, a_2, a_3, .., a_k$ for the sample size n using Sample Calculation Table 1 where:

$$k = \frac{n}{2} \quad if\ n\ is\ even\text{; and}$$

$$k = \frac{n-1}{2} \quad if\ n\ is\ odd$$

- Step 7. Determine b by the formula:

$$b = \sum_{i=1}^{k} a_i \left(R_{[n-i+1]} - R_i\right) = \sum_{i=1}^{k} b_i$$

- Step 8. Calculate W_{calc} using b from above:

$$W_{calc} = \left[\frac{b}{S_R\sqrt{n-1}}\right]^2$$

- Step 9. Determine W_{test} at the 5% significance level from Sample Calculation Table 2.

- Step 10. Reject H_O at the 5% significance level if W_{calc} is less than W_{test}.

To test the null hypothesis that the data set has been drawn from an underlying lognormal distribution, transform the data to $y_{1j}, y_{2j}, y_{3j},...,y_{ij}$ where $y_{ij} = ln\ R_{ij}$. Repeat steps 1 through 10 as described in the preceding paragraphs. A summary of all Shapiro-Wilk results can be found in Table 4-1.

4.3.1.2 Shapiro-Francia Test of Normality (n>50)

The Shapiro-Wilk test of Normality can be used for sample sizes up to 50. When the sample size is larger than 50 a slight modification of the procedure called the Shapiro-Francia Test (Shapiro and Francia, 1972) can be used instead. This procedure was not employed for these analyses because sample size for SWMU 30 was 40.

4.3.1.3 Homogeneity of Variance

An important assumption in analysis of variance (ANOVA) is that the variances in the different groups are equal (homogeneous). A powerful and commonly used test of this assumption, when underlying distributions are the same is Levene's Test. This test has practically replaced the older and less robust Bartlett's Test and Chi-square Test.

Levene's Test (homogeneity of variances): For each dependent variable, an analysis of variance is performed on the absolute deviations of values from the respective group means. If the Levene Test is statistically significant, then the hypothesis of homogeneous variances should be rejected.

To conduct Levene's Test first compute the absolute value of the residuals:

$$Zij = \left| Xij - \overline{Xi} \right|$$

where Xij represents the jth value from the ith well. Then run a standard one-way analysis of variation (ANOVA) on the variable Zij (see section 4.3.1.4). If the F Test is significant, reject the hypothesis of equal group variances. Otherwise, proceed with the analysis of Xij's as planned. A summary of all Levene's Test results can be found in Table 4-2.

4.3.1.4 Parametric ANOVA

Assume that a site has k wells and that n_i data points (analyte concentrations) are available for the ith well. The following equations present a step-by-step procedure for conducting the parametric ANOVA.

- Step 1. Compute the sums and means of each well (*i*) as follows:

$$X_i = \sum_{j=1}^{n_i} X_{ij}, \Sigma \, of \; all \; n_i \; observations \; at \; well \; i$$

$$\overline{X} = \frac{X}{N}, \; grand \; mean \; of \; all \; observations$$

$$\overline{X_i} = \frac{X_i}{n_i}, average \; of \; all \; n_i \; observations \; at \; well \; i$$

$$X = \sum_{i=1}^{k} \sum_{j=1}^{n_i} X_{ij}, grand \; total \; of \; all \; n_i \; observations$$

$$N = \sum_{i=1}^{k} n_i, total \; number \; of \; observations$$

- Step 2. Compute the sum of squares of differences between the individual well means and the grand mean:

$$SS_{sample} = \sum_{i=1}^{k} n_i \left(\overline{X_i} - \overline{X}\right)^2 = \sum_{i=1}^{k} \left[\frac{X_i^{\,2}}{n_i}\right] - \frac{X^2}{N}$$

This sum of squares has v1 = (*k-1*) degrees of freedom associated with it and is a measure of the variability between wells.

- Step 3. Compute the corrected total sum of squares

$$SS_{total} = \sum_{i=1}^{k} \sum_{j=1}^{n_i} \left(X_{ij} - \overline{X}\right)^2 = \sum_{i=1}^{k} \sum_{j=1}^{n_i} \left[\left(X_{ij}\right)^2\right] - \frac{X^2}{N}$$

This sum of squares has v2 = (*N-1*) degrees of freedom associated with it and is a measure of variability in the whole data set.

- Step 4. Compute the sum of squares of differences of observations within wells from the well means. This value is the sum of squares due to error and is obtained by simple subtraction:

$$SS_{Error} = SS_{Total} - SS_{Sample}$$

The sum of squares due to error has associated with it (*N-k*) degrees of freedom and is a measure of the variability within wells.

- Step 5. Set up the ANOVA table. The sums of squares and their degrees of freedom were obtained from Steps 2 through 4. The mean square quantities are simply obtained by dividing each sum of squares by its corresponding degrees of freedom.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sums of Squares	Degrees of Mean	Freedom Squares	F
Between Locations	SS_{sample}	MS_{Sample}=k-1	SS_{Sample}/(k-1)	F=$MS_{samples}/MS_{Error}$
Error (within Locations)	SS_{Error}	MS_{Error}=N-k	SS_{Error}/(N-k)	
Total	SS_{Total}	N-1		

- Step 6. To test the hypothesis of equal means for all *k* wells, compute $F = MS_{Sample}/MS_{Error}$ (last column in above table). Compare this statistic to the tabulated F statistic with (*k-1*) and (*N-k*) degrees of freedom (Sample Calculation Table 3) at the 5% significance level. If the calculated *F* value exceeds the tabulated value, reject the hypothesis of equal well means. Otherwise, conclude that there is no significant difference between the concentrations of the *k* wells and thus no evidence of contamination. A summary of all parametric ANOVA results can be found in Table 4-3.

4.3.2 Nonparametric Anova

The parametric ANOVA technique is the preferred approach for comparing environmental measurements from downgradient monitoring wells to upgradient well data. However, parametric ANOVA methods make two key assumptions: (1) the inter-well residuals are normally (or lognormally) distributed and (2) the group variances are approximately equal. If either of these assumptions are violated, non-parametric tests may be used to determine if constituent concentrations present in the downgradient wells significantly exceed those present in upgradient wells.

Non-parametric tests are conducted using the ranks of the analytical results rather than the analytical results themselves. Therefore, the data sets are inspected for extremely high values that may have been underestimated as a result of the ranking process.

4.3.2.1 The Wilcoxon Rank-Sum Test

The Wilcoxon Rank-Sum Test (EPA, 1992) (also known as the Mann-Whitney U Test) should be employed as the non-parametric ANOVA technique. The following equations present a step-by-step procedure for conducting the Wilcoxon Rank-Sum Test.

The null hypothesis (H_0) that is tested is:

H_O *The downgradient concentration IS NOT statistically higher than the upgradient concentration.*

The alternate hypothesis (H_A) is:

H_A *The downgradient concentration IS statistically higher than the upgradient concentration.*

If H_O is rejected, then H_A is accepted. If H_0 is not rejected, the data set is consistent with the H_0 distribution.

- Step 1. Combine the upgradient and downgradient data and rank the ordered values from 1 to *N*. Assume there are *n* downgradient samples and m upgradient samples so that $N = m + n$.

- Step 2. Compute the Wilcoxon statistic *W*:

$$W = \sum_{i=1}^{n} E_i - \frac{1}{2}n(n+1)$$

where E_i are the ranks of the downgradient samples (Large values of the statistic *W* give evidence of contamination in downgradient wells).

- Step 3. Compute an approximate *Z-score*. To find the critical value of *W*, a normal approximation to its distribution is used. The expected value and standard deviation of *W* under the null hypothesis (i.e., no contamination exists) are given by the formulas:

$$E(W) = \frac{1}{2}mn; \qquad SD(W) = \sqrt{\frac{1}{12}mn(N+1)}$$

An approximate *Z-score* for the Wilcoxon Rank-Sum Test may be calculated by the following equations:

$$Z = \frac{W - E(W) - \frac{1}{2}}{SD(W)}$$

The factor of 1/2 in the numerator serves as a continuity correction because the discrete distribution of the statistic W is being approximated by the continuous normal distribution. If n or $m > 10$ and ties are present, an adjustment to the approximate *Z-score* must be made:

$$Z_{RS} = \frac{W - E(W) - \frac{1}{2}}{SD'(W)}$$

where: $$SD'(W) = \left(\frac{mn}{12} \left[N + 1 - \frac{\sum_{j=1}^{g} t_j (t_j^2 - 1)}{N(N-1)} \right] \right)^{\frac{1}{2}}$$

g = the number of tied groups and t_j is the number of tied data in the jth group.

- Step 4. For a one-tailed 95% confidence level test for H_0 versus the, reject H_0 and accept H_A if $Z_{ADJUSTED} > Z_{0.95} = +1.645$, which corresponds to a p-value of 0.10. A summary of all Wilcoxon Rank-Sum results can be found in Table 4-4.

4.4 DISCUSSION

There were nineteen parameters detected at least once in the five downgradient wells during the five rounds:

Total Metals (8)

Arsenic	Nickel
Barium	Selenium
Copper	Thallium
Hexavalent Chromium	Zinc

Dissolved Metals (9)

Arsenic	Nickel
Barium	Selenium
Chromium	Thallium
Copper	Zinc
Lead	

Miscellaneous Parameters (2)

Ammonia, as Nitrogen

Total Kjeldahl Nitrogen

Parametric ANOVA techniques were performed on Total Barium and Dissolved Arsenic, Dissolved Barium, and Dissolved Selenium because the Shapiro-Wilk W test demonstrated that the underlying distributions of the upgradient and downgradient residuals were the same (lognormal) and Levene's test established that the upgradient and downgradient data had homogeneous variances. Non-parametric ANOVA (Wilcoxon Rank-Sum) techniques were performed on the other fifteen chemicals. A summary of all the ANOVA results can be found in Table 4-5. A positive Z score along with a p score less than 0.10 is indicative of statistically significant concentration elevations in the downgradient wells.

None of the nineteen parameters had downgradient concentrations that were higher than their respective upgradient concentrations at a statistical significance of 5% (i.e., 95% confidence). This supports the hypothesis that there is no significant impact on ground water at this site due to activities at the unit.

TABLE 4-1

SHAPIRO-WILK W TEST OF NORMALITY
SUMMARY OF RESULTS
NSWC CRANE, INDIANA

	DOWNGRADIENT				UPGRADIENT			
PARAMETER	SHAPIRO-WILK W NORMAL	SHAPIRO-WILK W LOGNORMAL	SHAPIRO-WILK W TEST	UNDERLYING DISTRIBUTION	SHAPIRO-WILK W NORMAL	SHAPIRO-WILK W LOGNORMAL	SHAPIRO-WILK W TEST	UNDERLYING DISTRIBUTION
Total Metals								
ARSENIC	0.9435	0.9447	0.927	LOGNORMAL	0.9027	0.8972	0.842	NORMAL
BARIUM	0.9518	0.9653	0.927	LOGNORMAL	0.9283	0.9430	0.842	LOGNORMAL
COPPER	0.7153	0.7378	0.927	NOT DEFINED	0.5945	0.6046	0.842	NOT DEFINED
HEXAVALENT CHROMIUM - FIELD	0.8683	0.9008	0.927	NOT DEFINED	0.7620	0.7555	0.842	NOT DEFINED
NICKEL	0.5173	0.7548	0.927	NOT DEFINED	0.6206	0.6408	0.842	NOT DEFINED
SELENIUM	0.8679	0.8577	0.927	NOT DEFINED	0.8922	0.9030	0.842	LOGNORMAL
THALLIUM	0.7074	0.7140	0.927	NOT DEFINED	0.6206	0.6283	0.842	NOT DEFINED
ZINC	0.6126	0.7047	0.927	NOT DEFINED	0.8458	0.8277	0.842	NORMAL
Dissolved Metals								
ARSENIC	0.9334	0.9430	0.927	LOGNORMAL	0.8488	0.8688	0.842	LOGNORMAL
BARIUM	0.9564	0.9578	0.927	LOGNORMAL	0.9379	0.9435	0.842	LOGNORMAL
CHROMIUM	0.8381	0.8767	0.927	NOT DEFINED	0.7356	0.7504	0.842	NOT DEFINED
COPPER	0.7050	0.7244	0.927	NOT DEFINED	0.7413	0.7636	0.842	NOT DEFINED
LEAD	0.7594	0.7592	0.927	NOT DEFINED	0.7838	0.7900	0.842	NOT DEFINED
NICKEL	0.8435	0.8880	0.927	NOT DEFINED	0.8972	0.9083	0.842	LOGNORMAL
SELENIUM	0.8909	0.9420	0.927	LOGNORMAL	0.7807	0.8542	0.842	LOGNORMAL
THALLIUM	0.6616	0.6652	0.927	NOT DEFINED	0.6308	0.6343	0.842	NOT DEFINED
ZINC	0.6495	0.7305	0.927	NOT DEFINED	0.8943	0.7464	0.842	NORMAL
Miscellaneous Parameters								
AMMONIA, AS NITROGEN	0.8097	0.8099	0.927	NOT DEFINED	0.6637	0.6639	0.842	NOT DEFINED
TOTAL KJENDAHL NITROGEN	0.7803	0.7789	0.927	NOT DEFINED	0.8359	0.8354	0.842	NOT DEFINED

TABLE 4-2

LEVENE'S TEST OF HOMOGENEITY OF VARIANCE
SUMMARY OF RESULTS
NSWC CRANE, INDIANA

Levene Test of Homogeneity of Variances

	SS Effect	df Effect	MS Effect	SS Error	df Error	MS Error	F	p
TOTAL METALS								
BARIUM	0.000039	1	0.000039	0.531	38	0.0140	0.003	0.9582
DISSOLVED METALS								
ARSENIC	0.00030	1	0.00030	0.080	38	0.0021	0.144	0.7068
BARIUM	0.0026	1	0.0026	0.230	38	0.0061	0.428	0.5168
SELENIUM	0.00031	1	0.00031	1.966	38	0.052	0.0060	0.9387

TABLE 4-3

PARAMETRIC ANALYSIS OF VARIANCE (ANOVA)
SUMMARY OF RESULTS
NSWC CRANE, INDIANA

Analysis of Variance

	SS Effect	df Effect	MS Effect	SS Error	df Error	MS Error	F	p
TOTAL METALS								
BARIUM	0.0016	1	0.0016	12.427	38	0.327	0.0048	0.9454
DISSOLVED METALS								
ARSENIC	0.203	1	0.203	27.241	38	0.717	0.283	0.5980
BARIUM	0.0019	1	0.0019	10.814	38	0.285	0.0068	0.9347
SELENIUM	0.308	1	0.308	42.843	38	1.127	0.273	0.6042

TABLE 4-4

NON-PARAMETRIC ANOVA
WILCOXON RANK-SUM
SUMMARY OF RESULTS
NSWC CRANE, INDIANA

PARAMETER	Rank Sum Downgradient	Rank Sum Upgradient	U	Z	p-level	Z adjusted	adjusted p-level	Valid N Downgradient	Valid N Upgradient
Total Metals									
ARSENIC	635.0	185.0	130	0.6247	0.5322	0.6460	0.5183	30	10
COPPER	636.0	184.0	129	0.6559	0.5119	0.7289	0.4661	30	10
HEXAVALENT CHROMIUM - FIELD	654.5	165.5	110.5	1.2338	0.2173	1.4081	0.1591	30	10
NICKEL	647.5	172.5	117.5	1.0151	0.3101	1.3350	0.1819	30	10
SELENIUM	655.5	164.5	109.5	1.2650	0.2059	1.3679	0.1714	30	10
THALLIUM	622.5	197.5	142.5	0.2343	0.8148	0.3771	0.7061	30	10
ZINC	662.5	157.5	102.5	1.4837	0.1379	1.6249	0.1042	30	10
Dissolved Metals									
CHROMIUM	617.5	202.5	147.5	0.0781	0.9378	0.0882	0.9297	30	10
COPPER	577.5	242.5	112.5	-1.1713	0.2415	-1.2019	0.2294	30	10
LEAD	582.0	238.0	117	-1.0307	0.3027	-1.1842	0.2363	30	10
NICKEL	640.5	179.5	124.5	0.7965	0.4258	0.8502	0.3952	30	10
THALLIUM	614.5	205.5	149.5	-0.0156	0.9875	-0.0179	0.9857	30	10
ZINC	593.0	227.0	128	-0.6872	0.4920	-0.7036	0.4817	30	10
Miscellaneous Parameters									
AMMONIA, AS NITROGEN	648.0	172.0	117	1.0307	0.3027	1.2105	0.2261	30	10
TOTAL KJENDAHL NITROGEN	585.0	235.0	120	-0.9370	0.3487	-0.9945	0.3200	30	10

TABLE 4- 5

SUMMARY OF STATISTICAL COMPARISON
DOWNGRADIENT TO UPGRADIENT
GW RESULTS - ROUNDS 1 THROUGH 5
NSWC CRANE, INDIANA

PARAMETER	DOWNGRADIENT UNDERLYING DISTRIBUTION	UPGRADIENT UNDERLYING DISTRIBUTION	LEVENE TEST RESULT	TYPE OF ANOVA	ANOVA RESULTS (p)	DOWNGRADIENT ABOVE UPGRADIENT?
Total Metals						
ARSENIC	LOGNORMAL	NORMAL	---	NON-PARAMETRIC	0.5183	No
BARIUM	LOGNORMAL	LOGNORMAL	PASS	PARAMETRIC	0.9454	No
COPPER	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.4661	No
HEXAVALENT CHROMIUM - FIELD	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.1591	No
NICKEL	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.1819	No
SELENIUM	NOT DEFINED	LOGNORMAL	---	NON-PARAMETRIC	0.1714	No
THALLIUM	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.7061	No
ZINC	NOT DEFINED	NORMAL	---	NON-PARAMETRIC	0.1042	No
Dissolved Metals						
ARSENIC	LOGNORMAL	LOGNORMAL	PASS	PARAMETRIC	0.5980	No
BARIUM	LOGNORMAL	LOGNORMAL	PASS	PARAMETRIC	0.9347	No
CHROMIUM	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.9297	No
COPPER	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.2294	No
LEAD	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.2363	No
NICKEL	NOT DEFINED	LOGNORMAL	---	NON-PARAMETRIC	0.3952	No
SELENIUM	LOGNORMAL	LOGNORMAL	PASS	PARAMETRIC	0.6042	No
THALLIUM	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.9857	No
ZINC	NOT DEFINED	NORMAL	---	NON-PARAMETRIC	0.4817	No
Miscellaneous Parameters						
AMMONIA, AS NITROGEN	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.2261	No
TOTAL KJENDAHL NITROGEN	NOT DEFINED	NOT DEFINED	---	NON-PARAMETRIC	0.3200	No

5.0 RISK SCREENING

5.1 APPLICABLE RISK BASED SCREENING CRITERIA

The EPA - approved Work Plan for this RFI presented risk-based target levels (RBTLs) that would be specifically applicable to the potential contamination at this Landfarm. These RBTLs are presented in Table 1-2 and were derived from several health-based criteria, including Federal Maximum Contaminant Levels (MCLs), Secondary MCLs (SMCLs), Region IX Preliminary Remediation Goals (PRGs), and other RBTLs that were previously developed using Region V EPA technical support.

Maximum contaminant levels (MCLs) are health-based standards established within the framework of Federal National Primary Drinking Water Regulations. MCLs are legally enforceable standards that apply to public water systems. Primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in public water systems. Secondary maximum contaminant levels (SMCLs) are secondary Federal standards that apply to public water systems for the purpose of ensuring that potable water has compatible aesthetic properties such as taste, odor, and color, but are not based on any indication of toxicity.

The Region IX PRGs for ground water are screening levels which correspond to fixed levels of risk, either a cancer risk of one in a million (1×10^{-6}) or a noncancer hazard quotient of 1.0. The Region IX PRGs consider the most sensitive receptor, a residential child, for chemicals associated with noncancer toxicity. For carcinogenic chemicals, exposure is based upon the assumption of cumulative exposure for a residential child and a residential adult. The Region IX PRGs account for exposure to chemicals in ground water via ingestion of tap water and inhalation of volatiles from tap water utilized during household activities (e.g., showering, laundering, dishwashing).

There is no current ground water usage for this site and therefore, human receptors considered for this evaluation included the following:

- Park employees (future land use)
- Park visitors (future land use)
- On-SWMU residents (future land use)

Because there are no known seeps of ground water into surface water bodies from this SWMU, ecological receptors do not exist.

5.2 RISK BASED SCREENING COMPARISON

Table 3-4 contains a tabulation of analytical results with those substances exceeding corresponding RBTLs highlighted. In downgradient (point-of-compliance) well 30-2, unfiltered samples revealed concentrations of arsenic and thallium that were greater than their respective RBTLs, but the concentrations reported exceedances were within a factor of two of the corresponding RBTL criteria. Arsenic exceeded its RBTL in dissolved (filtered) samples from the same well. Arsenic also exceeded its RBTLs by a narrow margin (within a factor of 2 of the RBTL) in unfiltered samples from downgradient wells 30-4, 30-5, and 30-6, and in some filtered samples from these same wells. Arsenic is also below current (50 µg/l) and proposed (10 µg/l) MCL. In well 30-6, cadmium and nickel exceeded RBTLs in one of 6 samples and these exceedances were marginal compared to the RBTL. However, there is uncertainty regarding the concentrations of nickel and cadmium in this well because non-detect results (i.e., sample quantitation limits) reported for 5 out of 6 samples are equal to one-fifth to one-tenth of the concentrations found in the one positive well sample. This generates suspicion that the sporadic positive results may be spurious and not representative of the conditions in well 30-6.

5.3 ELIMINATION OF CHEMICALS ATTRIBUTABLE TO UPGRADIENT CONDITIONS

As concluded in Section 4, the statistical ANOVA analysis of upgradient and downgradient well data demonstrated that none of the detected parameters in downgradient wells were present at concentrations statistically greater than upgradient levels. In addition, Table 3-4 indicates that exceedances of RBTLs in upgradient well 30-1 were similar to the exceedances in downgradient wells. Based on the rigorous statistical analysis described in Section 4.0 and a comparison of exceedances in upgradient versus downgradient wells, none of the substances found in downgradient wells were statistically significant.

5.4 RISK SCREENING CONCLUSIONS

The lack of any statistically significant downgradient concentrations among the four parameters that were present at levels slightly greater than RBTLs (arsenic, cadmium, nickel, and thallium) indicates that site activities have not impacted ground water quality and that there are no significant ground water quality problems in the vicinity of the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The objective of this project was to determine the presence or absence of contaminants in the ground water at SWMU 30, as well as the nature and extent of any such ground water contamination. Seven ground water monitoring wells were sampled five times over a 12-month duration. Conclusions drawn from this investigation include, but are not limited to the following:

- Upgradient and downgradient well results show limited exceedances of RBTLs for four parameters (arsenic, cadmium, nickel, and thallium).
- Volatiles and energetics sampled in Rounds 1 and 2 were non-detect for all parameters analyzed.
- Water elevations are stable and ground water flow direction is consistently toward the southeast.
- Statistical ANOVA analysis of upgradient and downgradient well data demonstrate that none of the detected parameters in downgradient wells were present at concentrations statistically greater than upgradient levels.
- Exceedances of RBTLs were noted in upgradient well 30-1 and were similar to the exceedances noted in downgradient wells.
- Risk screening indicates that there are no significant ground water quality problems in the vicinity of the site.

6.2 RECOMMENDATON

Based upon the results of this investigation, site activities have not impacted ground water quality and there are no significant ground water quality problems in the vicinity of the site. Therefore, no remedial actions are warranted for ground water at the site and a recommendation for no further action regarding ground water is requested by the Navy. This no further action request is for all media based on review of the wastes that were disposed, the length of time they were disposed, and site data.

REFERENCES

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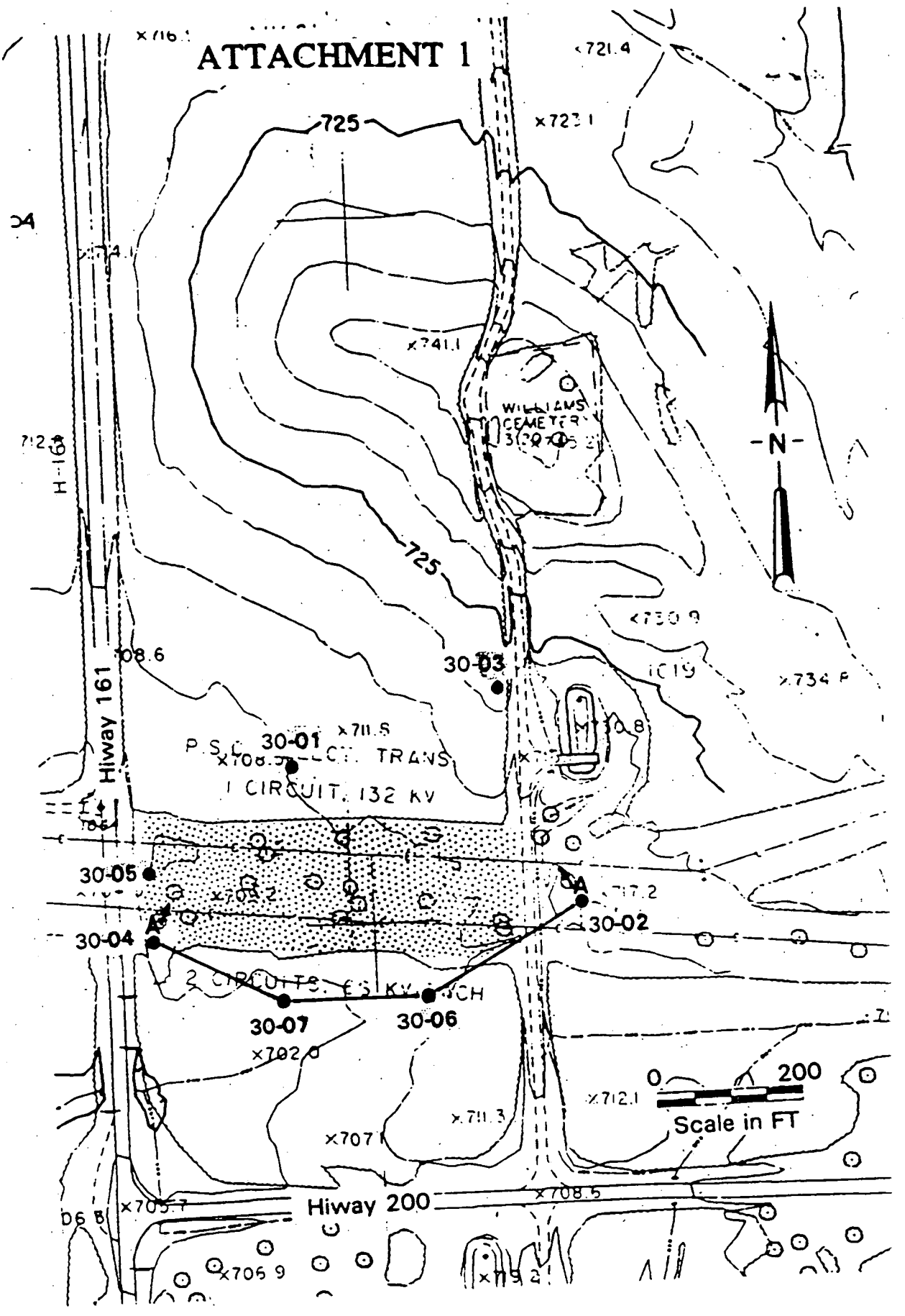
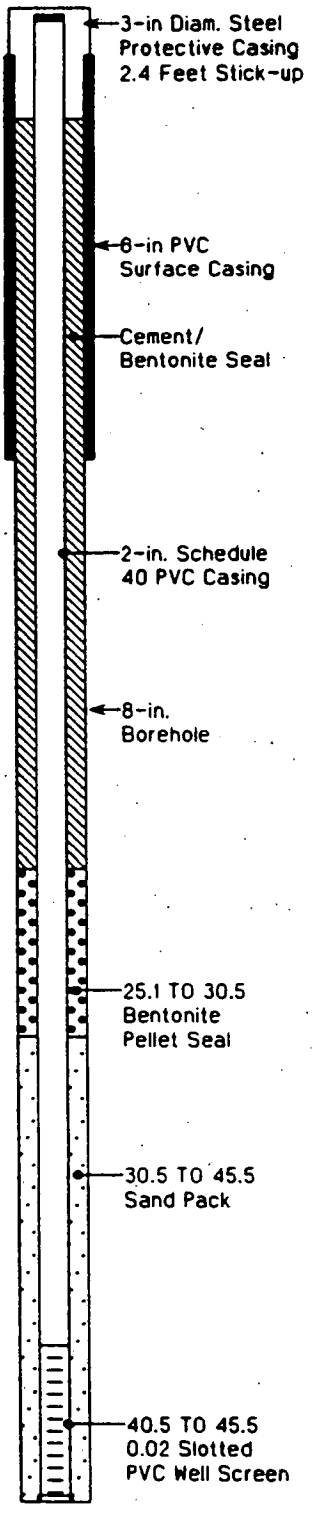
APPENDIX A

BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

ATTACHMENT 1





DEPTH (feet)	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)	SAMPLES	SOIL CLASS	GRAPHIC LOG	MATERIALS DESCRIPTION
	1 2				ML-CL		OVERBURDEN (0-12 FEET) SILTY CLAY TO CLAYEY SILT LIGHT COLORED, PROBABLY LOESS, MIXED WITH RESIDUAL SOIL
							INTERBEDDED SHALE AND SANDSTONE (12-18.6) SHALE IS GRAY TO BLACK INTERBEDDED WITH QUARTZ SANDSTONE AND BLACK GRAY RHYTHMITE SHALE
							SANDSTONE (18.6-45.5) RED-BROWN MICACEOUS QUARTZITE, MEDIUM GRAINED, FRIABLE ▼ Water Level 9-23-93 SANDSTONE IS MORE COMPETENT BUT LOST SOME WATER BETWEEN 31.6 AND 37.6 FEET SAND WITH WATER ENTERING (FRACTURE ZONE) WATER ENTERS BELOW 37.6 (ARTESIAN)
							TD=45.5 DATE DRILLED 9-17-93
							Revised by Brown and Root Environmental June, 1996

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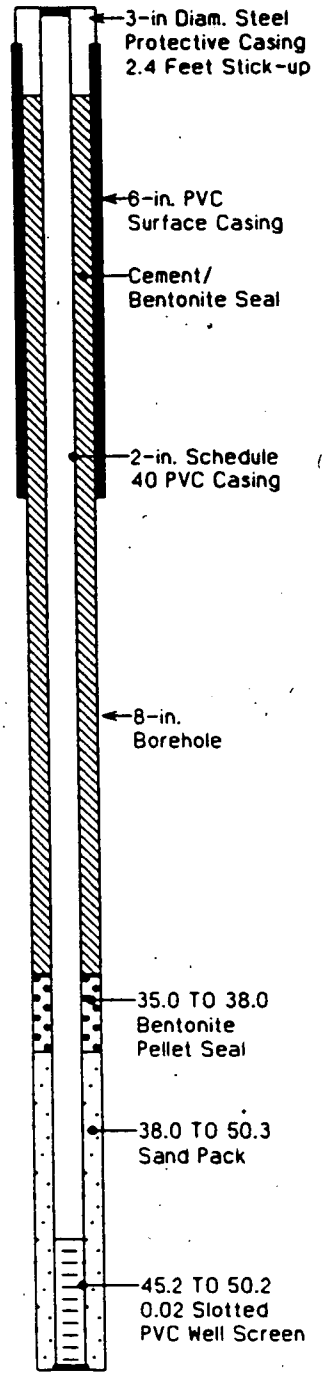
LOG OF BORING 30-01

CLIENT NAME Naval Surface Warfare Center LOCATION Crane, Indiana
SURFACE ELEVATION 710.51 (7.00) Feet DRILLING METHOD 7 in. Auger-Q wireline
TOTAL DEPTH OF HOLE 45.5 Feet GEOLOGIST Will Murphy

WELL CONSTRUCTION



DEPTH (feet)	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)	SAMPLES	SOIL CLASS	GRAPHIC LOG	MATERIALS DESCRIPTION
	1 2				ML-CL		OVERBURDEN (0-16.6 FEET) MOTTLED BROWN TO OCHRE SILTY CLAY TO SILT. RESIDUAL SOIL. OCHRE COLOR & ROCK FRAG. BELOW 10 FEET SOIL IS LESS COHESIVE AND DRY. REFUSAL AT 16.6
5							
10							
15							
20							SANDSTONE. LIMONITE STAINED. (16.6-22.8) MANY BEDDING PLANE BREAKS. FRIABLE. (RQD=0) LOST LOT OF WATER AT 21.5-22.8 PROBABLY THROUGH THE JOINTS. CORE PIECES LESS THAN 0.1 FEET SANDSTONE. (22.8-26.6) FRAGMENTED AND JOINTED. BECOMES HARDER AT 33.8-35.0
25							
30							
35							▽ Water Level 9-23-93
40							
45							SANDSTONE IS CLEAN, WHITE FROM 43.8-46.4 BECOMES BROWN AT 47-47.5. LIGHT BROWN. FRIABLE. SOFT TO BOTTOM OF HOLE (TD=48) WATER ENTERING THIS ZONE (AQUIFER)
50							TD=50.3 DATE DRILLED 9-27-93
55							Revised by Brown and Root Environmental June, 1996
60							

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LOG OF BORING 30-02

CLIENT NAME Naval Surface Warfare Center LOCATION Crane, Indiana
SURFACE ELEVATION 716.17 (TOC) Feet DRILLING METHOD 7 in. Auger (HQ Wir
TOTAL DEPTH OF HOLE 50.3 Feet GEOLOGIST W.L. Murphy

WELL CONSTRUCTION	DEPTH (feet)	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)	SAMPLES	SOIL CLASS	GRAPHIC LOG	MATERIALS DESCRIPTION
3-in Diam. Steel Protective Casing 2.4 Feet Stick-up; 6-in. PVC Surface Casing; Cement/ Bentonite Seal	0–12.2					ML-CL		OVERBURDEN 0-12.2 FEET. 0-1.5 SILT (ML) TO (CL) PROBABLY LOESS WITH LIMONITE STAINS. REWORKED AND RESIDUAL SOIL. REFUSAL AT 12.
2-in. Schedule 40 PVC Casing; 8in. Borehole	12.2–26.5							INTERBEDDED BLACK SHALE, SILTSTONE WITH SOFT CLAY AND IRONSTONE. CLAY IS PROBABLY WEATHERED SHALE. GRADATIONAL CHANGE TO FLASER BEDDED SANDSTONE AT 26.5
	26.5–35.2							FLASER BEDDED SANDSTONE W BLACK SHALE INTERBEDS TO 35.2. #35.2 SANDSTONE, TAN FINE TO MEDIUM GRAINED QUARTZ SANDSTONE W/ SOME BLACK MINERAL GRAINS. BECOMES COARSER BELOW 39.4
33.5 TO 37.5 Bentonite Pellet Seal; 37.5 TO 51.6 Sand Pack; 41.4 TO 51.4 0.02 Slotted PVC Well Screen	35.2–51.6							∇ water level 9-28-93. SANDSTONE AS ABOVE STREAKED W BROWN COLOR FROM 51.6 TO 51.8 AND IRON STAINED SOFT AND FRIABLE AQUIFER
	51.6							TD=51.6 DATE DRILLED 9-24-93

Revised by Brown and Root Environmental June, 1996

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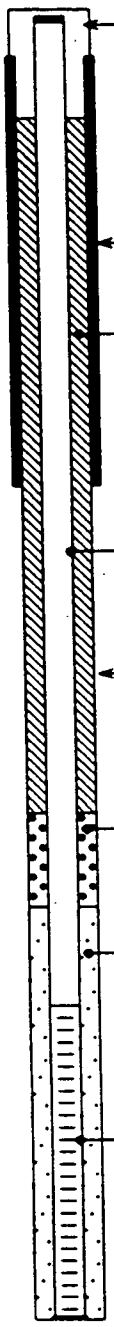
LOG OF BORING 30-03

CLIENT NAME Naval Surface Warfare Center LOCATION Crane, Indiana
SURFACE ELEVATION 719.[illegible] (TOC) Feet DRILLING METHOD [illegible] Auger/HSA Rotary
TOTAL DEPTH OF HOLE 51.6 Feet GEOLOGIST W.C. Murphy

WELL CONSTRUCTION



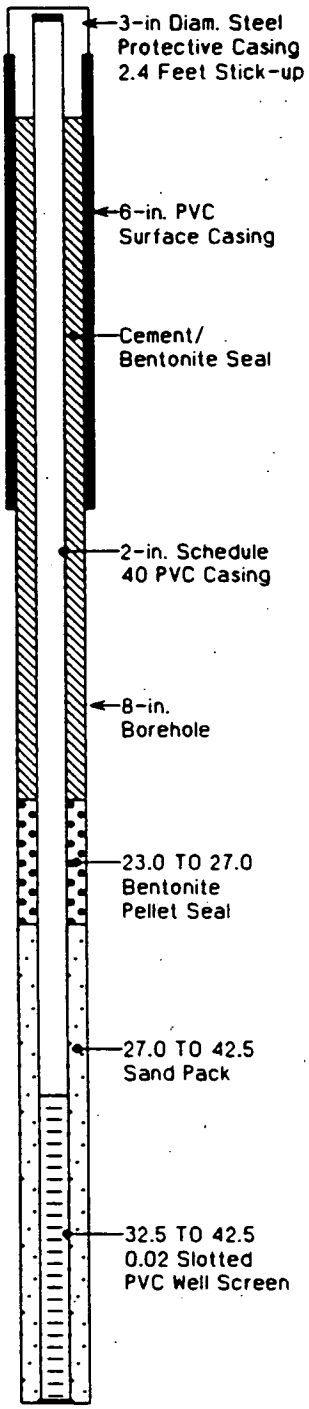
DEPTH (feet)	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)	SAMPLES	SOIL CLASS	GRAPHIC LOG	MATERIALS DESCRIPTION
5, 10					ML-CL		OVERBURDEN (0-12.9 FEET) SILT TO SILTY CLAY, PROBABLY LOESS. TAN AND MOTTLED, GRADES WITH DEPTH TO REWORKED LOESS AND ROCK FRAGMENTS. REFUSAL AT 12.9 FEET.
15, 20, 25							INTERBEDDEDBLACK SHALE, OCHRE CLAY TO TAN SHALE AND SANDSTONE. TRACE OF LIGNITE RQD=0. CORE IS VERY BROKEN
30, 35, 40							SANDSTONE (27.0-39.8) FINE TO MEDIUM GRAINED, MORE FRIABLE BELOW 31.9 FEET. ▽ Water Level 9-28-93 SANDSTONE IS AS ABOVE WITH A COLOR CHANGE TO WHITE AT 38.9, MEDIUM GRAINED, FRIABLE WITH GOOD RQD (95%). (AQUIFER
							TD=39.8 DATE DRILLED 9-27-93
45, 50							Revised by Brown and Root Environmental June, 1996

U.S. Army Corps of Eng.
Waterways Experiment Station

LOG OF BORING 30-04

CLIENT NAME Naval Surface warfare Center LOCATION Crane, Indiana
SURFACE ELEVATION 705.95 (TOC) Feet DRILLING METHOD 7 in. Auger HQ W
TOTAL DEPTH OF HOLE 39.8 Feet GEOLOGIST W.L. Murphy

WELL CONSTRUCTION



DEPTH (feet)	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)	SAMPLES	SOIL CLASS	GRAPHIC LOG	MATERIALS DESCRIPTION
0–13.6	1				ML-CL		OVERBURDEN (0-13.6 FEET) LOESS, (ML/CL), PROBABLY REWORKED WITH RESIDUAL SOIL. PEBBLE SIZE ROCK FRAGMENTS BELOW 5 FEET. REFUSAL AT 13.6
13.6–22.7							INTERBEDDED TAN OCHRE SOFT CLAY AND HARD SANDSTONE (13.6-22.7) RQD VERY LOW WITH SOME VERY BROKEN ZONES
22.7–24							22.7 TO 24 INTERBEDDED SHALE AND SANDSTONE
24–42.5							∇ Water Level 9-29-93 SANDSTONE, FINE TO COARSE GRAINED, MORE FRIABLE WITH DEPTH, VERY FEW BLACK SHALE LAMINAE. RQD=50%
42.5							SANDSTONE IS MASSIVE (BEDDING ONLY APPARENT AT BREAKS) RQD=100%, EXCEPT BOTTOM 4 FEET (AQUIFER)
42.5							TD=42.5 DATE DRILLED 9-29-93
							Revised by Brown and Root Environmental June, 1996

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LOG OF BORING 30-05

CLIENT NAME Naval Surface Warfare Center LOCATION Crane, Indiana
SURFACE ELEVATION 707.88 (TOC) Feet DRILLING METHOD 7 in Auger/HQ Wireline
TOTAL DEPTH OF HOLE 42.5 Feet GEOLOGIST W.L. Murphy

WELL CONSTRUCTION	DEPTH (feet)	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)	SAMPLES	SOIL CLASS	GRAPHIC LOG	MATERIALS DESCRIPTION
3-in Diam. Steel Protective Casing 2.4 Feet Stick-up; 6-in. PVC Surface Casing; Cement/ Bentonite Seal	5, 10	1				ML-CL		OVERBURDEN (0-13.4 FEET) REWORKED LOESS (ML-CL) WITH ROCK FRAGMENTS. LITTLE PLASTICITY. TAN TO OCHRE SILT WITH MINOR CLAY. LOESS REWORKED WITH RESIDUAL SOIL. TOP OF ROCK AT 13.4
2-in. Schedule 40 PVC Casing; 8-in. Borehole	15, 20							INTERBEDDED BLACK SHALE, SOFT OCHRE TO GRAY CLAY, HARD RED-BROWN IRONSTONE AND BROWN SANDSTONE (13.4 TO 23.3), RQD=0. 23.3 TO 25.7 INTERBEDDED BLACK SHALE, COAL AND SANDSTONE, WAVY OR FLASER BEDDED.
24.0 TO 27.4 Bentonite Pellet Seal; 27.4 TO 42.8 Sand Pack; 32.8 TO 42.8 0.02 Slotted PVC Well Screen	25, 30, 35, 40							SANDSTONE (25.7-42.8) ∇ Water Level 9-30-93 SANDSTONE, BROWN FRIABLE, MEDIUM GRAINED WI ABRUPT CHANGE TO WHITE TO LIGHT GRAY AT 29.5 BECOMES FINE-GRAINED AND CALCAREOUS, RQD=0 SHARP CONTACT AT 34.5 TO BROWN SANDSTONE: F NON-CALCAREOUS WITH OCCASIONAL STRINGERS.
	45, 50							TD=42.8 DATE DRILLED 9-29-93
								Revised by Brown and Root Environmental June 1996

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Waterways Experiment Station

LOG OF BORING 30-06

CLIENT NAME Naval Surface Warfare Center LOCATION Crane, Indiana
SURFACE ELEVATION 707.82 (TOC) Feet DRILLING METHOD 7 in. Auger/HQ Wir
TOTAL DEPTH OF HOLE 42.8 Feet GEOLOGIST W.L. Murphy

WELL CONSTRUCTION	DEPTH (feet)	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)	SAMPLES	SOIL CLASS	GRAPHIC LOG	MATERIALS DESCRIPTION
3-in Diam. Steel Protective Casing 2.4 Feet Stick-up; 6-in. PVC Surface Casing; Cement/ Bentonite Seal	0–10					ML-CH		OVERBURDEN (0-10.1 FEET) (ML-CH)
2-in. Schedule 40 PVC Casing; 8-in. Borehole	10–23.5							INTERBEDDED CLAY, SHALE AND SANDSTONE FROM 10.1 TO 23.5
22.0 TO 28.1 Bentonite Pellet Seal; 28.1 TO 42.8 Sand Pack; 32.8 TO 42.8 0.02 Slotted PVC Well Screen	23.5–42.8							SANDSTONE (23.5-42.8) ∓ Water Level 10-9-93
	42.8							TD=42.8 DATE DRILLED 10-9-93
	45							Revised by Brown and Root Environmental June, 1996
	50							

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LOG OF BORING 30-07

CLIENT NAME Naval Surface Warfare Center LOCATION Crane, Indiana
SURFACE ELEVATION 705.03 (700' Feet) DRILLING METHOD 7 in. Auger HQ Wire
TOTAL DEPTH OF HOLE 45.5 Feet GEOLOGIST W.L. Murphy

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. Landfarm 30-01

PROJECT: LANDFARM Wells. (Crane) | INSTALLATION: Well installation | SHEET OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
						All depths shown are from Top of Ground (TOG)
			Protective 3" steel casing and cap cemented with PVC casing	30-01		
						2A' STICKUP
			GROUND			
						0
			6" PVC Surface Casing			OVERBURDEN ML-CL
						10
			12.0			
			Grout (Water cemented/bentonite)			INTERBEDDED SHALE & SANDSTONE
			18.6			
						20
			25.1		9/24/93	
			Bentonite Pellets			9/21/93
			30.5			30
						SANDSTONE
			37.8 Sand			
						AQUIFER (Water entering this zone)
						40
			TD 45.5 T.O.G.			
						50

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. Landfarm 30-02

PROJECT | INSTALLATION | SHEET OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
				30-02		
						2.4' STICKUP
			GROUND (TOG)			
						OVERBURDEN
			6" PVC Surface Casing			CL-ML
						16.6
						SANDSTONE
					9/29/93 ▽	
			35' Bentonite 38'			
			Sand		45.2 SCRN	AQUIFER (Water entering this zone)
			TD 50.3 TOG		50.2	

DEPTH, FT TOG: 0, 10, 20, 30, 40, 50

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No.** 30-03

PROJECT | INSTALLATION | SHEET OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0 GROUND	30-03		OVERBURDEN ML-CL
			12.2			INTERBEDDED Black SHALE, SILTSTONE, SOFT CLAY, IRONSTONE
			Neat Cement & Bentonite			
			26.5			Gradational
						FLASER-BEDDED SANDSTONE w/ black SHALE
			33.5			
			35.2 Pellets			Gradational
			37.5		5/25/83 ▽	
			42.6			SANDSTONE AQUIFER
			Sand			
			T.D. 51.6 T.O.G			

0 10 20 30 40 50 60

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. Landfarm 30-04

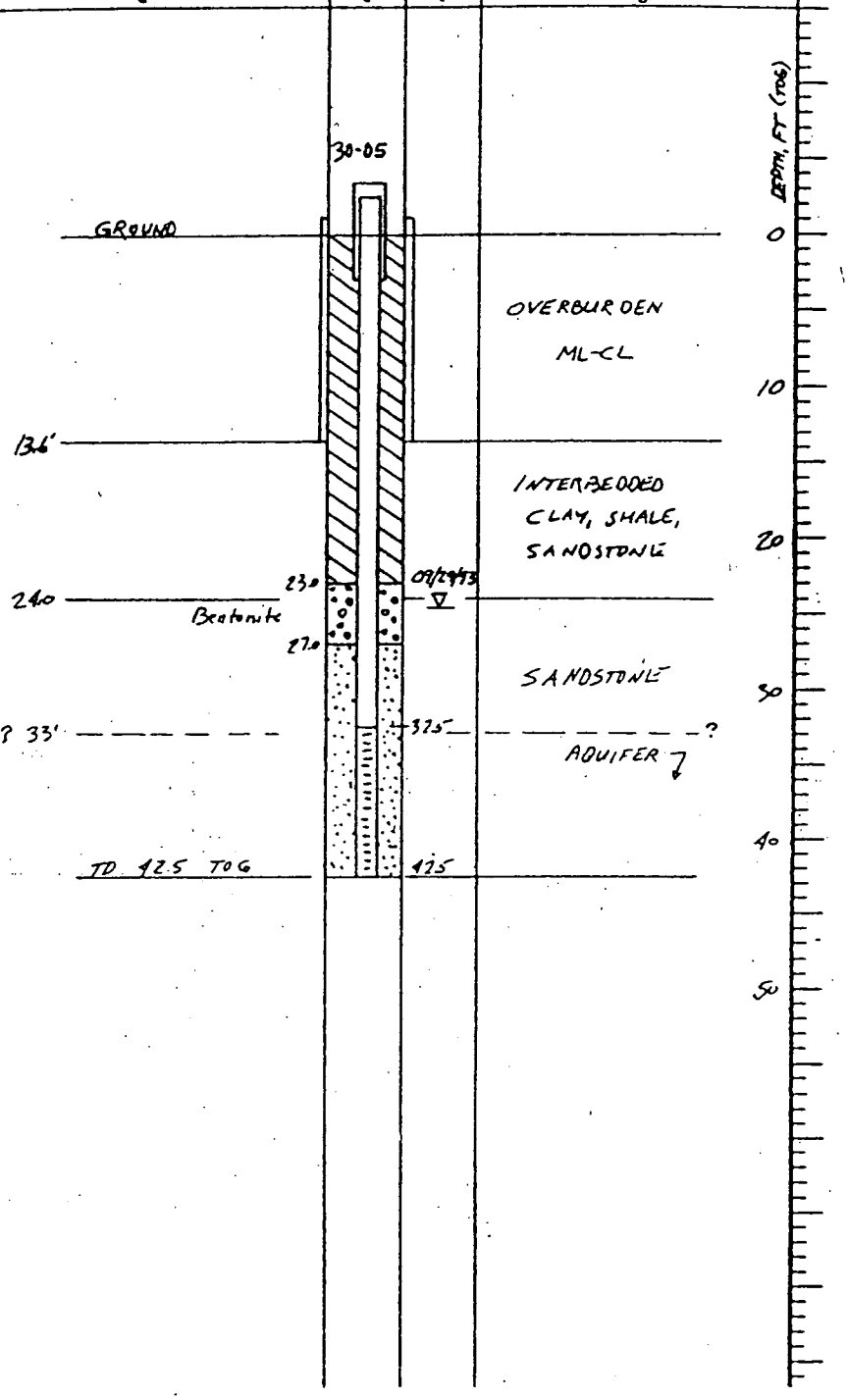
PROJECT | INSTALLATION | SHEET OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
				30-04		
	0		0 GROUND			705.04 (Elev TOW)
						OVERBURDEN
						ML-CL
	10					
			12.9'			
						INTERBEDDED
					02/28/93 ▽	SHALE &
	20					SANDSTONE
			23.5 Bentonite 26.5			
			?29' ?		29.7	? AQUIFER
	30		Sand			SANDSTONE
			TD 39.8 T.O.G.		39.7	
	40					
	50					

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No.** 30-05

PROJECT | INSTALLATION | SHEET OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			GROUND			
						OVERBURDEN ML-CL
			13.6'			
						INTERBEDDED CLAY, SHALE, SANDSTONE
			24.0	23.0	09/29/73	
			Bentonite	27.0		
						SANDSTONE
			? 33'		32.5'	? AQUIFER
			TD 42.5 TOG		42.5	



DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No.** 30-06

PROJECT | INSTALLATION | SHEET OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0 GROUND	30-06		
						OVERBURDEN ML-CL
			13.4			
						INTERBEDDED SHALE, CLAY AND SANDSTONE
			25.7 Bentonite	24.0 – 22.4	9/30/93	
			29.8			SANDSTONE, BROWN
			34.5 Sand			SANDSTONE, WHITE, CALC.
						(AQUIFER) SANDSTONE, BROWN
			TD 42.8 T.O.G.			

Depths are from T.O.G.

DEPTH, FT: 0, 10, 20, 30, 40, 50

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | **Hole No. 30 - 07**

PROJECT | INSTALLATION: Landfarm | SHEET OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			0 GROUND			0
						OVERBURDEN CH-ML
			10.1			10
						INTERBEDDED CLAY, SHALE AND SANDSTONE
						20
			22.0			
			23.5			
			Bentonite		10/9/73 ▽	
			28.1			
						SANDSTONE
						30
			Sand			
						40
			TD 42.8 TOG			

ATTACHMENT 2

BORING LOG
FIELD DATA

Project Crane Landfarm Wells Site Landfarm Date 9/17/93
Location NSWCC Job No.
Drill Rig Failing 1500 Inspector W.L. Murphy Operator E. Brown, V. Mixon Surface El ~ Boring No. Landfarm 30-01

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
1		0		0.0		0.0	0.4	Drove 3" Split	Jar #1		Silty clay to clayey silt (CL/ML).
2					2.00	1.4	2.0	spoon (jars)	Jar # 2		Light colored, ochre below 0.5'; Probably
			12.0	6" Flt	Auger to	13.8					loess, mixed w/ residual soil at depth.
		12.0		13.8	14.4	13.8	14.4	Drove SS w/ 300 lb hammer			Gray to black hard shale. Dry. Sampled
											w/ SS, discarded sample. Could drive only
				14.4	20.5	14.4	20.5 —	HQ Core barrel	Run 1 6.1	Pull 3.8	0.6' w/ SS: v. hd. At 14.4', set up
				Coring w/ water				(10')	Lost	2.3	mud pan for drill water (no mud), cored
											remainder of hole w/ 10' core barrel.
											HQ Wire/water. 12.0-18.6' is interbdd
											red-brn ironstone (quartz sandstone)
											and black-gray rhythmite shale
			18.6								(wavy-bdd).
		18.6									18.6' to 20.5 is SANDSTONE (see descrip-
											tion below)

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 1 of 3 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date 9/18/93
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No Landfarm 30 -01

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
Drove 6" PVC casing to 14.9 ft (then 0.8) Water did not come up overnight. Rockbit to 20.7', Flushed w/ water to clean out hole. Bailed hole again, water level at 18.3'. Can't tell if water coming up. Went back in w/ core barrel for 5' run											
				20.7	25.8			HQ Core barrel	RUN 2 5.1	PULL 4.85	20.7-25.8 SANDSTONE as above. Red-brown
									Core loss	0.25	micaceous, quartzitic. Mod. grained, friable,
	Bailed-out hole - Not making water. - Back in w/ core barrel.										fairly soft to drill. Rounded, well sorted, mostly
											quartz w/ mica, some black mineral (carbonaceous)
											grains especially on bedding planes. Limonite(?)
											staining is heavy, prominent along bedding. Prominent
											thin bedding, some x-bdng.
				25.8	31.8			HQ Core barrel	RUN 6.0	PULL 6.0	25.8-31.8 SANDSTONE as above. (Competent
	Bailed - Not making water								100% core		rock, few breaks.
				31.8	37.8	31.8	37.6	"	RUN 6.0	PULL 5.8	31.8 - 37.8 SANDSTONE as above. Lost
	Bailed - Not making water. Water taped at 37.6'								100% core 0.2' in hole.		a little water this run.
	on 9/18 @ 1530 - Let stand over weekend.										
	Water did not come up over weekend										

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Sheet 2 of 3 Sheets

45.5
37.6

BORING LOG
FIELD DATA

Project _____ Site _____ Date 9/20/93
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. LANDFARM 30 - 01

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
	0820 - Monday	-									
			45.5	37.8	46.1	37.6	45.5	HQ Wireline C.Bar.	RUN 5 8.3	PULL 7.90	37.8 - 45.5 SANDSTONE as above
		Hole	topped	at	45.5			lcH	no core 0.6 in	loss hole	interval of chocolate brown color at
											40.8 to 41.5' depth (TOG). Sandstone
	Bailed hole to bottom. Water came up 8' in 5 minute (making water).										is otherwise lighter in color than above, pure
	Set 2" (0.020" slot) PVC screen - bottom plug at 45.5'. Added										qtz sandstone, v. friable in bottom foot.
	med-grained sand by hand, in a slurry, up to 30.5' depth.										
	Set bentonite pellets to 25.1' depth (TOG) @ 1215, 9/20/93.										Water enters below 37.8' (artesian)
	Grouted to surface w/ 2 bags Portland Cement thickened with bentonite mud.										
	2.4' stickup of 2" PVC casing.										
	Water stood at 28.1' TOG (30.5 TOC) on 9/21/93										

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 3 of 3 Sheets

BORING LOG
FIELD DATA

Project LANDFARM MONITORING WELLS Site LANDFARM, CRANE Date 9/21/93
Location _____ Job No. _____
Drill Rig Failing 500 Inspector MURPHY Operator BROWN/MIXON Surface El ~714 Boring No. 30-02

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
1	9/21	0.0		0		0.2	0.6	3" Split spn	JAR	#1	Mottled brown to ochre silty clay (CL)
2	9/21				1.5	1.1	1.5	"	JAR	#2	to silt (ML) (LOESS). Some plasticity (moldable)
			16.6	0.0	16.6	NONE		6" Flight auger			from cuttings - Residual soil, ochre color, CL
											w/rock frags (pebble size). Plastic, cohesive.
											Below ~10', soil is less cohesive, more
											like ML, dry. Refusal at 16.6' TOG
	Pushed 6" PVC casing to 16.6' w/ 1.1' stick up. Sealed bottom of casing										
	w/ "Hole Plug" (bentonite), also top.										
	9/22	16.6		16.6	22.8			HQ Core barrel	RUN 1 6.2	PULL 9.6	16.6-22.8 SANDSTONE, limonite stained,
		Coring w/ water				16.6	18.8 -	discarded rest	Lost 1.6'		like boring 30-01. Many bedding plane breaks,
								Taped 22.8			friable, core pieces < 0.2' (RQD = 0) Lost lot
											of water at ~21.5' to 22.8, probably thru
											jts. Kept only top 2.2' of core.
				22.8	33.0				RUN 2 10.2	PULL 9.2	SANDSTONE as above. Fragmented &
						25.3	27.1 -	discarded rest	Lost	1.0'	jtnd 22.8 to 26.6, better below. Many bdng
											jnts. Kept 25.3-27.1 of core.

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 1 of 2 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date 9/23/93
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. 30-02

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
	9/22			33.0	43.0			HQ Core	RUN 3 10.0	PULL 9.5	Taped at 42.9 SANDSTONE as above
								Taped 42.9	0.1 in 0.4	hole Lost	Harder at 33.8'-35.0'
		W.L	at 30.1	TOC	@ 1345	, 9/22					
		W.L.	at 36.0	TOC	@ 0725	, 9/23					
	9/23		50.3	43.0	50.3			HQ Core	RUN 4 7.3	PULL 7.0	SANDSTONE as above. Clean, white from
			Hole	Taped at	503	TOG		Taped 50.3	Lost	0.4	43.6 - 46.4. Chocolate brown @ 47.0 - 47.5,
											Light brown, friable, soft to bottom.
		Making	water								
	Set	5' screen at		50.2	to 45.2	Sand	pack to	38'. Bentonite pellets to			35'. Grouted to surface.
			2.4'	stickup	on riser						
			W.L.	at	35.2 TOG	on	9/24				
					35.0	on	9/27				
					34.4	on	9/29				

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of ___ Sheets

BORING LOG
FIELD DATA

Project [illegible] Site [illegible] Date 9/24/93
Location [illegible] Job No. [illegible]
Drill Rig [illegible] Inspector [illegible] Operator [illegible] Surface El [illegible] Boring No. [illegible]

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
1	9/24	0.0		0	1.5	1.3	1.5	3" Split Spoon	JAR	#1	0-1.5 [illegible] (ML) to CL. Probably
											loess w/ limonite stain
			12.2	0	12.2	None		7" Flt Auger			Loess, reworked, and residual soil, as
											above. [illegible]
											in 3.0' and -02. Dry. Refusal at
			Set 6" PVC	Casing	to	12.2'	TOG,	sealed at bottom			12.2' TOG
			w/ bentonite								
	9/24	12.2		12.4	22.4	12.4	22.2	HQ Core barrel	RUN 1 10.0	PULL 9.8	12.2-22.2 Interbedded [illegible] black
		Coring w/	water					Taped 22.2'	0.2' in hole 1.0' lost		shale, ochre siltstone and soft tan clay,
											w/ occasional v. hd red-brn ironstone (ce-
			Kept all of Run 1 (Bx 1) for stratigraphy								mented sandstone). Clay is probably w/thrd
											shale. 1.0' core loss.
			26.5	22.4	32.6	25.5	26.8	HQ Core barrel	RUN 2 10.2	PULL 10.1	22.4-26.5 Interbdd shale, ss as above to
								Taped 32.6'	0.3'	Lost	26.5. Gradational change to flaser-bedded
											SANDSTONE w/ black shale interbeds. Kept
											25.5-26.3 [illegible]

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 1 of 2 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date 9/25

Location _____ Job No. _____

Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. 30-03

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER		-	CLASSIFICATION AND REMARKS
				32.6	42.6	41.4	42.3	HQ Core barrel	RUN 3 10.0	PULL 9.9	32.6-35.2 Flaser bedded sandstone with
			35.2					Taped 42.6	Lost	0.1	black shale interbeds. Below 35.2 is all
					Kept	41.4-42.3, discarded rest					SANDSTONE, friable, tan, fine-med grained,
				Bailed hole,		not making water					quartzitic, micaceous w/ some black min-
											eral grains, but 95% quartz, as in Borings
											30-01, 30-02. 0.5' red ironstone at 35.5-36.0'
											SANDSTONE is coarser, more friable below 39.4.
		35.2	51.6	42.6	51.6	42.6	51.6	HQ Core barrel	RUN 4 9.0	PULL 8.8	42.6-51.6 SANDSTONE as above. Streaked
								Taped 51.6	Lost	0.2'	w/ chocolate brown color 52.5-57.5 (severe
											iron oxide staining). Soft, friable.
		Bailed	hole,	Water	at	45.5 @	1628	9/24			
						47.1 @	1631	9/24			
						39.7 @	0737	9/25			
		Set	10' PVC	Screen	at 5	1.4 to	41.4.	Filter sand to	37.5',	bentonite pellets to 33.5.	

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of 2 Sheets

BORING LOG
FIELD DATA

Project Landfarm Monitoring Wells Site Landfarm, NSWC Date 9/27/93
Location SW Corner (down slope) Job No.
Drill Rig Failing 1500 Inspector MURPHY Operator BROWN/MIXON Surface El ~70.3 Boring No. 30-04

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
1	9/27	0.0		0.0	1.5	0.4	0.8	3" Split spoon	Clear	#1	Silt (ML) to silty clay (CL), probably
											loess. Tan, mottled.
			12.9	0.0	12.9			7" Fill Auger			0.0-12.9 Loess (ML) to silty clay (CL),
		Set	6" PVC	Casing	to 12.9'	in 1	1/2' of	bentonite at bottom,			gravel w/ depth to reworked loess and rock frags
		filled	annulus	of hole	around casing to	surface w/	bentonite				(residual soil) Refusal at 12.9'
		12.9		12.9	23.1	12.9	14.3	HQ Core barrel	RUN 1 10.2	PULL 6.6	12.9-16.8 Interbedded black shale, ochre
		Coring w/ water				and 22.7	23.1	Tapped 23.1'	Lost	3.6'	clay, tan shale, brown sandstone and hd red-brn
											irregular drill holes 30-03, 30-02, 30-01.
											0.1' black lignite coal at bottom of run. Core
											broken. RQD ~ Zero. Lost 3.6' total. Kept
											12.9-14.3 and 22.7-23.1' in box, discarded rest
			27.2	23.1	33.1	23.1	25.2	HQ Core barrel	RUN 2 10.0	PULL 7.3	23.1-27.2 Interbdd brown SANDSTONE and
						and 32.0	32.7	Tapped 32.9	No Core	loss	black fuzzy shale (not n wg bdd). SANDSTONE is
		27.2							0.2' in hole		fine to med. grained, more friable below 31.9'. Kept
		Bailed hole, water coming in —									24.1-25.2 and 32.1-32.7, RQD better this run.
											(All SANDSTONE below 27.2)

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 1 of 2 Sheets

Pull - Amount recovered
Run - Amount cored

6.9

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. 30-04

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
			39.8	33.1	39.8	32.9	39.8	HQ Core barrel	Run 3 6.7	Pull 6.7	33.1 - 39.8 SANDSTONE as above. Below
								TAPED 39.8	0.2 Core loss.		38.9' color changes gradually to white. Sand-
											stone is medium - grained, friable. RQD is
			Bailed hole, let sit overnight								about 75% for this run. A few bedding jts. Kept
											all of Run 3. Pull interval was 6.5', recov.
		Water at 22.2' TOG 0800, 09/28/93									6.7, 0.2' core loss.
	Set 10' well screen at 39.7 to 29.7. Added filter sand to								26.5'		
	added bentonite pellets to 23.5'										

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of ___ Sheets

BORING LOG
FIELD DATA

Project Landfarm Monitoring Wells Site Landfarm, NSWC Crane Date 9/28/93
Location West Side, adjacent Hiway 161 Job No.
Drill Rig Failing 1500 Inspector MURPHY Operator BROWN/MIXON Surface El ~ 704 Boring No. 30-05

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
1	9/28	0.0		0.0	1.5	0.5	0.8	3" Splitspoon	Jar	#1	Loess (?) ML-CL, plastic, ochre to tan color.
			13.6	0.0	13.6	None		7" Flt Auger			0.0-13.6 Loess (?) ML-CL, probably reworked with residual soil. Pebble-sized rock frags below ~5'. Plastic. Rock at 13.6'
		Set 6" PVC casing to 13.6' in 1' bentonite (Hole Plug). Filled annulus w/ bentonite to surface.									
		13.6		13.6	23.1	13.6	22.7	HQ Core barrel	RUN 1 9.5	PULL 3.7	13.6-22.7 Interbdd tan-ochre soft, plastic clay and hd, fine-grnd red-brn SANDSTONE (ironstone). 5.4' of core lost in several badly broken zones. RQD v. low.
				Coring w/ water				Taped 22.7	0.4 in hole Lost	5.4'	
				23.1	33.1	22.7	32.5	"	RUN 2 10.0	PULL 9.6	22.7-24.0 Interbdd black shale and brown SANDSTONE as above. 24.0-32.5 is brn SANDSTONE, fine-med, coarser and more friable w/ depth. Very few black shale laminae. Core broken: RQD ~ 50%.
			24.0					Taped 32.5	0.6 in hole Lost	0.2'	
		24.0									
				33.1	42.6	32.5	42.5	"	RUN 3 9.5	PULL 9.9	32.5-42.5 Brn med-grnd SANDSTONE as above. Massive (bddng only apparent at breaks) RQD 100% except in bottom 4'. Much more
								Taped 42.5	0.1 in hole Lost	0.1'	

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

PULL = Amount Recov.
RUN = " cored

Sheet 1 of 2 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. 30-05

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
			42.5								friable in bottom 2', and coarser grained.
		Bailed hole, water came up to ~28' at 1730, 9/28/93									
		Set screen at 42.5 to 32.5 (10'). Brought sand									
		up to 27.0 TOG, bentonite to 23.0' TOG									
		Water at 24.7' T.O.G. 0745, 09/29/93									

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of 2 Sheets

BORING LOG
FIELD DATA

Project: Landfarm Monitoring Wells Site: Landfarm, NSWC Crane Date: 9/29/83
Location: South side, east Job No.:
Drill Rig: Failing Inspector: Murphy Operator: BROWN/MIXON Surface El: ~708 Boring No.: 30-06

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
1	9/29	0.0		0.0	1.5	0.5	0.8	3" Splitspoon	Jar	#1	Reworked loess (?) ML-CL w/rock
											frags. Little plasticity
			13.4	0.0	13.4	None		7" FltAnger			0.0-13.4 Tan to ochre silt ML w/
		Set 6" PVC Casing to 13.4' in 1' bentonite (Hole Plug). Filled annular									minor clay CL, loess (?) reworked w/ residual
		of casing w/ bentonite to surface.									soil, w/rock frags. Top of rock 13.4'
		13.4		13.4	23.4	13.4	23.3	HQ Core barrel	RUN 1 10.0	PULL 6.7	13.4-23.3 Interbdd black SHALE, soft ochre
								Taped 23.3	0.1 in Lost	hole 3.2'	to gray clay, hard red-brn ironstone, and
											brown SANDSTONE as in other borings. RQD=0.
											Recov. 6.7' of 9.9', lost 3.2' in several zones.
				23.4	33.4	23.3	33.2	"	RUN 2 10.0	PULL 9.2	23.3-25.7 Interbdd black SHALE, COAL and
								Taped 33.2	0.2 in Lost	hole 0.7'	SANDSTONE, wavy or flaser bedded. 24.7-25.7 is
											all gray SHALE and black SHALE, flaser bedded. Abrupt
			25.7								change to SANDSTONE at 25.7
		25.7	29.8								25.7-29.8 Brown, friable, med. qtzitic SANDSTONE
		29.8									29.8-33.2 Abrupt change to white to light gray,
											dense, fine grained, calcareous qtzitic SANDSTONE.
											Core loss probably in upper foot. Core in good condition

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

RUN = Amount cored
PULL = Amount recov.

Sheet 1 of 2 Sheets

BORING LOG
FIELD DATA

Project _____ Site _____ Date _____
Location _____ Job No. _____
Drill Rig _____ Inspector _____ Operator _____ Surface El _____ Boring No. 30-06

SAMPLE NUMBER	DATE TAKEN	STRATUM FROM	STRATUM TO	DRIVE FROM	DRIVE TO	SAMPLE FROM	SAMPLE TO	TYPE OF SAMPLER			CLASSIFICATION AND REMARKS
											below top foot, RQD ~ 85%.
			34.5	33.4	43.4	33.2	42.8	HQ core	RUN 3 10.0	PULL 8.5	33.2-34.5 White, dense, calc. SANDSTONE
								Taped 42.8	0.6 in Lost	hole 1.1'	as above. Sharp contact at 34.5 to brown
											SANDSTONE
		34.5	42.8								34.5-42.8 Brown friable non-calc SAND-
											STONE as above 29.8, w/ occasional chocolate
		Bailed	hole, water entering slowly.								brown stringers. One 0.15' gray shale bed
			Water at 26.6' T.O.G. 0700, 9/30/93								at 39.6'. Pulled from 33.2 to 42.8' (9.6'),
		Set	screen 42.8 - 32.8' Brought sand up to 27.4' TOG.								recov. 8.5', lost 1.1'. Core is in short lengths
			Bentonite pellets to 24.0'								below 35.7 (RQD below 35.7 = 0).

WES FORM JAN 74 819 EDITION OF NOV 1971 MAY BE USED

Sheet 2 of 2 sheets

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NOTE:

Boring No. Landfarm 30-07

Boring Log Field Data - Not available

Per Bill Murphy (Corps of Engineers Waterways Experiment Station)

POINT NO.	POINT ID	EASTING	NORTHING	POINT TYPE	POINT ELEVATION	TOP CASING ELEVATION	GROUND ELEVATION
POINT 217	SNA PK GPS 44	552872.0247	477151.5430	Bench Mark	0.000		
POINT 220	BTCAP	554972.9737	477543.8282	BT Cap	704.840		
POINT 221	WELL 14-2-93	555591.6583	477510.9344	MW	711.310	711.650	709.290
POINT 223	WELL 14-3-93	554895.4928	477510.4489	MW	705.210	705.330	703.460
POINT 224	WELL 14-6-93	554562.9990	477365.9243	MW	685.960	686.170	683.790
POINT 225	WELL 14-5-93	554412.4525	477214.7415	MW	675.740	676.080	673.660
POINT 226	WELL 2A	554337.7239	477225.5519	MW	673.200	673.500	670.830
POINT 227	BERNTSEN SET	554858.3726	477016.9512	Berntsen Set	712.680		
POINT 228	WELL 6B	555336.9998	476417.1700	MW	690.090	690.400	687.720
POINT 229	WELL 6A	555336.2638	476415.1660	MW	690.080	690.390	687.720
POINT 230	WELL 5B	554829.8264	476375.3616	MW	695.360	695.700	693.010
POINT 231	WELL 5A	554829.9204	476372.5647	MW	695.410	695.700	693.000
POINT 232	WELL 4A	554435.9060	476399.0990	MW	689.530	689.830	687.180
POINT 233	WELL 4B	554436.1960	476401.4450	MW	689.500	689.820	687.100
POINT 234	WELL 203	554453.3228	476672.7067	MW	681.540	681.940	679.830
POINT 235	WELL 3A	554438.9710	476849.5133	MW	679.320	679.580	677.360
POINT 236	PK SET	556355.7865	477364.8817	PK Set	711.670		
POINT 242	WELL 201	556361.6774	477501.1145	MW	715.160	715.490	713.040
POINT 243	WELL 1A	556574.1384	477463.1224	MW	715.040	715.300	712.590
POINT 244	WELL 1B	556574.1284	477464.4764	MW	714.990	715.350	712.680
POINT 245	WELL 14-4-93	556466.6757	477016.0278	MW	710.910	711.190	708.780
POINT 246	BTCAP SET	556608.9398	476814.0215	BT Cap	711.930		
POINT 247	WELL 3B	554439.4410	476851.2523	MW	679.340	679.560	677.390
POINT 248	BTCAP SET	556609.7164	476036.7628	BT Cap	702.640		
POINT 249	WELL 14-1-93	556256.6643	476263.7043	MW	709.390	709.640	707.420
POINT 250	WELL 14-7-93	555926.7243	476234.0366	MW	710.520	710.740	708.610
POINT 251	WELL 7A	555926.7246	476274.9643	MW	712.110	712.920	710.970
* POINT 252	WELL 30-04	556676.2888	475983.8248	MW	706.900	707.020	704.590 *
* POINT 253	WELL 30-05	556675.5575	476081.9110	MW	708.510	708.630	706.260 *
POINT 254	BTCAP SET	556876.5872	476007.2683	BT Cap	706.290		
POINT 255	HT SET	556618.7250	472521.4643	HT Set	0.000		
* POINT 256	WELL 30-01	556889.3377	476227.0434	MW	711.520	711.800	709.380 *
* POINT 257	WELL 30-07	556864.2474	475891.1603	MW	706.120	706.250	703.870 *
* POINT 258	WELL 30-02	557301.3427	476020.1554	MW	717.920	718.050	715.560 *
POINT 259	HT SET	557265.5769	476175.8034	HT Set	0.000		
* POINT 260	WELL 30-06	557074.6306	475891.5229	MW	708.610	708.740	706.530 *
* POINT 261	WELL 30-03	557191.2763	476328.8376	MW	720.890	721.020	718.570 *

APPENDIX B

COPY OF FIELD LOG BOOK

ROUND 1
OCTOBER 1999

TABLE OF CONTENTS

SUBJECT

PAGE NO.

TITLE NSWC CRANE

PROJECT NO. 7395

9.20.99 MONDAY

BOOK 2450

Work continued from Page

WEATHER: OVERCAST SOME LT. RAIN 70-76°F

SUNDAY PM TRAVEL FROM HOME TO SITE/BOQ AT NSWC CRANE.

0650 AT TRAILER KEITH SIMPSON, SETH PELEPIRO & SCOTT NEIL. CTO 38, 48 & 19 ON GOING DURING THIS SHIFT. KS & SP CAL. EQUIPMENT THEN

0815 TO SWL & LF FOR SITE WIDE WATER LEVELS & WELL INSPECTIONS COMPLETE W/L RETURN TO TRAILER LUNCH. KS PREP WORK FOR WELL DEVELOPMENT @ LF.

KS TO ENTERPRISE INDIANAPOLIS TO PICK-UP 4X4 PICK-UP TRUCK

1830 KS @ TRAILER LOAD WELL DEVELOPMENT EQUIPMENT INTO TRUCK

1845 DEPART TRAILER FOR BOQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE T. S. Simpson

DATE 9.20.99

WITNESS

DATE

Scientific Bindery Productions 1255 S. Wabash Chicago, IL 60605

TITLE NSWC CRANE **PROJECT NO.** 7393

TUESDAY 9.21.99 **BOOK** 2450

Work continued from Page WEATHER: SUNNY 50-70°F

0650 KS @ TRAILER LOAD 300 GAL TANK INTO PICK-UP CAL. HORIBA LOAD EQUIPMENT FOR DEVELOPMENT.

0750 DEPART SITE FOR LF. START DEVELOPMENT @ 30-3 COMPLETE DEVELOPMENT

0955 @ 30-3 MOVE TO 30-1 START DEVELOPMENT @ 30-1. COMPLETE 30-1

1145 TO LUNCH TO TRAILER PICK-UP SUPPLIES

1230 TO LF 30-2 DEVELOP 30-2

1425 TO 30-6 START DEVELOPMENT

1546 COMPLETE 30-6 RETURN TO TRAILER DECONED DEVELOPMENT EQUIPMENT WORKING ON CTO 38/48

1840 DEPART TRAILER FOR BCQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 9.21.99

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7393

WED. 9.22.99 **BOOK** 2450

Work continued from Page WEATHER: SUNNY 38-68°F

0645 KS @ TRAILER (WORKING ON CTO 38)

0745 LOAD TRUCK & DEPART FOR LF FOR WELL DEVELOPMENT. START DEV.

0815 @ 30-7 COMPLETE 30-7

0945 START 30-4 COMPLETE 30-4

1050 TO TRAILER RESTOCK TRUCK

1135 TO LUNCH

1210 @ 30-5 START DEVELOPMENT

1342 COMPLETE 30-5 TO TRAILER WORKING ON CTO 48 DECON & STORE DEVELOPMENT EQUIP.

30-5 COMPLETES THE 7 LANDFARM WELL DEVELOPMENT.

AT EACH OF THE 7 WELLS, AFTER WATER LEVELS, PID READINGS & BTM. MEASURMENTS WERE TAKEN, THE WELL WAS SURGED FOR APPROX. 5 MIN USING A 2" SURGE BLOCK & 3/4" PVC PIPE (5' SECTIONS). AFTER THE SURGING THE WELL WAS PUMPED USING A 12V SUB. PUMP (WHALE BRAND, 2 STAGE). THE GW WAS PUMPED INTO A 300 GAL TANK MOUNTED ON A PICK-UP TRUCK.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 9.22.99

WITNESS DATE

TITLE SWC CRANE 9.22.99

PROJECT NO. 1595

BOOK 2450

Work continued from Page

ALL EQUIPMENT WAS DECONED BETWEEN WELLS FOLLOWING THE FSP. DECON WATER WAS CONTAINED IN THE 300 GAL TANK. THE DEVELOPMENT SEQUENCE WAS; BACKGROUND TO CROSS-GRADIENT TO DOWNGRADIENT PER PG. 2-4 FSP. ALL DEVELOPMENT WATER WILL BE STORED ON SITE (AT TRAILER LOCATION) PENDING ANALYSES.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 9.22.99

WITNESS

DATE

TITLE

PROJECT NO.

BOOK

Work continued from Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

TABLE OF CONTENTS

SUBJECT	PAGE No.

TITLE NSWC CRANE

PROJECT NO. 1373

BOOK 2469

October 12, 1999

Work continued from Page WEATHER: Sunny, low 40's - mid 70's.

0645 Keith Simpson (KS) and Scott Neil (SN) depart BOQ for Building 3260. Arrive at 3260 and pick-up supplies, then depart for Thous trailer.

0705 KS & SN arrive at trailer. Unpack supplies/equipment. KS calibrates Horiba U-22's and SN prepares bottle sets. Preparation takes place for water level measurements also. SN calibrates PID. See Logbook #2451 for water level measurement information.

1045 Lunch.

1130 Arrive at 30-02 and setup to begin purging.

1145 Begin purging - one casing volume = 2.4 gallons. Refer to corresponding Low Flow Purge Data Sheet for purge information on this well (30-02).

1320 End purging. Purged 2.6 gallons (one casing = 2.4 gallons).

Work continued to Page 2

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 10/12/99

WITNESS DATE

Scientific Bindery Productions 1255 S. Wabash Chicago, IL 6066

TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2469

Work continued from Page 1

1326 Begin sampling - fill VOA's, Explosives, Cyanide, Total & Dis. Metals, Total & Dis. Phosphorus, TKN, Ammonia, Nitrate/Nitrite. Sample ID 030-GW-002-01. Refer to corresponding GW Sample Log Sheet for specific sample data for 30-02. Triple volume sampled for MS/MSD. Pump rate = 96 mL/min.

1820 End sampling. Load equipment in vehicle and depart Landfarm for trailer.

1842 Arrive at trailer. Unload vehicle and place samples in refrigerator.

1855 Depart for BOQ.

VOID SWN 10/12/99

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 10/12/99

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2469

OCTOBER 13, 1999

Work continued from Page WEATHER: Breezy w/ 20-30 MPH winds in PM, Mid 50's - Mid 70's.

0655 Arrive at trailer. Begin prep for field work. Calibrate PID and Horiba U-22.

0717 SW departs trailer for Landfarm well 30-03.

0726 SW arrives at well 30-03 and sets up equipment to begin purging. One casing volume = 2.3 gallons. Pump drive air throttle on control box is leaking causing abnormal usage of nitrogen. Refer to Low Flow Purge Data Sheet for specific purge data for this well (30-03).

1017 End purging. 2.7 gallons removed. Air throttle on control box has stopped leaking. Water level is stable @ 40.39.

1025 Begin sampling. Sample ID 030-GW-003-01. Fill VOAs, Explosives, Total & Dis. Metals, Dis. Phosphorus, Cyanide and a one liter poly for TKN, Ammonia Nitrate/Nitrite, Total Phos.

Work continued to Page 4

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Neil DATE 10/13/99

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TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2469

Work continued from Page 3

Sampling at a rate of 67 mL/min. Refer to the corresponding GW Sample Log Sheet for specific sample data on well 30-03.

1238 End sampling. Load equipment in vehicle and depart for the trailer/lunch.

1257 Arrive at trailer. Place samples in the refrigerator. Load vehicle for well 30-04.

1314 Depart trailer for Landfarm well 30-04.

1330 Arrive at 30-04 and begin to set up equipment for purging.

1343 Begin purging. One casing volume = 2.7 gallons. Refer to Low Flow Purge Data Sheet that corresponds to well 30-04 for specific purge data. Began purging at 76 mL/min, however water level drawdown was ≈ 0.3 Ft. Decreased flow rate to 56 mL/min.

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Reid

DATE 10/13/99

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 1373

BOOK 2469

Work continued from Page 4

1418 Decrease flow rate to 49 mL/min. Water level holding steady at ≈ 26.10 Ft.

1708 End purging. Purged one casing volume (2.7 gallons) with all parameters stable.

1712 Begin sampling at 49 mL/min. Sample ID 030-GW-004-01. Fill VOAs, Explosives, Total & Dis. Metals, Cyanide, Dis. Phosphorus, and a one liter poly for Ammonia, TKN, Nitrate/Nitrite, and Total Phosphorus. Refer to the corresponding GW Sample Log Sheet for well 30-04 for specific sample data.

1735 KS arrives at well 30-04.

1820 KS departs with Cr 6+ sample to analyze at trailer.

1933 End sampling. Load equipment in vehicle and depart for the trailer.

1944 Arrive at trailer. Place samples in refrigerator and departs for BBQ. END.

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Scott W. Reid

DATE 10/13/99

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2469

October 14, 1999

Work continued from Page WEATHER: Sunny, low 40's - mid 50's.

0645 SW & KS arrive at trailer. Load vehicles with equipment and calibrate instruments.

0705 SW departs for Landfarm well 30-06.

0717 SW arrives at well 30-06 and sets up equipment for purging.

0735 Purging begins. One casing volume = 2.7 gallons. Refer to corresponding Low Flow Purge Data Sheet for specific purge data on well 30-06. Control box air throttle is leaking. Purge rate = 60/64 ml/min. water level stable. Air throttle stopped leaking at 0815.

1020 End purging. Removed 2.7 gallons with all parameters stable.

1025 Begin sampling. Sample ID 030-GW-006-01. Fill VOAs, Explosives, Cyanide, Total and Dis. Metals, Dis. Phosphorus, and one 1 Liter poly for NH_3, TKN, NITRATE/NITRITE,

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SIGNATURE Scott W. Reid DATE 10/14/99

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2469

Work continued from Page 6

and Total Phosphorus. Refer to the GW Sample Log Sheet that corresponds to well 30-06 for specific sample data. Appears to be an "effervescence" in sample water.

1110 KS relieves SW. SW departs for the BOQ to check out.

1150 SW & KS meet at trailer. Unload equipment from vehicle. SW departs site for airport

KS 10/14/99 SWR

Work continued to Page

SIGNATURE Scott W. Reid DATE 10/14/99

WITNESS DATE

ROUND 2
JANUARY 2000

TITLE NSWC CRANE PROJECT NO. 7393

FRIDAY 10-15-99 BOOK 2450

Work continued from Page

0645 MS CHECK-OUT OF BCQ TO TRAILER - PACKING PUMP CONTROL BOXES FOR RETURN VIA FED EX TAKE TRAILER INVENTORY

0805 TO BLD 3260 COPY FIELD NOTES

0835 RETURN TO TRAILER COMPLETE PACKING OF SUPPLIES/EQUIPMENT TO BE FEDEXED. CLEAN TRAILER & SHUT DOWN WATER

0925 DEPART SITE, BASE FOR AIRPORT PGH OFFICE & HOME

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 10-15-99

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

Monday 1/10/00 BOOK 2450

Work continued from Page

0645 SW departs from home to Pgh Airport.

1230 SW arrives at Bloomington Holiday Inn for check-in.

1335 SW arrives at Env. Building - checks in w/ Chris Freeman. SW proceeds to trackdown equipment.

1405 SW at trailer - only 3 coolers of bottles were found. Bldg. all personnel said that the rest of supplies are on delivery truck. Begin prep for GO 19 work.

1420 Call T. Rojahn. Line is busy

1430 Return to Bldg 3260 to check for equipment - equipment MES (SW) has not arrived. Return to trailer.

1455 SW departs trailer for BOC Gases in Bedford, IN.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 14

SIGNATURE [signature] DATE 1/10/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

MON 1/10/00 BOOK 2050

Work continued from Page 13

1700 SN returns to Base. Stops at Bldg 3200 to check for equipment - equipment has not arrived.

1710 SN at trailer. Unload nitrogen cylinders and prep for tomorrow.

1745 SN departs trailer for airport to meet Terry Reisman (TR).

2050 SN + TR arrive at Holiday Inn.

WEATHER: Mostly sunny, 30's - 40's.

Void
SN
1/10/00

SIGNATURE [signature] DATE 1/10/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

TUESDAY 1/11/00 BOOK 2050

Work continued from Page WEATHER AM: windy, clear, upper 30's.

0700 SN and TR arrive at Guard Gate for TR's pass, then proceed to trailer.

0725 SN calls Mark Francis. Mark is not in his office - will try later.

0730 SN and TR depart trailer for Tom Brent's office

0735 Arrive at Tom Brent's office - pick-up equipment.

0750 Depart for trailer. Upon arrival at trailer unload / unpack equipment and sample bottles.

0815 Call Mark Francis; inform him of today's activities.

0845 Depart for landfarm and water levels.

0900 Begin water level measurements. See page 16 for measurement data.

SIGNATURE [signature] DATE 1/11/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

Tues 1/11/00 BOOK 2450

Work continued from Page 15

WELL DATA FOR SECOND ROUND

~~STATIC WATER LEVEL TOTAL DEPTH DATE SAMPLED TIME SAMPLED~~ SWN 1/11/00

WELL #	WATER LEVEL	DATE SAMPLED	TIME SAMPLED	COMMENTS
30-01	30.03'	1/12/00	1100	
30-02	37.54'	1/12/00	1035	
30-03	39.82'	1/13/00	1055	MS/MSD
30-04	25.36'	1/11/00	1455	
30-05	26.71'	1/11/00	1530	
30-06	28.12'	1/13/00	1200	DUPLICATE
30-07	25.16'	1/12/00	1657	

0930 SW + TR arrive at trailer. TR calibrates Horiba U-22 (both). SW calls Mark Francis w/ H_2O level readings.

0955 ~~TR calibrates~~ SW Begin prep for sampling wells this afternoon. SW runs Cr^{6+} standards

1115 Depart trailer for lunch.

1150 Return to trailer - then to Land Farm for sampling

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 17

SIGNATURE Scott W. Reid DATE 1/11/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

Tues. 1/11/00 BOOK 2450

Work continued from Page 16

1205 Arrive at well 30-04. SW aids TR in setting-up for purging/sampling.

1230 SW begins setting up equipment for purging/sampling of well 30-05.

1245 Begin purging: One casing vol = 2.9 gallons; water level = 26.87'; initial flow rate = 78 ml/min. See the Low-Flow Purge Data Form that corresponds to well 30-05 for specific purge data.

1525 End purging. Total volume purged = 3.0 gallons.

1530 Start sampling; Fill VOAs, Explosives, Metals (Total + Dis), Phosphorus (Dis), Cyanide, NH_3/Nitrate/Nitrite/TKN TOTAL PHOS. Refer to the GW Sample Log Sheet that corresponds to well 30-05, sample # 030-GW-005-02 for specific sampling data.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 18

SIGNATURE Scott W. Reid DATE 1/11/00

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2450

Tues. 1/11/00 (SN)

Work continued from Page ~~18~~ 19

1657 End sampling - load equipment in vehicle.

1705 Depart for trailer

1718 SN + TR arrive at the trailer - unload vehicles, place samples into refrigerator, and run Cr^{6+}.

1835 SN + TR depart trailer for Lowe's, Sam's Club for supplies - then to the Holiday Inn.

WEATHER PM: Clear & windy, mid 40's.

TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2450

Wednesday 1/12/00

Work continued from Page WEATHER (AM): Clear, windy, 20's-30's.

0700 SN and TR arrive at trailer. Begin to prep/load equipment in vehicles for today's sampling + purging activities. Calibrate PID, calibrate Horiba's, and prepare trip blank (030-TB-002-02).

0800 SN + TR depart trailer for Landfarm

0810 SN + TR arrive at well 30-01. SN assists TR in setting up for purging and sampling of 30-01.

0817 SN arrives at well 30-02 and sets up equipment to purge and sample.

0840 Begin purging well 30-02; One casing volume = 2.4 gallons, static water level = 37.78 ft, and initial flow rate = 84 mL/min. See the Low-Flow Purge Data Sheet that corresponds to well 30-02 for specific purge data/info.

1030 End purging. Purged 2.7 gallons. All parameters stable.

TITLE NSWC CRANE PROJECT NO. 7393

WED. 1/12/00 BOOK 2450

Work continued from Page 19

1035 Begin sampling. Sample # 030-GW-002-02 for VOAs, Explosives, Metals (Total + Dis), TKN, Phosphorus (Total + Dis), Cyanide, Nitrate/Nitrite.

1200 End sampling. Final H_2O level = 38.02. Load equipment + samples in vehicle.

1209 Depart Landfarm for lunch and trailer.

1234 Return to trailer - unload vehicle and place samples in refrig. Run Cr^{6+} on samples 030-GW-001-02 and 030-GW-002-02. Pack samples for pick up by FED EX; samples Shipped: 030-GW-001-02, 030-GW-002-02, 030-GW-04-02, 030-GW-005-02, ~~TB~~ SA 030-TB-001-02, and 030-TB-002-02; FED EX Air Bill # 8168 8343 7177

1445 Begin draining IDW tank and demobilize of trailer.

Work continued to Page 21

SIGNATURE Scott W. Reid DATE 1/12/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

WED. 1/12/00 BOOK 2450

Work continued from Page 20

1545 ~~1345~~ SA FED EX arrives - picks up 2 coolers for delivery to Lauck's. SW calls Hugh Prentice at Lauck's to inform him of pending sample delivery.

1630 SW departs trailer for Test Control building to get key from Tom Brent.

1655 SW @ Landfarm well # 30-06 to check on TR.

1720 SW back at trailer to continue discharging SA IDW to the Crane Sanitary Sewer System. Continue demob of trailer.

1830 SW to Landfarm well 30-07 to check on TR. TR finished sampling at ≈ 1840. TR + SW return to trailer. TR runs Cr^{6+} on 030-GW-007-02.

1905 Drop off equipment at Test Control Bldg.

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SIGNATURE Scott W. Reid DATE 1/12/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

WED 1/12/00 BOOK 2450

Work continued from Page 21

1935 Depart Pest Control Bldg for Holiday Inn.

WEATHER (PM): Light rain, mid 30's.

SIGNATURE Scott Neo DATE 1/12/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

THURSDAY 1/13/00 BOOK 2450

Work continued from Page WEATHER (AM): WINDY, MID 30'S & FALLING.

0705 SN + TR at trailer. Calibrate PID, Horiba, and prepare bottle sets. Load equipment in vehicles.

0810 TR departs trailer for well 30-03. SN departs for Tom Brent's office.

0818 Arrive @ Tom Brent's office but he is not in his office - leave a note. Depart for Café for ice. Get ice and depart for Landfarm.

0845 Arrive at landfarm well 30-03 to drop office for TR.

0855 Arrive SN at well 30-03 and set up equipment for purging and sampling.

0910 Begin purging - one casing volume - 2.7 gallons, static H_2O level = 28.42 FT, and initial H_2O flow = 67 mL/min. Refer ~~to GW Sample Log Sheet for~~ Low Flow →

SIGNATURE Scott Neo DATE 1/13/00

WITNESS DATE

TITLE NSNC CRANE PROJECT NO. 73[illegible]
THURS 1/13/00 BOOK 2450

Work continued from Page

Purge Data Sheet that corresponds to well 30-06 for specific purge data.

1200 End purging 30-06 @ 1200. Purged 2.8 gallons.

1205 Begin sampling: sample ID 030-GW-006-00[illegible] This sample will be a duplicate. Refer to GW Sample Log Sheet for specific sample data.

1430 Tom Brent arrives at well 30-06.

1438 Tom Brent departs.

1457 End sampling. Filled (2) VOAs; (2) Cyanide; (4) Explosives; (2) Dis. Phos; (2) Dis. Metals; (2) Total Metals; (2) NH_3, TKN, Total Phos, Nitrate/Nitrite. Final H_2O Level = 29.03 ft. Load samples & equipment in vehicle. Depart Landfarm.

1525 Arrive at trailer. Unload vehicle

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page 25

SIGNATURE Scott W. Bell DATE 1/13/00
WITNESS DATE

TITLE NSNC CRANE PROJECT [illegible]. 7393
BOOK 2450

Work continued from Page 24

Run CR 6+ on wells 30-03 and 30-06, ~~demob~~ begin demob of trailer for shift.

1730 TR arrives at trailer. Unload vehicle. Complete emptying of IDW tank. Continue demob

1855 Depart trailer for Holiday Inn.

WEATHER (PM): windy, falling temps into the mid 20's.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Scott W. Bell DATE 1/13/00
WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7393

BOOK 2450

Work continued from Page WEATHER (Am): Cold, mid teen's

0650 TR + SW on site. Begin demob activities. Pack equipment and samples for shipment by FEDEX.

1230 Depart Base for FEDEX.

1530 Drop equipment and samples at FED EX. Air Bill # for samples is 8168 8343 7166.

1550 Depart FEDEX for Airport.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE [signature] DATE 1/14/00

WITNESS DATE

TITLE

PROJECT NO.

BOOK

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE DATE

WITNESS DATE

ROUND 3
APRIL 2000

TITLE NSWC CRANE PROJECT NO. [illegible]

MONDAY 4-17-00 BOOK [illegible]50

Work continued from Page WEATHER: LTE RAIN 60°F

KEITH SIMPSON & SCOTT NEIL FROM PITTSBURGH TO CRANE, IN.

START OF ROUND 3

1300 TO BLD 3245 PREP. EQUIPMENT AND SAMPLE BOTTLES.

1440 TO LANDFARM FOR WATER LEVELS @ 7 WELLS.

1625 RETURN TO BLD 3245 AND CONTINUE TO PREP. FOR GW SAMPLING ON TUES. AM.

COMPLETE PREP.

1800 DEPART BASE

SCIENTIFIC BINDERY PRODUCTIONS · CHICAGO 60605

Work continued to Page

SIGNATURE Keith S Simp

WITNESS

DATE 4-17-00

DATE

TITLE NSWC CRANE PROJECT NO. 7573

TUES. 4.18.00 BOOK 2450

Work continued from Page WEATHER: OVERCAST 40-60°F

0650 KS & SN ON SITE LOAD SUVS TO LANDFARM.
KS SET-UP (PURGE/SAMPLE) ON 30-3 WELL SCOTT ON 30-2 MW
1100 SN COMPLETES SAMPLING @ 30-2 AND RETURNS TO BLD. 3245 TO RUN CR^{+6} ON BOTH 30-2 & 30-3
1145 KS COMPLETES SAMPLING @ 30-3 TO LUNCH THEN BLD 3245 TO RESTOCK SUV.
RETURNED TO LANDFARM AND SET-UP ON 30-4 PURGE & SAMPLE
SN SET-UP @ 30-1
30-1 3X VOL FOR MS/MSD
3-4 2X VOL FOR DUP
1935 KS RETURN TO BLD 3260 RUN CR^{+6} AND CLEAN/CHARGE EQUIPMENT
1934 RAN CR STANDARD SOLUTION
1952 RETURN TO LF TO HELP SN COMPLETE MW 30-1
LOAD EQUIPMENT
2015 RETURN TO BLD ~~3260~~ 3245
PUT SAMPLES IN FRIDGE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE [signature] DATE 4.18.00
WITNESS DATE

TITLE NSWC CRANE PROJECT NO.
4.18.00 BOOK 2450

Work continued from Page

2040 DEPART SITE TO HOTEL

DAILY SUMMARY

ON SITE: T+NUS,
SCOTT NEIL
KEITH SIMPSON
4 WELLS SAMPLED
30-1 MS/MSD, 30-2, 30-3 &
30-4 DUP
SEE ALSO LOG BOOK # 2469
AND FIELD NOTES, COC's

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE [signature] DATE 4.18.00
WITNESS DATE

TITLE NSWC CRANE
WED 4.19.00

PROJECT NO. 7575
BOOK 2450

Work continued from Page WEATHER: SUNNY 50-72°F

0650 KS & SN ON SITE @ BLD 3245
LOAD SUV'S TO LF KS SET-UP
@ 30-6 SN @ 30-5
PURGE & SAMPLE
COMPLETE SAMPLING @ 30-6
1205 TO LUNCH / GAS & ICE THEN
BLD 3245 RAN CR+6 ON 30-6
1310 RETURN TO LF & SET-UP ON
30-7
SN WORKING @ DBG CTO 10
1740 COMPLETE SAMPLING 30-7
THIS COMPLETES 3RD ROUND OF
SAMPLING.
1755 RETURN TO 3245 PACK EQUIPMENT
RUN CR+6 FOR 30-7
DEMOB SUPPLIES & EQUIPMENT
DEPART SITE FOR HOTEL

— DAILY SUMMARY —
K. SIMPSON & S. NEIL ON SITE
3 WELLS SAMPLED
SCOTT ALSO WORKED ON CTO 10
SEE ALSO LOG BOOK # 2469
COC'S & FIELD NOTES

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS

DATE 4.19.00
DATE

TITLE NSWC CRANE
THUR 4.20.00

PROJECT NO. 7575
BOOK 2450

Work continued from Page WEATHER: RAIN 60°F

0700 KS & SN @ BLD 3245 PACKING
FOR RENTAL RETURNS AND SAMPLE
SHIPPMENT.
2 NITROGEN CYL. OUT-SIDE BLD
3245 FOR PICK UP BY BOC GASES
ON MAY 3, 00.
0920 KS & SN TO AIRPORT / PGH.

END OF ROUND 3

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE K. S. Simpson
WITNESS

DATE 4.20.00
DATE

ROUND 4
JULY 2000

TITLE Mon 7-24-00

PROJECT NO. 1575

BOOK 2450

Work continued from Page

Start of Round 4

JS arrived at NSWC Crane Sunday night at 11:15 pm and obtained room key from Admin Bldg. (#1).

Rob Hill arrived at Sunday (7/23) at 6:30 pm and checked into BOC

7-24-00

- Rob and I went to breakfast at 7:30 am CD
- Got to Bldg. 3245 at 8:30 am Read through H&S Plan, Work Plan, and filled out H&S forms
- Opened coolers with bottles at 9:30 am. All bottles for total metals dissolved metals, total nutrients and cyanide (10 each) were present. Ten (10) bottles were also present for dissolved phosphorus but these bottles did not have H_2SO_4 preservative in the bottles (i.e. empty bottles).

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-24-00

WITNESS DATE

TITLE NSWC Crane 7-24-00

PROJECT NO. 7393

BOOK 2450

Work continued from Page 33

Placed the empty bottles in the storage room (extras) and found four new bottles with preservative. Obtained four other new bottles from Navy. We now have sufficient bottles to do sampling.

Rob Hill worked on Hach colorimeter and hex. chrome standards to check to see if meter is working properly.

9:15 am Made up a standard using 1 mL of 50 mg/L Cr^{6+} and diluted ~~with~~ into 200 mL distilled water. Meter should have read 0.25 mg/L, but instead read 0.11 mg/L.

10:00 am 2nd standard prepared using 5 mL of 50 mg/L Cr^{6+} diluted into 500 mL with distilled water. Meter zeroed using distilled water. 2nd calibration

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-24-00

WITNESS DATE

TITLE NSWC Crane 7-24-00

PROJECT NO. 7393

BOOK 2450

Work continued from Page

solution (0.50 mg/L) read as 1.45 mg/L.

Conclusion: If calibration solution is accurate and mixture dilution calculation is correct, then the meter is reading the concentrations at approximately 3 times too high.

11:00 am - went to loading dock to pick up meters, equipment, supplies that were shipped to Crane. All boxes were present except for two water quality meters sent by QED

- opened up boxes and checked contents
- sorted out supplies and got everything organized.

12 noon -- went to lunch at base cafeteria

sunny, clear, about 85°F, humid

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-24-00

WITNESS DATE

Work continued from Page

1:00 pm -- called Hugh Prentice of
(13:00) Lauks Testing Lab and informed him that the ten bottles shipped to the site for dissolved phosphorus did not contain preservative (H_2SO_4). However were borrowed 4 ~~E~~ new bottles from the Navy and had 4 from previous sampling event so we had sufficient bottles to perform sampling. Also informed Hugh Prentice that samples should arrive to Lauks by Thursday (7-27) or ~~Wednesd~~ Friday (7-28-00)

~~Epm~~ (14:00) called QED (Dee) and told them that water quality meters had not arrived. They said they would place a track on the Fed Ex shipment and call me back.

(14:45) Dee (QED) called me back and informed me that Fed Ex confirmed that one box (water quality meters)

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-24-00

WITNESS DATE

Work continued from Page

had not been delivered but may arrive in late afternoon with oversize box carrier.

15:50 I went over to receiving dock and did not find box with water quality meters.

16:00 Rob Hill checked that PID was working and placed battery on charger for the evening

I checked batteries on water level indicators. They were working fine.

16:10 Chromium

~~16:50~~ Rob Hill checked standards
JPS again on the Hach Colorimeter They were still reading high.

16:20
~~17:00~~ left base and went into town of Bedford
JPS to pick up nitrogen tanks.

18:30 returned back to base with tanks.

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-24-00

WITNESS DATE

TITLE NSWC Crane PROJECT NO. 7393

7-25-00 BOOK 2450

Work continued from Page warm (~83°F), sunny, humid

8:15 am drove to Bldg 3245 (lab)

8:30 Rob calibrated PID instrument and rechecked Hach colorimeter. The Cr^{6+} standards still reading high.

8:30 Jeff S. placed labels on bottles and loaded bottles into coolers. Got equipment and supplies sorted out and distributed between trucks.

9:00 – 11:30 went out to site and measured H_2O levels and inspected wells

11:55 – went over to receiving dock and found QED box with two water quality meters. Brought box to lab. Broke for lunch.

1:20 Opened box with meters and sorted out supplies and parts.

2:10 Assembled w.q. meters and calibrated

3:30 pm loaded trucks and went out to site

5:10 pm set up pump and began purging well 30-3

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

10 pm (20:00) finished sampling well 30-3

SIGNATURE Jeffrey P. Schubert DATE 7-25-00

WITNESS DATE

TITLE sunny, clear, warm (~85°), humid small breeze PROJECT NO. 7393

7-26-00 BOOK 2450

Work continued from Page

7:15 arrived at lab and picked up equipment and bottles

7:30 called Scott Neil and QED concerning the third connection on top of wells. Scott said that quickconnect closest to the water discharge line is for pressurized air in to pump. The other quickconnect (without the telephone label) is for freeze protection).

7:45 finished picking up supplies and headed for gas station to get ice. Gas station not open till 9:00 am Will use existing ice til we can get new.

8:30 am arrived at Well 30-02 Rob Hill already set up and pumping. Dropped off some bottles, form sheets, and supplies.

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Jeffrey P. Schubert DATE 7-26-00

WITNESS DATE

TITLE NSWC Crane 7-26-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

9:00 am arrived at Well 30-01.

9:16 am depth to water 30.54 ft

9:38 Starting pressure of N_2 tank = 2200 psi

pump hooked up and ready

9:45 pump turned on
Well Wizard QED # 15914
everything working well it appears
flow from well is steady
and clear

11:03 pump running well, @ ~ 100 mL/min.
not sure turbidity probe working
total depth of well = 47.9 ft
depth to water = 30.57 ft
ht. of water column = 17.33 ft
1 well volume = 2.82 gallons
= 10.7 L

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-26-00

WITNESS DATE

TITLE NSWC Crane 7-26-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

11:10 went to Well # 30-02 to check on Rob; pump is not working well; very slow pumping rate for 30-02 total depth = 52.6 ft
depth to water = 37.92
water column = 14.68 ft
× 0.163
1 well volume for well 30-02 } 2.39 gallons

11:59 started sampling 30-01
finished purging

12:30 pm finished work at 30-1
picked up, put WD-40 on lock,
and locked well

12:45 checked on Rob at 30-2,
he has pump problem solved;
gave him my samples to take
back to lab (30-1 samples)

1:30 arrived at well 30-7

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-26-00

WITNESS DATE

TITLE NSWC Crane 7-26-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

well 30-7 setup

1:40 pm starting depth to water = 25.78 ft

pump started well 30-7 at 1:55 pm

pressure out of tank reg. = 90 psi

pressure out of control box = 32 psi

2:40 total depth of well 30-07 = 45.2 ft

depth to water = 25.78 ft

water column = 19.42 ft

× 0.163

1 well volume = 3.17 gal

5:15 pm finished sampling 30-7 and DUP-GW-001-04

gave valve fitting for pump controller to Rob Hill to ~~[illegible]~~ make his pumping easier

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-26-00

WITNESS DATE

TITLE NSWC Crane 7-26-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

calculations for 30-6 well volume

total depth = 45.2

depth to water = 28.83

water col. = 16.37 ft

× 0.163 = 2.67 gallons

one well volume

5:55 pm locked up well 30-7 (sprayed lock with WD-40 away from well before locking the well)

6:30 arrived back at laboratory put samples in refrigerator cleaned off meters

7:00 Rob is running hex Cr on samples. HACH meter is still giving us high readings

Done for day

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-26-00

WITNESS DATE

TITLE SWC Crane 7-27-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

8:00 picked up bottles and ice at lab

Arrived at site 8:30 am

warm, humid, sunny-partly cloudy, ~ 80°F hazy

Rob is sampling well #30-4

I am setting up on #30-5

8:43 water level = 27.36 ft

8:46 Started pump

tank pressure = 1800 psi

pressure to controller = 90 psi

pressure to pump = 30-33 psi

running pump at 50 sec fill, 15 sec. discharge

9:44 well 30-5 total depth = 44.9 ft

starting depth to water = 27.36

water column = 17.54

× 0.163 = 2.86 gallons

one well volume for well 30-5

9:46 well 30-4 total depth = 42.1 ft

starting depth to water = 25.96

water column = 16.14

one well volume = 2.63 gal

Work continued to Page

SIGNATURE Jeff Schubert DATE 7-27-00

WITNESS DATE

TITLE NSWC Crane 7-27-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

sampling of well 30-5 completed and all bottles in cooler with ice.

kept pumping (same rate as before) and measured water quality parameters twice more.

turned off pump.

picked up equipment and supplies

Rob took all of the samples

12:45 put WD-40 on lock and locked up the well. Headed back to room for lunch.

13:45 ~~Assembled~~ Removed all sample bottles from the lab refrigerator and put in order by well. Checked all bottle labels for completeness and accuracy, placed in zip lock bags and placed in two coolers.

14:20 Rob added ice and packed coolers for shipping. COC taped to inside cover of one cooler at

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-27-00

WITNESS DATE

TITLE NSWC Crane 7-27-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

about 15:00. Coolers taped shut with signed custody seals.

3:10 pm I checked calibration of two water quality meters. Meters maintained calibration very well.

4:00 – 5:00 pm Packed meters, equipment for Fed Ex shipping. Two coolers and 5 boxes total for shipping.

5:00 pm Loaded boxes and coolers into truck and headed to Fed Ex office in Bloomington IN

6:40 pm reached/found Fed Ex office and shipped boxes.

7-9 pm had supper in Bloomington and returned to base.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-27-00

WITNESS DATE

TITLE NSWC Crane 7-28-00 PROJECT NO. 7393 BOOK 2450

Work continued from Page

7:15 am had breakfast at the cafeteria

7:45 met at lab and started cleaning up supplies, washing sinks and lab equipment, and throwing out garbage

8:45 said goodbye to Rob Hill. He is returning nitrogen tanks to Bedford IN Supply.

9:00 – 11:15 went out to Mustard gas burial ground (MGBG) and took pictures. Inspected access to site and difficulties of drilling for several drilling locations

11:15 – 12:00 noon. Returned to room, packed up, and checked out.

12:00 (noon) – 11:30 pm returned to Pittsburgh

END of ROUND 4

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Jeffrey P. Schubert DATE 7-28-00

WITNESS DATE

TITLE NSWC Crane

PROJECT NO. 7393

BOOK 2469

Wednesday July 26, 2000

Work continued from Page

Weather: Clear High of 88°F

0805 Bob Hill (RH) arrived @ 30-2
water level = 37.92'

0814 Started pumping Well 30-2. Will wait for water to start flowing Before starting Pumping Time.

0836 Started getting flow rate -
1 well volume = 2.39 gals.

1145 Found out fitting on air line hose going to well is bad - Have to take off after every cycle to let air out.

1213 Started Sampling #030 GW-002-04

1315 Finish sampling.

1340 Exit site to take samples to the office & run CR+6 samples, get Rice & eat lunch

1545 Arrived back on site. Set up on 030-06

1609 Started pumping 030-06

1757 Started sampling 030-06. Total Purged 2.7 gals.

1848 Finish sampling.

1915 Exit site to go back to field office

2015 Exit Field office for day

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE J.R. Hill

DATE 7-26-00

WITNESS

DATE

TITLE NSWC

7-27-00

PROJECT NO. 7593

BOOK

Work continued from Page

Weather: Partly Cloudy High of 85°F

0710 R. Hill (R.H) arrival @ Field office. Prep. for days activies

0825 Arrived @ 030-04, started setting up.

0848 Started Pumping. 1 well volume = ~~2.63 gals~~ 2.63 gals.

1109 Started Sampling. Total volume Purged = 2.8 gals

1202 Finish filling Sample bottles.

1230 Exit site for lunch.

1330 Arrival @ field office. Started packing samples & supplies.

1430 Exit Field office for day

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 7-27-00

WITNESS

DATE

TITLE

PROJECT NO.

BOOK

Work continued from Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE

WITNESS

DATE

ROUND 5
OCTOBER 2000

TITLE NSWC CRANE PROJECT NO. 7393

MONDAY 10.16.00 BOOK 2450

Work continued from Page LITE RAIN 68°F

0745 KEITH SIMPSON & FRANK WHORWICH @ PGH AIRPORT. FLT. DELAYS

1500 @ INDIANAPOLIS PICK-UP NITROGEN CYL IN BEDFORD TO CRANE

1900 CHECK INTO BCQ TO BLD 3245 & PREP FOR

1910 SAMPLING ON TUES CAL. EQ. RUN CR^{+6} STANDARD LOAD SUVs

2035 TO BCQ

CR^{6+} TEST INFO.

METER: HACH DR/890 COLORIMETER SER. # 000690011430

RENTED FROM US ENVIRONMENTAL

REAGENT: HACH CHROMAVER 3 CHROMIUM REAGENT CAT. # 25050-25, LOT A0154

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 Work continued to Page

SIGNATURE [signature] DATE 10.16.00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7393

TUES 10.17.00 BOOK 2450

Work continued from Page LT RAIN AM 55-68°F

0650 KS & FW @ LANDFARM SITE

0745 COMPLETE SITE WIDE (7 WELLS) WATER LEVELS.

FW SET-UP ON MW 30-03

KS @ 30-02 PURGE & SAMPLE

COMPLETE SAMPLING, RAN CR^{+6} @ WELLS.

1150 TO LUNCH THEN BLD 3245 RESTOCK TRUCKS

RETURN TO SITE

SET-UP ON MW 30-04 & 07

PURGE & SAMPLE

1800 FW COMPLETES 07 TO BLD 3245 TO CLEAN/CAL EQ. AND RESTOCK SUV.

KS SAMPLING MW 04

30-04 3X VOL FOR MS/MSD

30-07 2X VOL FOR DUP ON 01 05

2000 KS TO BLD 3245 UNLOAD SUV PAPER WORK

KS & FW TO BCQ

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605 Work continued to Page

SIGNATURE [signature] DATE 10.17.00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7570
WED 10.18.00 BOOK 2450

Work continued from Page SUNNY 44-67°F

0650 RS & FW @ LANDFARM SET-UP
@ MW 030-01 & 05
PURGE & SAMPLE
1145 COMPLETE SAMPLING
TO LUNCH & BLD 3245
1245 FW TO LANDFARM TO SAMPLE
MW 030-06
RS SITE TOUR WITH DRILLERS
FOR CTO 10
RS & FW @ BLD 3245 START
TO DEMOB, PACK EQUIPMENT.
1820 TO ~~BLD~~ RS BOQ

NOTE: THE HORIBA U-22
RENTED FROM US ENVIRONMENTAL
WAS SUPPLIED WITH THE WRONG
SPECIFIC CONDUCTANCE CAL. SOLUTION.
THEREFORE THE S. COND. FIELD READINGS
ARE IN ACCURATE AND SHOULD NOT
BE USED.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE [signature] DATE 10-18-00
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7570
THUR 10.19.00 BOOK 2450

Work continued from Page

0540 FW TO AIRPORT & POH OFFICE
0650 RS CHECK OUT OF BQ TO
BLD 3245 PACK EQUIPMENT
FOR RETURN & PAPERWORK
0800 TO BEDFORD & RETURN NITROGEN
CYL. PICK-UP ICE ON BASE
TO BLD 3260 PACK SAMPLES

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 Work continued to Page

SIGNATURE [signature] DATE 10-18-00
WITNESS DATE

APPENDIX C

SUMMARY OF FIELD ACTIVITIES

ROUND 1
OCTOBER 1999

NSWC CRANE, IN
CTO 19
SUMMARY OF FIELD ACTIVITIES
OCTOBER 11, 1999 THROUGH OCTOBER 15, 1999

The following is a summary of field activities conducted for RCRA Monitoring Event #1, October 11, 1999 through October 15, 1999, during one 5-day work shift, at the NSWC Crane facility, Crane, Indiana. RCRA Monitoring Event #1 sampling was completed for all monitoring wells at the Solid Waste Management Unit 30 (SWMU 30) commonly called the Landfarm. Field chemical analysis was also completed for Hexavalent Chromium, on-site, for all monitoring wells. Monitoring Event #1 sampling was conducted following the August 1999 Field Sampling Plan (FSP).

Monitoring Well Sampling:
Monitoring Event #1 sampling was completed for all seven monitoring wells. All samples to be analyzed at a fixed base laboratory were shipped, via over-night courier, to Laucks Testing Laboratory, Inc. Field chemical analysis for Hexavalent Chromium was conducted on site for all monitoring wells sampled. A HACH brand portable Colorimeter was used for the field chemical analysis of all samples. Purge water generated during the well development and sampling was transported (via 8 gal. containers) and held in a 300 gallon Poly-Tank, located at the field trailer. Pending analytical results confirming the purge water (IDW) as non-hazardous it will be discharged to the NSWC-permitted sanitary sewer system. See the table below for a list of monitoring wells and dates sampled.

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

For more details on any of the above activities, see the following: log books, sample log forms, and COCs.
Log book numbers: 2450 and 2469

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

MONITORING POINT	DEVELOPMENT DATE	SAMPLE DATE	QC SAMPLES
030-GW-001-01	9/21/99	10/13/99	---
030-GW-002-01	9/21/99	10/12/99	MS/MSD
030-GW-003-01	9/21/99	10/13/99	---
030-GW-004-01	9/22/99	10/13/99	---
030-GW-005-01	9/22/99	10/14/99	---
030-GW-006-01	9/21/99	10/14/99	---
030-GW-007-01	9/22/99	10/12/99	DUPLICATE
ADDITIONAL SAMPLES COLLECTED			
030-RB-001-01	---	10/11/99	RINSATE BLANK
030-FB-001-01	---	10/13/99	SOURCE BLANK
030-IW-001-01	---	10/14/99	IDW

Note: All monitoring well were developed during a previous field effort, 9/21 and 9/22/99.
Dedicated Bladder Pumps were installed in all seven wells on 10/11 and 10/12/99.

After receiving and reviewing analytical results of the IDW sample permission, from The Navy, was given on 12/14/99 to discharge the IDW to the NSWC-permitted Sanitary sewer system. IDW is scheduled to be discharge during the up coming January 2000 field effort.

ROUND 2
JANUARY 2000

SUMMARY OF FIELD ACTIVITIES
RCRA MONITORING EVENT #2
SWMU 30-LANDFARM
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

The following is a summary of field activities conducted for RCRA Monitoring Event #2, which took place during one 5-day work shift from January 10 through January 14, 2000 at NSWC Crane, Indiana. RCRA Monitoring Event #2 sampling was completed for all monitoring wells at the Solid Waste Management Unit 30 (SWMU 30) commonly called the Landfarm. Field chemical analysis for Hexavalent Chromium was also completed on site for all monitoring wells. Monitoring Event #2 sampling was conducted in accordance with the August 1999 Field Sampling Plan (FSP).

Field Activities During Event #2:
Monitoring Event #2 sampling was completed for all seven monitoring wells. All samples for fixed base laboratory analysis were shipped via over-night courier (Federal Express) to Laucks Testing Laboratory, Inc. Field chemical analysis for Hexavalent Chromium was conducted on site for all monitoring wells sampled. A HACH brand portable Colorimeter was used for the field chemical analysis of all samples. Purge water generated during well sampling was transported to Manhole 327 (via 8 gal. containers) and discharged to the NSWC Crane-permitted sanitary sewer system. See the table below for a list of monitoring wells and dates sampled.

Also during Event #2, the 300-gallon poly tank containing development and purge water from Event #1 had its contents discharged to the NSWC Crane-permitted sanitary sewer system.

In addition, the trailer was demobilized for the purpose of its removal. The contents of the trailer were transferred to an area inside the Pesticide Control Building, which is adjacent to the Environmental Building. This area takes the place of the trailer and will serve as TtNUS's Base office.

- **TtNUS personnel on site:**
  Scott Neil and Terry Rojahn

For more details on any of the above activities, see the following: Logbook #2450, sample log forms, and COCs.

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

MONITORING POINT	DEVELOPMENT DATE	SAMPLE DATE	QC SAMPLES
030-GW-001-01	9/21/99	1/12/00	---
030-GW-002-01	9/21/99	1/12/00	---
030-GW-003-01	9/21/99	1/13/00	MS/MSD
030-GW-004-01	9/22/99	1/11/00	---
030-GW-005-01	9/22/99	1/11/00	---
030-GW-006-01	9/21/99	1/13/00	Duplicate
030-GW-007-01	9/22/99	1/12/00	---

Note: All monitoring wells were developed during a previous field effort, 9/21 and 9/22/99.
Dedicated Bladder Pumps were installed in all seven wells on 10/11 and 10/12/99.

ROUND 3
APRIL 2000

SUMMARY OF FIELD ACTIVITIES
RCRA MONITORING EVENT #3
SWMU 30 - LANDFARM
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

The following is a summary of field activities conducted for RCRA Monitoring Event #3, which took place during one 4-day work shift, April 17 through April 20, 2000, at NSWC Crane, Indiana. RCRA Monitoring Event #3 sampling was completed for all monitoring wells at the Solid Waste Management Unit 30 (SWMU 30) commonly called the Landfarm. Field chemical analysis for hexavalent chromium was also completed on site for all monitoring wells. Monitoring Event #3 sampling was conducted in accordance with the August 1999 Field Sampling Plan (FSP).

Field Activities During Event #3:

Monitoring Event #3 sampling was completed for all seven monitoring wells. All samples for fixed base laboratory analysis were shipped via over-night courier (Federal Express) to Laucks Testing Laboratory, Inc.. The US EPA approved NSWC Crane's request to eliminate VOCs and energetics (explosives) from the chemical analysis list, therefore samples for these parameters were not collected during Monitoring Event #3 and will not be collected during Events #4 and #5. Field chemical analysis for hexavalent chromium was conducted on site for all monitoring wells sampled. A HACH brand portable colorimeter was used for the field chemical analysis of all samples. A synoptic round of water-levels measurements was taken at the seven monitoring wells, on April 17, 2000. Purge water generated during ground water sampling was transported to building 3245 (via 8 gal. Containers) and discharged to the NSWC Crane-permitted sanitary sewer system. See the table below for a list of monitoring wells and dates sampled.

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

For more details on any of the above activities, see the following: Logbook #2450, sample log forms, and COCs contained in the other appendices of this report.

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

MONITORING POINT	DEVELOPMENT STATE	SAMPLE DATE	QC SAMPLES
030-GW-001-03	9/21/99	4/18/00	MS/MSD
030-GW-002-03	9/21/99	4/18/00	---
030-GW-003-03	9/21/99	4/18/00	---
030-GW-004-03	9/22/99	4/18/00	DUPLICATE
030-GW-005-03	9/22/99	4/19/00	---
030-GW-006-03	9/21/99	4/19/00	---
030-GW-007-03	9/22/99	4/19/00	---

Note: All monitoring wells were developed during a previous field effort, 9/21 and 9/22/99. Dedicated bladder pumps were installed in all seven wells on 10/11 and 10/12/99.

ROUND 4
JULY 2000

SUMMARY OF FIELD ACTIVITIES
ROUND 4
SWMU 30 – LANDFARM
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

The following is a summary of field activities conducted during Round 4, which took place between July 24–27, 2000 at NSWC Crane, Indiana. Round 4 sampling was completed for all seven monitoring wells located at Solid Waste Management Unit (SWMU) 30, commonly called the Landfarm. Ground water samples were sent to Laucks Testing Laboratory for analysis of total and dissolved Appendix IX metals, cyanide, nitrate/nitrite, ammonia, total Kjeldahl nitrogen, and total and dissolved phosphorus. In addition, field chemical analyses for hexavalent chromium was also performed on site for all monitoring wells. Round 4 was conducted in accordance with the Phase II Ground Water Work Plan (TtNUS, August 1999).

Field Activities During Round 4:
All seven monitoring wells were purged and sampled during Round 4, using low-flow sampling procedures (Note: dedicated QED bladder pumps are installed in each of the seven wells). All samples for fixed-base laboratory analyses were shipped via overnight courier (Federal Express) to Laucks Testing Laboratory, Inc. A HACH portable Colorimeter was used for the field chemical analysis of hexavalent chromium. Purge water generated during well sampling was containerized and transported to Building #3245. The purge water was then discharged to the sanitary sewer drain, located outside at the rear of the building, for which permission has been obtained from the NSWC Crane Environmental Site Manager.

The ground water samples collected and dates collected are listed below:

MONITORING WELL	SAMPLE NO.	SAMPLE DATE	QC SAMPLES
30-1	030-GW-001-04	07-26-00	
30-2	030-GW-002-04	07-26-00	
30-3	030-GW-003-04	07-25-00	
30-4	030-GW-004-04	07-27-00	
30-5	030-GW-005-04	07-27-00	Matrix Spike
30-6	030-GW-006-04	07-26-00	
30-7	030-GW-007-04	07-26-00	Duplicate

TtNUS Personnel on Site:

Jeff Schubert and James Robert Hill

ROUND 5
OCTOBER 2000

SUMMARY OF FIELD ACTIVITIES
RCRA MONITORING EVENT #5
SWMU 30-LANDFARM
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

The following is a summary of field activities conducted for RCRA Monitoring Event #5, which took place during one 4-day work shift, October 16 through October 19, 2000, at NSWC Crane, Indiana. RCRA Monitoring Event #5 sampling was completed for all monitoring wells at the Solid Waste Management Unit 30 (SWMU 30) commonly called the Landfarm. Field chemical analysis for Hexavalent Chromium was also completed on site for all monitoring wells. Monitoring Event #5 sampling was conducted in accordance with the August 1999 Field Sampling Plan (FSP).

Field Activities During Event #5:
Monitoring Event #5 sampling was completed for all seven monitoring wells. All samples for fixed base laboratory analysis were shipped via over-night courier (Federal Express) to Laucks Testing Laboratory, Inc. The US EPA approve NSWC Cranes request to eliminate VOCs and Energetics (explosives) from the chemical analysis list, therefore samples for these parameters were not collected during Monitoring Event #5. The water quality meter (Horiba U-22 rented from US Environmental) was supplied with the wrong specific conductance calibration solution. This error was not found until after the sampling was complete. Therefore the specific conductance field readings (see Groundwater Sample Log Sheet) are inaccurate and should not be used. Field chemical analysis for Hexavalent Chromium was conducted on site for all monitoring wells sampled. A HACH brand portable Colorimeter (DR/890) was used for the field chemical analysis of all samples. A synoptic round of water levels measurements was taken, at the seven monitoring wells, on October 17, 2000. Purge water generated during groundwater sampling was transported to building 3245 (via 8 gal. containers) and discharged to the NSWC Crane-permitted sanitary sewer system. See the table below for a list of monitoring wells and dates sampled.

- **TtNUS personnel on site:**
  Frank Wudkwych and Keith Simpson

For more details on any of the above activities, see the following: Logbook #2450, sample log forms, and COCs.

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

MONITORING POINT	SAMPLE DATE	QC SAMPLES
030-GW-001-05	10/18/00	---
030-GW-002-05	10/17/00	---
030-GW-003-05	10/17/00	---
030-GW-004-05	10/17/00	MS/MSD
030-GW-005-05	10/18/00	---
030-GW-006-05	10/18/00	---
030-GW-007-05	10/17/00	Duplicate

Note: All monitoring wells were developed during a previous field effort, 9/21 and 9/22/99.
Dedicated Bladder Pumps were installed in all seven wells on 10/11 and 10/12/99.

APPENDIX D

WATER-LEVEL MEASUREMENT FORMS AND MONITORING WELL INSPECTION FORMS

ROUND 1
OCTOBER 1999

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: OVERCAST 73°F

Project No.: CTO ~~48~~ 125 19
Personnel: KEITH SIMPSON
Measuring Device: HERON (NUS 0001)
Remarks: DRY (NO TO LITTLE RAIN) OVER THE LAST MONTH

Well ID	Date	Time	Water Level *	Thickness of Free Product	PID Reading ppm RP	PID Reading ppm BZ	Comments
GW.001	9.20.99	1130	30.18	NA	0	0	
GW.002		1122	~~H22~~ 37.71		0	0	
GW.003		1125	39.93		0	0	
GW.004		1057	25.62		0	0	
GW.005		1100	27.03		0	0	
GW.006		1118	28.25		0	0	
GW.007		1108	25.45		0	0	25.45'

* All measurements to the nearest 0.01 foot

Signature(s): Keith S. Simpson

NSWC Crane
Field Form
Revision: 0
January 1999

NSWC Crane
Field Form
Revision: 0
January 1999

WATER LEVEL MEASUREMENT FORM

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: SUNNY / 72°F

Project No.: CTO 19 7393
Personnel: K. SIMPSON, S. NEIL
Measuring Device: HERON NMS 0001
Remarks:

Well ID	Date	Time	Water Level *	Thickness of Free Product *	PID Reading ppm RP	PID Reading ppm BZ	Comments
30-01	10.12.99	0914	30.51	0	0 ~~0.2~~	0	"NEW" DEDICATED
30-02	↓	0927	38.00	0	0	0	BLADDER PUMPS
30-03		0910	40.28	0	0.2	0	INSTALLED IN ALL WELLS (7)
30-04		0938	25.93	0	0	0	
30-05		0943	27.28	0	0	0	
30-06		0931	28.59	0	0	0	
30-07	↓	0935	25.72	0	0	0	

* All measurements to the nearest 0.01 foot

Signature(s): K. S. Simpson

MONITORING WELL INSPECTION FORM

CTO 19

Well ID: GW 30-01

Time: 1130 Date: 9.20.99 Inspector's Name: KEITH 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...	—		NA
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: 1
January: 1999

MONITORING WELL INSPECTION FORM

CTO 19

Well ID: GW 30 02

Time: 1122 Date: 9.20.99 Inspector's Name: KEITH 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...	—	—	NA
PVC Riser	Condition of riser & survey reference point	/		

Comments:

Signature(s) Keith E Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION FORM

CTO 19

Well ID: GW 30 -03

Time: 1125 Date: 9.20.99 Inspector's Name: KEITH 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...	—	—	NA
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) Keith E Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

GW 30-04

MONITORING WELL INSPECTION FORM

CTO 19

Well ID: GW 04

Time: 1057 **Date:** 9-20-99 **Inspector's Name:** KEITH 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...	KS ✓		NA
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) Keith E. Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION FORM

CTO19

Well ID: GW 30-5

Time: 1100 **Date:** 9.20.99 **Inspector's Name:** KEITH 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...	KS ✗		NA
PVC Riser	Condition of riser & survey reference point	✓		

Comments:

Signature(s) Keith E Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION FORM

CTO 19

Well ID: GW 30 06

Time: 1118 Date: 9.20.99 Inspector's Name: KEITH 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...	—	—	NA
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: 1
January: 1999

MONITORING WELL INSPECTION FORM

CTO 19

Well ID: GW 30-07

Time: 1100

Date: 9.20.99

Inspector's Name: [illegible]

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...	—	—	NA
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: 1
January: 1999

ROUND 2
JANUARY 2000

WATER LEVEL MEASUREMENT SHEET

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: WINDY, NO RAIN, UPPER 30'S.

Project No.: CTO 19
Personnel: SCOTT NEIL / TERRY ROTHAHN
Measuring Device: HERON DIPPER-T (TENUS # 0001)
Remarks:

Well ID	Date	Time	Water Level *	Thickness of Free Product	PID Reading ppm RP	PID Reading ppm BZ	Comments
30-1	1/11/00	0910	30.03	—	1.4	0.0	
30-2	↓	0905	37.54	—	0.10	0.0	
30-3		0900	39.82	—	0.0	0.0	
30-4		0915	25.36	—	0.0	0.0	
30-5		0918	26.71	—	0.0	0.0	
30-6		0928	28.12	—	0.0	0.0	
30-7		0923	25.16	—	0.0	0.0	

* All measurements to the nearest 0.01 foot

Signature(s): Scott Neil

MONITORING WELL INSPECTION SHEET

Well ID: 30-01

Time: 0910 **Date:** 1/11/00 **Inspector's Name:** SCOTT NEIL

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

Comments:

Signature(s) Scott W. Neil

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

NSWC Crane
Field Form
Revision: 1
January, 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-02

Time: 0905 Date: 1/11/00 Inspector's Name: SCOTT NEIL

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

Comments:

Signature(s) Scott Neil

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-03

Time: 0900 **Date:** 1/11/00 **Inspector's Name:** SCOTT NEIL

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

Comments:

Signature(s) Scott W. Neil

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

NSWC Crane
Field Form
Revision: 1
January 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-04

Time: 0915 Date: 1/11/00 Inspector's Name: SCOTT NEIL

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

Comments:

Signature(s) Scott N. Neil

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-05

Time: 0918 Date: 1/11/00 Inspector's Name: SCOTT NEIL

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

Comments:

Signature(s) Scott N. Neil

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

NSWC Crane
Field Form
Revision: 1
January 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-06

Time: 0928 Date: 1/11/00 Inspector's Name: SCOTT NEIL

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

Comments:

Signature(s) Scott A. Neil

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-07

Time: 0423 Date: 1/11/00 Inspector's Name: SCOTT NEIL

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

Comments:

Signature(s) Scott A. Neil

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

NSWC Crane
Field Form
Revision: 1
January 1999

ROUND 3
APRIL 2000

WATER LEVEL MEASUREMENT SHEET

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: LT. RAIN 60°F

Project No.: CTO 19
Personnel: R. SIMPSON, S. NEIL
Measuring Device: HERON
Remarks:

Well ID	Date	Time	Water Level *	Thickness of Free Product	PID Reading ppm RP	PID Reading ppm BZ	Comments
30 - 1	4.17.00	1525	30.16	—	0.0	0.0	
30 - 2	↓	1520	37.59	—	0.0	0.0	
30 - 3	↓	1515	39.85	—	0.0	0.0	
30 - 4	↓	1534	25.68	—	0.0	0.0	
30 - 5	↓	1530	26.98	—	0.0	0.0	
30 - 6	↓	1543	28.22	—	0.0	0.0	
30 - 7	↓	1537	25.36	—	0.0	0.0	

* All measurements to the nearest 0.01 foot

Signature(s): [illegible]

NSWC Crane
Field Form
Revision: 0
January 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-1

Time: 1525 **Date:** 4.17.00 **Inspector's Name:** KEITH 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… BLADDER PUMP	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 3

Signature(s) [signature]

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-2

Time: 1520 **Date:** 4.17.00 **Inspector's Name:** KEITH 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… BLADDER PUMP	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 3

Signature(s) Keith S. Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-3

Time: 1515 **Date:** 4.17.00 **Inspector's Name:** KEITH 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… BLADDER PUMP	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 3

Signature(s) Keith S. Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-4

Time: 1534 **Date:** 4.17.00 **Inspector's Name:** KEITH 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… BLADDER PUMP	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 3

Signature(s) K. S. Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-5

Time: 1530 **Date:** 4-17-00 **Inspector's Name:** KEITH 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… BLADDER PUMP	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 3

Signature(s) Keith Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-6

Time: 1543 **Date:** 4-17-00 **Inspector's Name:** KEITH 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… BLADDER PUMP	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 3

Signature(s) K. S. Simpson

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-7

Time: 1537 **Date:** 4.17.00 **Inspector's Name:** KEITH 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… BLADDER PUMP	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 3

Signature(s) [illegible]

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

NSWC Crane
Field Form
Revision: 1
January: 1999

ROUND 4
JULY 2000

WATER LEVEL MEASUREMENT SHEET

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: ~ 80° humid

Project No.: CTO 19
Personnel: Jeff Schubert, Rob Hill
Measuring Device: Slope Indicator W.L. Indicator
Remarks:

Well ID	Date	Time C.D.T	Water Level * (ft below toc)	Thickness of Free Product	PID Reading ppm RP	PID Reading ppm BZ	Comments
30-3	7-25-00	9:48am	40.20	0.0	0.0	0.0	
30-2	7-25-00	9:55	37.94	0.0	0.0	0.0	in woods
30-1	7-25-00	10:08	30.50	0.0	0.0	0.0	nested ants in lock sticking bad cap
30-5	7-25-00	10:22	27.37	0.0	0.0	0.0	ants nest around base of well lock sticking
30-4	7-25-00	10:29	26.01	0.0	0.0	0.0	
30-7	7-25-00	10:42	25.78	0.0	0.0	0.0	in woods
30-6	7-25-00	10:55	28.60	0.0	0.0	0.0	in woods

* All measurements to the nearest 0.01 foot

Signature(s): Jeff Schubert

MONITORING WELL INSPECTION SHEET

Well ID: 30-1

Time: 10:05 am **Date:** 7-25-00 **Inspector's Name:** Jeff Schubert

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		lock hard to open; needs WD-40
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… bladder pump	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round ~~#~~ 4

Signature(s) Jeff Schubert

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-2

Time: 9:52 am **Date:** 7-25-00 **Inspector's Name:** Jeff Schubert

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... ~~bladder pump~~	✓		
Area Immediately around well pad	Record any evidence of/or standing water in area of well	✓		
Dedicated sampling equipment	Condition of... bladder pump	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm, CTO 19, Round 4

Signature(s) Jeff Schubert

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-3

Time: 9:45 am Date: 7-25-00 Inspector's Name: Jeff Schubert

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.. bladder pump	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round ~~#~~ 4

Signature(s) Jeff Schubert

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-4

Time: 10:26 am **Date:** 7-25-00 **Inspector's Name:** Jeff Schubert

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… bladder pump	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 4

Signature(s) Jeff Schubert

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-5

Time: 10:18 am **Date:** 7-25-00 **Inspector's Name:** Jeff Schubert

Inspection Item	Types of Problems	Status		Observation
		S	U	
Well Tag	Is it in-place, legible	✓		
Well security	Condition protective case, cap, lock	✓		lock hard to open; needs WD-40
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… bladder pump	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 4

Signature(s) Jeff Schubert

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-6

Time: 10:52 am **Date:** 7-25-00 **Inspector's Name:** Jeff Schubert

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… bladder pump	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 4

Signature(s) Jeff Schubert

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

NSWC Crane
Field Form
Revision: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 30-7

Time: 10:36 am **Date:** 7-25-00 **Inspector's Name:** Jeff Schubert

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.. bladder pump	✓		
PVC Riser	Condition of riser & survey reference point	✓		

Comments: Land Farm Site, CTO 19, Round 4

Signature(s) Jeff Schubert

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

NSWC Crane
Field Form
Revision: 1
January: 1999

ROUND 5
OCTOBER 2000

WATER LEVEL MEASUREMENT SHEET

Project Name: NSWC Crane
Location: Crane, IN
Weather Conditions: LT RAIN
RAIN OVERNITE

Project No.: CTO 19
Personnel: R. SIMPSON, F. WUDRWYCH
Measuring Device: HERON
Remarks:

Well ID	Date	Time	Water Level *	Thickness of Free Product	PID Reading ppm RP	PID Reading ppm BZ	Comments
020 MW 03	10.17.00	0700	40.13	NONE	0	0	
01		0711	30.42		0	0	
06		0716	28.45		0	0	
05		0720	27.18		0	0	
04		0723	25.85		0	0	
07		0724	25.60		0	0	
02		0730	37.85		0	0	

* All measurements to the nearest 0.01 foot

Signature(s): [illegible]

MONITORING WELL INSPECTION SHEET

Well ID: 030 MW 01

Time: 0711 **Date:** 10.17.00 **Inspector's Name:** KEITH 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: 1
January 1999

MONITORING WELL INSPECTION SHEET

Well ID: 030 MW 02

Time: 0730 **Date:** 10.17.00 **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: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 030 MW 03

Time: 0700 Date: 10.17.00 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: 1
Ja[illegible]: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 030 MW 04

Time: 0723 Date: 10.17.00 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: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 030 MW 05

Time: 0720 Date: 10.17.00 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: 1
Ja[illegible]: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 030 MW 06

Time: 0716 **Date:** 10.17.00 **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: 1
January: 1999

MONITORING WELL INSPECTION SHEET

Well ID: 030 MW 07

Time: 0724 **Date:** _____ **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: 1
January: 1999

APPENDIX E

MANUFACTURER'S PUMP CERTIFICATIONS

10-11-99
3002
(30-02)

QED
Ground Water
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

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

TWC

Quality Certification Manager

SEP 1 1999
Date

P1150
Pump Model

089902
Batch Serial Number

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

10-11-99
30-01

QED
Ground Water
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

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

TWC

Quality Certification Manager

SEP 1 1999
Date

P1150
Pump Model

089902
Batch Serial Number

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

30-04
10-11-99

QED
GroundWater
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

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

INCA TWC TRJF

Quality Certification Manager

SEP 1 1999
Date

P1150
Pump Model

089902
Batch Serial Number

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

10-11-99
30-03

QED
GroundWater
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

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

INCA TWC TRJF

Quality Certification Manager

SEP 1 1999
Date

P1150
Pump Model

089902
Batch Serial Number

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

10.11.99
30-06

QED
Ground Water
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

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

INCA T.W.C. INJ

Quality Certification Manager

SEP 1 1999
Date

P1150
Pump Model

089902
Batch Serial Number

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

10.11.99
30-05

QED
Ground Water
Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

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

INCA T.W.C. INJ

Quality Certification Manager

SEP 1 1999
Date

P1150
Pump Model

089902
Batch Serial Number

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

10-11-99

30-07

QED

GroundWater Specialists

P.O. Box 3726 • Ann Arbor, MI 48106

QED PUMP CERTIFICATION

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

INCD TWC INJT

Quality Certification Manager

SEP 1 1999

Date

P1150

Pump Model

089902

Batch Serial Number

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

APPENDIX F

MONITORING WELL DEVELOPMENT RECORD

MONITORING WELL DEVELOPMENT RECORD

Well: 30-1
Site: LANDFARM
Date Installed: NA
Date: 9.21.99
Dev. Method: Surged & Pumped
Pump Type: Submersible 12V

Depth to Bottom (ft.): 48.11
Static Water Level Before (ft.): 30.41
Static Water Level After (ft.): 40.0'
Screen Length (ft.): 5
One Well Vol: 2.9 GAL
Casing ID (in.): 2" PVC

Personnel: K. SIMPSON
Drilling Co.: NA
Project Name: NSWC Crane
Project Number: CTO 19

FLOW RATE ≈ 0.5 GPM

SURGED 1ST FOR 5 MIN.

	Time	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
	1017	—	30.41	13.5	6.42	3.09	>999	LT. BRN., NO ODOR
	1023	3	↓	13.6	6.71	3.20	875	CLOUDY
	1029	6	↓	13.6	6.82	3.38	252	CLEARING
	1034	9	↓	13.5	6.70	3.47	125	
	1040	12	47.00	13.4	6.70	~~3.68~~ KS	241	S. COND = 3.25
RESTART	1101	12	NA	13.2	7.03	3.55	275	1044 DRY; TO 47'
	1105	14	↓	13.1	6.83	3.60	350	
	1108	16	↓	13.2	6.70	3.59	311	
	1112	18	↓	13.2	6.68	3.59	601	
	1117	21	↓	13.2	6.74	3.58	503	
	1120	22	↓	13.2	6.74	3.61	444	
	1124	24	↓	13.3	6.73	3.62	540	
	1128	26	↓	13.4	6.67	3.63	91	WL: CAN'T GET WL PROBE
	1133	29	40.00	13.2	6.75	3.65	75	PAST PUMP TUBING
	1135	END	DEVELOPMENT					PID Readings BH 0 PPM
								BZ 0 PPM

Note: Well was installed in the fall of 1993 and are being redeveloped at this time.

MONITORING WELL DEVELOPMENT RECORD

Well: 30-2
Site: LANDFARM
Date Installed: NA
Date: 9.21.99
Dev. Method: Surged & Pumped
Pump Type: Submersible 12V

Depth to Bottom (ft.): 52.50
Static Water Level Before (ft.): 37.89
Static Water Level After (ft.): 47.40
Screen Length (ft.): 5
One Well Vol: 2.4 GAL
Casing ID (in.): 2" PVC

Personnel: KEITH SIMPSON
Drilling Co.: NA
Project Name: NSWC Crane
Project Number: CTO 19

PUMP RATE ≈ 0.5+ GPM

SURGED 1ST FOR 5 MIN

START 1310

Time	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1312	1	37.89	14.2	6.79	1.89	821	LT GRAY; NO ODOR
1317	4		14.0	6.69	2.20	70	CLEARING
1325	8		13.9	6.49	2.33	48	
1330	11		14.0	6.64	2.34	108	→ MOVED PUMP
1335	14		14.1	6.55	2.31	16	
1345	21		14.1	6.49	2.32	18	
1355	28		14.2	6.47	2.32	0	
1405	34		14.1	6.46	2.32	0	
1415	40	47.40	14.1	6.46	2.32	0	
1418	END	DEVELOPMENT					
							PID Readings BH 0 PPM
							BZ 0 PPM

Note: Well was installed in the fall of 1993 and are being redeveloped at this time.

52.5

MONITORING WELL DEVELOPMENT RECORD

Well: 30-3
Site: LANDFARM
Date Installed: NA
Date: 9.21.99
Dev. Method: Surged & Pumped
Pump Type: Submersible 12V

Depth to Bottom (ft.): 53.90
Static Water Level Before (ft.): 40.16
Static Water Level After (ft.): 49.50
Screen Length (ft.): 10
One Well Vol: 2.2 GAL
Casing ID (in.): 2" PVC

Personnel: KEITH SIMPSON
Drilling Co.: NA
Project Name: NSWC Crane
Project Number: CTO 19

PUMP RATE ≈ 1 GPM START SLOWING TO ≈ 3/4 GPM

SURGED 1ST FOR 5 MIN.

	Time	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
	0837	—	40.16	14.2	6.10	2.22	>999	CLOUDY, NO ODOR
	0844	7	↓	13.8	6.33	2.21	949	
	0850	13	↓	13.4	6.25	2.26	376	CLEARING
	0900	20	49.50	13.9	5.77	2.26	159	DRY (TO PUMP INLET) @ 0902
RESTART	0920	21	42.50	13.9	5.98	2.26	164	
	0925	25	↓	13.7	6.02	2.25	193	
	0930	27	49.50	13.7	6.06	2.26	109	DRY (49.5') @ 0931
RESTART	0940	28	45.00	13.7	6.05	2.27	55	
	0945	31	↓	13.7	6.08	2.25	60	
	0947	32	49.50	13.7	6.07	2.25	24	DRY (49.5) @ 0948
	0948	33	END	DEVELOPMENT				

PID Readings BH 0 PPM
BZ 0 PPM

Note: Well was installed in the fall of 1993 and are being redeveloped at this time.

MONITORING WELL DEVELOPMENT RECORD

Well: 30-4
Site: LANDFARM
Date Installed: NA
Date: 9.22.99
Dev. Method: Surged & Pumped
Pump Type: Submersible 12V

Depth to Bottom (ft.): 41.88
Static Water Level Before (ft.): 25.90
Static Water Level After (ft.): 36.0
Screen Length (ft.): 10
One Well Vol: 2.6 GAL
Casing ID (in.): 2" PVC

Personnel: KEITH SIMPSON
Drilling Co.: NA
Project Name: NSWC Crane
Project Number: CTO 19

SURGED 1ST FOR 5 MIN

PUMP RATE 0.5 TO 1 GPM

	Time	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
START 0955	0957	2	25.90	12.6	6.39	4.19	>999	LT. GRAY, NO ODOR
	0959	4	40.0	DRY				
RESTART	1013	4	30.0	12.4	6.70	4.47	874	LT. BRN. TO CLOUDY
	1015	6	↓	12.9	6.40	4.38	461	
	1017	8	40.0	DRY				
RESTART	1036	8	30.0	13.0	6.05	4.54	176	CLEARING
	1038	10	↓	13.1	6.02	4.47	162	
	1040	11	↓	13.1	6.00	4.31	301	
	1041	12	40.0	DRY				
		END	DEVELOPMENT	@	1041			
								PID Readings BH 0 PPM
								BZ 0 PPM

Note: Well was installed in the fall of 1993 and are being redeveloped at this time.

MONITORING WELL DEVELOPMENT RECORD

Well: 30-5
Site: LANDFARM
Date Installed: NA
Date: 9-22-99
Dev. Method: Surged & Pumped
Pump Type: Submersible 12V

Depth to Bottom (ft.): 44.96
Static Water Level Before (ft.): 27.22
Static Water Level After (ft.): 36.0
Screen Length (ft.): 10
One Well Vol: 2.9 GAL
Casing ID (in.): 2" PVC

Personnel: KEITH SIMPSON
Drilling Co.: NA
Project Name: NSWC Crane
Project Number: CTO 19

PUMP RATE 0.5 TO 1 GPM

SURGED 1ST FOR 5 MIN.

	Time	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
START 1230	1232	2	27.22	14.6	6.70	2.47	>999	LT. BRN., NO ODOR
1234	~~1242~~	3	↓	14.4	6.60	2.17	545	
	1239	6	↓	14.4	6.53	2.76	>999	
	1242	7	44.0	14.4	6.51	2.94	210	DRY
RESTART	1302	7	30.0	14.5	6.40	2.97	43	
	1305	9	↓	14.4	6.42	3.03	396	
	1306	10	44.0	— DRY				
RESTART	1326	10	30.0	14.5	6.39	2.97	79	
	1329	12	↓	14.3	6.44	2.98	206	
	1331	13	↓	14.2	6.39	3.09	283	
	1332	14	44.0	— DRY				
			END DEVELOPMENT			@ 1332		
								PID Readings BH 0 PPM
								BZ 0 PPM

Note: Well was installed in the fall of 1993 and are being redeveloped at this time.

MONITORING WELL DEVELOPMENT RECORD

Well: 30-6
Site: LANDFARM
Date Installed: NA
Date: 9.21.99
Dev. Method: Surged & Pumped
Pump Type: Submersible 12V

Depth to Bottom (ft.): 44.9
Static Water Level Before (ft.): 28.45
Static Water Level After (ft.): 40.0
Screen Length (ft.): 10
One Well Vol: 2.7 GAL
Casing ID (in.): 2" PVC

Personnel: KEITH SIMPSON
Drilling Co.: NA
Project Name: NSWC Crane
Project Number: CTO 19

SURGED 1ST FOR 5 MIN

PUMP RATE ≈ 1 GPM

	Time	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ~~mS~~/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
START ~~1338~~ 1438 KS	~~1340~~	2	28.45	13.3	6.40	2.73	>999	LT. GRAY, NO ODOR
1445	~~134~~	7	↓	13.3	6.56	2.67	>999	
	1450	13		13.1	6.64	2.89	491	CLEARING
RESTART -	1507	14	31.5	13.0	6.53	2.95	68	DRY 44' @ 1451
	1512	19	44.0	12.8	6.52	2.98	150	DRY 44' @ 1512
RESTART -	1530	19	31.5	12.8	6.48	3.07	55	
	1534	23	44.0	12.7	6.49	2.92	154	DRY @ 1535-44.0'
44.9	1535	END	DEVELO	PMENT				
								PID Readings BH 0 PPM
								BZ 0 PPM

Note: Well was installed in the fall of 1993 and are being redeveloped at this time.

MONITORING WELL DEVELOPMENT RECORD

Well: 30-7
Site: LANDFARM
Date Installed: NA
Date: 9.22.99
Dev. Method: Surged & Pumped
Pump Type: Submersible 12V

Depth to Bottom (ft.): 45.20
Static Water Level Before (ft.): 25.66
Static Water Level After (ft.): 35.0
Screen Length (ft.): 10
One Well Vol: 3.2 GAL
Casing ID (in.): 2" PVC

Personnel: KEITH SIMPSON
Drilling Co.: NA
Project Name: NSWC Crane
Project Number: CTO 19

≈ 1 TO 0.5 GPM

PUMP RATE ≈ 1 GPM OR LESS

SURGED 1ST FOR 5 MIN.

START 0826

Time	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0828	2	25.66	12.7	5.65	2.86	581	CLOUDY, NO ODOR
0830	4		12.8	6.08	3.08	535	
0836	10		13.0	6.23	3.62	103	CLEARING
0841	13		12.9	6.18	3.75	107	
0848	16		12.7	6.12	3.54	43	
0854	21		12.7	6.15	3.88	58	
0901	25		12.7	6.19	3.90	18	
0908	29	44.0					DRY (44')
RESTART 0918	29	30.0	12.7	6.21	3.91	4	
0923	32		12.6	6.18	3.96	35	
0926	34	44.0					DRY (44')
	END	DEVELOPMENT		@	0926		
							PID Readings BH 0 PPM
							BZ 0 PPM

Note: Well was installed in the fall of 1993 and are being redeveloped at this time.

APPENDIX G

EQUIPMENT CALIBRATION LOGS

ROUND 1
OCTOBER 1999

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : HORIBA U10

PROJECT NAME : NSWC Crane

SERIAL NUMBER: 709047

PROJECT NUMBER : 7393 CTO 19

MANUFACTURER : HORIBA

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
9.21.99	4.05	AUTO CAL	AS PER MANUAL	NONE	3.99	TRS	USED AUTO-CAL
9.22.99	4.00	"	"	"	4.00	TRS	SOLUTION
9.23.99	3.98	"	"	"	3.99	TRS	"

Instrument Rented From: PINE ENVIRONMENTAL

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : SWMU 30-Landfarm

SITE NAME: NSWC Crane

PROJECT No.: 7393/CTO 19

INSTRUMENT NAME/MODEL: HORIBA / U 22

MANUFACTURER: HORIBA

SERIAL NUMBER: 9272106

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
10.12.99	9272106	RES	3.85 pH	4.35 cond.	4.01 pH	4.49 cond	907001	100-4 CAL SOLUTION
10/13/99	"	SWN	3.97 pH	4.30 cond.	4.01 pH	4.51 cond	"	"
10/14/99	"	SWN	3.98 pH	4.49 cond.	4.00 pH	4.50 cond	"	"

RENTED FROM PINE ENVIRONMENTAL
00739

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : SWMU 30-Landfarm

SITE NAME: NSWC Crane

PROJECT No.: 7393/CTO 19

INSTRUMENT NAME/MODEL: HORIBA/422

MANUFACTURER: HORIBA

SERIAL NUMBER: 9262009

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
10.12.99	9262009	RES	4.16 PH	4.43 cond	4.00 PH	4.49 cond	907001	100-4 CAL SOLUTION
10.13.99	"	RES	4.06	4.33	4.01	4.49	"	
10.14.99	"	RES	4.02	4.21	3.99	4.52	"	

RENTED FROM PINE ENVIRONMENTAL
00723

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : SWMU 30-Landfarm

SITE NAME: NSWC Crane

PROJECT No.: 7393/CTO 19

INSTRUMENT NAME/MODEL: PHOTOVAC 2020 (PID)

MANUFACTURER: PE

SERIAL NUMBER: ED FK 202

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
10/12/99	EDFK 202	Scott Neil	—	—	0.0	98	98 ppm ~~Isobutylene~~	ISOBUTYLENE
10.13.99	"	KES	—	—	0.0	99	98 PPM	"
10.14.99	"	KES	—	—	100	100	98 PPM	"

ROUND 2
JANUARY 2000

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : PE PHOTOVAC

PROJECT NAME : NSWC Crane

SERIAL NUMBER: ED FK 201

PROJECT NUMBER : CTO 19

MANUFACTURER : PE

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
1/11/00	0.0	ISOBUTYLENE	PER MAN.	NONE	100 ppm	SWN	100 PPM STANDARD
1/12/00	0.0	"	"	"	100 ppm	SWN	"
1/13/00	0.0	"	"	"	100 ppm	SWN	"

Instrument Rented From: PITTSBURGH WAREHOUSE

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : HORIBA U-22

PROJECT NAME : NSWC Crane

SERIAL NUMBER: ID # 00680

PROJECT NUMBER : CTO 19

MANUFACTURER : HORIBA / # 925015

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
1/11/00	NA	Auto Cal.	STANDARD	NA	NA	[signature]	pH 4.06/4.00 SC 4.31/4.49
1/12/00	"	"	"	"	"	[signature]	pH 4.02/4.00 SC 4.52/4.49
1/13/00	"	"	"	"	"	[signature]	pH 4.06/4.00 SC 4.44/4.49

→ Cat #2-AC00-8
Exp Date 8-4-01
Lot # 1994

Instrument Rented From: PINE ENV. SERV.

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : Horiba U-22

PROJECT NAME : NSWC Crane

SERIAL NUMBER: ID# 00887

PROJECT NUMBER : CTO 19

MANUFACTURER : HORIBA / #927255

MODEL U-2000

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
(TR) ~~10~~ 1/11/00	NA	Auto Cal	Standard	NA	NA	[signature]	pH 3.99/4.00 S.C. 4.51/4.49
1/12/00	"	"	"	"	"	[signature]	pH 4.03/4.00 SC 4.35/4.49
1/13/00	"	"	"	"	"	[signature]	ph 4.01/4.00 SC 4.31/4.49

↳ Cat. # 2-AC00-8
Exp. Date 8-4-01
Lot # 1994

Instrument Rented From: Pine Env. Serv.

ROUND 3
APRIL 2000

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : PHOTOVAC 2020

PROJECT NAME : NSWC Crane

SERIAL NUMBER: ED FJ 236

PROJECT NUMBER : CTO 19

MANUFACTURER : PERKIN-ELMER

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
4/17/00	0.0	ISOBUTYLENE	PER MAN.	NONE	100	SWN	CAL. GAS = 100ppm
4/18/00	0.0	"	"	NONE	100	SWN	"
4/19/00	0.0	"	"	NONE	100	SWN	"

Instrument Rented From: Pittsburgh Warehouse

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : Horiba/U-2000/U-22

PROJECT NAME : NSWC Crane

SERIAL NUMBER: 9292064

PROJECT NUMBER : CTO 19

MANUFACTURER : Horiba

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
4/18/00	—	Horiba Auto	Per Man.	None	See	Sun	pH = 3.99; Cond = 4.50;
—	—	Cal. Solution	—	—	comments	—	Turbidity = 0.
4/19/00	—	"	Per Man.	NONE	"	Sun	pH = 4.02; Cond = 4.54;
—	—	—	—	—	—	—	Turbidity = 0.

Instrument Rented From: US Environmental

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : HORIBA U-2000/U-22

PROJECT NAME : NSWC Crane

SERIAL NUMBER: 9292035

PROJECT NUMBER : CTO 19

MANUFACTURER : HORIBA

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
4/18/00	—	Horiba Auto	Per Man.	None	See comments	SWN	pH = 4.00; Cond = 4.51;
—	—	cal. solution	—	—	—	—	Turbidity = 0.
4/19/00	—	"	Per Man.	None	See Comments	SWN	pH = 4.00; Cond = 4.51;
—	—	—	—	—	—	—	Turbidity = 0.

Instrument Rented From: US Environmental

ROUND 4
JULY 2000

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: NSWC Crane

INSTRUMENT NAME/MODEL: Photoionization Detector Model 2020 with 11.7 eV Lamp

SITE NAME: Land Farm

MANUFACTURER: Photovac

PROJECT No.: 7393 (CTO 19)

SERIAL NUMBER: EDHJ334

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
7-25-00 (8:40am)	EDHJ334	JR Hill		~~100 ppm~~		100 ppm		Cal Gas = 100 ppm
7-25-00 (14:30)		JR Hill			97.0 ppm			checked cal. against cal gas
meter rented from U.S. Environmental, Waltham, MA								

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: NSWC Crane

INSTRUMENT NAME/MODEL: Model 6820/6-Series Env. Mon. System

SITE NAME: Land Farm

MANUFACTURER: YSI Inc.

PROJECT No.: 7393 (CTO 19)

SERIAL NUMBER: 217711

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings (NA) Pre-calibration	Instrument Settings Post-calibration	Instrument Readings Pre-calibration	Instrument Readings Post-calibration	Calibration Standard (Lot No.)	Remarks and Comments
7-25-00 (2:30 pm)	217711	JPS	Specific Cond.			1.000 mS/cm		KCl standard
			Dissolved Oxygen			100% (≈8.4 mg/L)		water-satd. air method assuming bar. pressure = 760 mm Hg
			pH			7.00 4.00		two-point method using pH = 7.0 and pH = 4.0 buffers
			ORP			+237 mV		Zobell solution, T=20°C
			Turbidy			0 NTU 100 NTU		distilled water standard
7-27-00 (3:20 pm)	217711	JPS	Specific Cond		←	1.011	mS/cm	KCl standard
			Dissolved O_2		99%			water-satd. air
			pH		7.04 4.09			pH 7.0 buffer pH 4.0 buffer
			ORP		+232	mV		Zobell solution
			Turbidity		102	NTU		standard soln.

Note -- meter calibrated on 7/25/00 to values listed above. On 7-27-00, standard solutions were measured as samples and the values were recorded. Instrument maintained calibration very well for all parameters.

meter rented from QED Environmental

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: NSWC Crane

SITE NAME: Land Farm

PROJECT No.: 7393 (CTO 19)

INSTRUMENT NAME/MODEL: Model 6820/6-Series Env. Monitoring System

MANUFACTURER: YSI Inc.

SERIAL NUMBER: 217714

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings: Pre-calibration	Instrument Settings: Post-calibration (NA)	Instrument Readings: Pre-calibration	Instrument Readings: Post-calibration	Calibration Standard (Lot No.)	Remarks and Comments
7/25/00 (2:40 pm)	217714	JPS	Specific Cond.			1.000 mS/cm		KCl standard
			Dissolved O_2			100% (8.4 mg/L)		water-saturated air method assuming bar. pressure = 760 mm Hg
			~~pH~~					
			pH			7.00 4.00		two-point method using pH = 7.0 and 4.0 standard buffers
			ORP			+237 mV		Zobell solution, T = 20°C
			Turbidity			0 NTU 100 NTU		distilled water standard
7-27-00 (3:35 pm)	217714	JPS	Specific Cond		←	1.007 mS/cm		KCl standard
			Dissolved O_2		98%			water-saturated air
			pH		7.06 4.02			pH 7.0 buffer pH 4.0 buffer
			ORP		+245 mV			Zobell Solution
			Turbidity		104 NTU			standard solution

Note – meter calibrated on 7-25-00 to values listed above. On 7-27-00 standard solutions were measured as samples and the values were recorded (see above). Instrument maintained calibration extremely well for all parameters.

Meter rented from QED Environmental

ROUND 5
OCTOBER 2000

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : HORIBA U-22

PROJECT NAME : NSWC Crane

SERIAL NUMBER: T0052020

PROJECT NUMBER : CTO 19

MANUFACTURER : HORIBA

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
10-16-00	4.20	Lot# 2133	AS PER MAN.	—	3.95	FOW	
10-17-00	3.68	"	"	—	3.99	FOW	

Instrument Rented From: _____

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : HORIBA U-22

SERIAL NUMBER: 9292062

MANUFACTURER : HORIBA

PROJECT NAME : NSWC Crane

PROJECT NUMBER : CTO 19

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
10-16-00	3.78	Lot #2133	AS PER MAN.	–	4.00	FCW	
10-17-00	3.82	"	"	–	3.99	FCW	

Instrument Rented From: _____

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : Photovac 20/20

SERIAL NUMBER: ED FK 206

MANUFACTURER : Photovac

PROJECT NAME : NSWC Crane

PROJECT NUMBER : CTO 19

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS
10-16-00	180	Lot# 29233	AS PER MAN.	—	100	Fa	

Instrument Rented From: _____

APPENDIX H

LOW-FLOW DATA SHEETS AND GROUND WATER SAMPLE LOG SHEETS

ROUND 1
OCTOBER 1999

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-001-01
Sample Location: 30-01
Sampled By: K. SIMPSON
C.O.C. No.: 320
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10·13·99	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 1005								
Method: Bladder Pump	CLEAR	6.91	3.81	14.6	6	6.19	101	NONE

PURGE DATA:

Date: 10·13·99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 48.11								
Static Water Level (WL): 30.30			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (~~gal~~ L): 2.9								
Start Purge (hrs): 0726								
End Purge (hrs): 0955								
Total Purge Time (min): 149								
Total Vol. Purged (~~gal~~ L): 3.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C 1000 ml	(1) ~~500~~ mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
500 ML PE FOR FIELD CR+6		@ 1122	✓

OBSERVATIONS / NOTES:

5' SCREEN

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): K. E. Simpson

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19
WELL ID.: 30-01
DATE: 10-13-99

Time	Water Level	Flow	pH	S. Cond.	Turb.	DO	Temp.	ORP	Comments
(24 hr)	(ft. below TOC)	(ml/min)	(S.U.)	(µS/cm)	(NTU)	(mg/l)	(Celcius)	(mV)	
0735	30.68	150	6.85	3.58	19	8.54	13.9	204	
0745	30.88	90	6.90	3.68	15	9.51	13.9	197	
0755	30.83	90	6.90	3.70	12	8.28	13.9	190	
0805	30.88	80	6.93	3.71	12	7.25	14.0	192	
0815	30.88		6.91	3.85	9	6.06	14.2	195	
0825	30.90		6.92	3.81	8	5.58	14.2	198	
0835	30.90		6.91	3.77	8	5.70	14.2	200	
0845	30.88		6.92	3.78	7	6.21	14.3	200	
0855	30.88		6.91	3.79	7	5.48	14.3	187	
0905	30.87		6.92	3.79	7	6.32	14.3	152	
0915	30.88		6.90	3.80	7	4.81	14.4	131	
0925	30.88		6.91	3.81	6	6.15	14.5	116	
0935	30.88		6.90	3.82	6	4.78	14.6	107	
0945	30.88		6.91	3.80	6	5.18	14.6	102	
0955	30.88		6.91	3.81	6	6.19	14.6	101	END PURGE
	START	SAMPLING	@ 0958						
	END	SAMPLING	@ 1125						

1 VOL = 2HR 15 MIN 0950

SIGNATURE(S): K-1 E. Simpson

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-002-01
Sample Location: 30-02
Sampled By: S. NEIL
C.O.C. No.: 00320
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/12/99	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 1326								
Method: Bladder Pump	CLEAR	6.84	2.41	14.9	3	5.95	203	NONE

PURGE DATA:

Date: 10/12/99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 52.50'								
Static Water Level (WL): 37.98'			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 2.4								
Start Purge (hrs): 1145								
End Purge (hrs): 1320								
Total Purge Time (min): 95								
Total Vol. Purged (gal/L): 2.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	9 ✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	6 ✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	3 ✓
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	3 ✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	3 ✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	3 ✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	3 ✓

OBSERVATIONS / NOTES:

Screen length = 5 ft.
Top of screen = 47.50 ft.
Filled one 500 mL poly for Cr^{6+} analysis.

Circle if Applicable:

MS/MSD YES

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19
WELL ID.: 30-02
DATE: 10/12/99

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(24 hr.)	(ft. below TOC)	(ml/Min.)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Celcius)	(mV)	
1145	37.98	→						→	Begin Purging - adjusted
1150	38.20	120	6.75	2.39	331	8.64	15.6	194	flow rate at beginning
1200	38.26	120	6.93	2.38	11	8.47	14.6	197	of purge.
1210	38.28	120	6.72	2.38	9	6.60	14.6	199	
1220	38.33	120	6.75	2.38	6	6.52	14.6	201	Reduce flow.
1230	38.28	96	6.76	2.44	4	5.21	14.8	201	
1240	38.28	96	6.80	2.44	3	5.04	14.8	198	
1250	38.26	96	6.80	2.41	9	5.03	14.8	200	
1300	38.27	96	6.78	2.38	4	4.96	14.8	201	
1310	38.26	96	6.82	2.39	0	5.83	14.9	204	
1320	38.27	96	6.84	2.41	3	5.95	14.9	203	End purging.
	Begin sampling @ 1326 - Sample ID 030-GW-002-01								

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-003-D1
Sample Location: 30-03
Sampled By: S. Neil
C.O.C. No.: 320
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/13/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1025	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	CLEAR	6.65	2.52	15.4	2	5.74	214	NONE

PURGE DATA:

Date: 10/13/99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.2								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 53.90'								
Static Water Level (WL): 39.96'			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 2.3								
Start Purge (hrs): ~~0839~~ 0739								
End Purge (hrs): 1017								
Total Purge Time (min): 158								
Total Vol. Purged (gal/L): 2.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C (SW)	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓

OBSERVATIONS / NOTES:

10' SCREEN
Top of Screen = 43.90'
Filled one 500mL poly for Cr^{6+} analysis.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Scott A. Neil

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19
WELL ID.: 30-03
DATE: 10/13/99

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
[illegible]	(ft below top of [illegible])	[illegible]	[illegible]	[illegible]	(NTU)	(mg/L)	(Celcius)	(mV)	
0739	39.96							→	BEGIN PURGING
0749	40.34	87	6.67	2.58	21.1	6.93	14.4	239	DECREASE FLOW. 870
0759	40.37	58	6.69	2.55	33	5.83	14.4	236	
0812	40.36	58	6.65	2.59	39	4.88	14.8	231	
0822	40.33	58	6.64	2.59	42	6.57	14.8	231	INCREASE FLOW. 1914
0832	40.36	62	6.70	2.60	20	6.44	15.0	223	
0842	40.37	62	6.71	2.64	11	6.45	15.1	222	
0852	40.37	62	6.70	2.64	14	5.24	15.3	220	
0902	40.36	62	6.68	2.63	10	6.94	15.3	223	INCREASE FLOW. 2480
0912	40.39	67	6.66	2.63	7	6.79	15.4	223	
0922	40.39	67	6.63	2.52	9	6.02	15.2	222	
0932	40.39	67	6.62	2.53	0	8.11	15.1	222	
0942	40.39	67	6.61	2.53	2	8.42	15.2	223	
0952	40.40	67	6.62	2.52	1	8.92	15.1	226	
1002	40.40	67	6.63	2.52	2	7.06	15.3	222	
1012	40.39	67	6.63	2.51	5	5.21	15.4	217	4490
1017	40.39	67	6.65	2.52	2	5.74	15.4	214	END PURGING.
	BEGIN SAMPLING @ 1025 - SAMPLE ID 030-GW-003-01.								

SIGNATURE(S): Scott W. Neil

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-004-01
Sample Location: 30-04
Sampled By: S. NEIL
C.O.C. No.:
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/13/99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1712	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	CLEAR	6.76	5.05	14.9	1	5.85	129	NONE

PURGE DATA:

Date: 10/13/99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 41.88'								
Static Water Level (WL): 25.54'			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 2.7								
Start Purge (hrs): 1343								
End Purge (hrs): 1708								
Total Purge Time (min): 205								
Total Vol. Purged (gal/L): 2.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C (SN)	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓

OBSERVATIONS / NOTES:

10' SCREEN
Top of the screen = 31.88 ft.
Filled one 500mL poly for Cr^{6+} analysis.

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Scott A. Neil

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 30-04
DATE: 10/13/99

Time (24 hours)	Water Level (ft. below TOC)	Flow (ml/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP (mV)	Comments
1343	25.54							→	BEGIN PURGING.
1348	25.82	70	6.82	4.98	9	7.14	15.9	232	DECREASE FLOW. 350
1358	25.96	56	6.67	5.05	34	4.23	15.3	230	
1408	26.07	56	6.76	5.07	27	7.99	15.6	223	DECREASE FLOW. 1150
1418	26.09	49	6.76	5.08	10	6.63	15.8	216	
1428	26.10	49	6.77	5.03	4	7.39	15.4	214	
1438	26.09	49	6.78	5.09	3	5.72	15.5	203	
1448	26.10	49	6.77	5.09	0	5.00	15.3	198	
1458	26.11	49	6.77	5.10	2	6.05	15.2	185	
1508	26.11	49	6.79	5.06	0	6.89	15.3	165	
1518	26.13	49	6.79	5.10	1	6.60	15.3	164	
1528	26.13	49	6.79	4.97	4	6.49	15.4	159	
1538	26.12	49	6.79	5.09	0	7.14	15.4	153	
1548	26.14	49	6.77	5.08	0	6.50	15.2	152	
1558	26.14	49	6.78	5.11	0	7.01	15.3	148	
1608	26.13	49	6.77	5.01	0	6.22	15.2	144	
1618	26.14	49	6.76	5.03	0	5.40	15.2	144	
1628	26.14	49	6.77	4.99	0	5.98	15.1	139	
1638	26.15	49	6.75	5.11	0	5.71	15.0	139	
1648	26.14	49	6.76	5.11	0	6.16	15.0	139	
1658	26.15	49	6.79	5.04	1	5.90	14.9	138	
1705	26.16	49	6.76	5.05	1	5.85	14.9	129	END PURGING.
	BEGIN SAMPLING @ 1712 - SAMPLE ID 030-GW-004-01.								

SIGNATURE(S): Scott W. [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-005-01
Sample Location: 30-05
Sampled By: R. SIMPSON
C.O.C. No.: 321
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10-14-99	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 0950								
Method: Bladder Pump	CLEAR	6.94	3.19	13.2	2	6.44	247	NONE

PURGE DATA:

Date: 10-14-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 44.96								
Static Water Level (WL): 27.34			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (~~gal~~ L): 2.9								
Start Purge (hrs): 0723								
End Purge (hrs): 0945								
Total Purge Time (min): 142								
Total Vol. Purged (~~gal~~ L): 3.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
CR+6 FIELD TEST	4°C	1 500 ML PE	✓

OBSERVATIONS / NOTES:

10' SCREEN

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
—		R. S. Simpson

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 30-05
DATE: 10.14.99

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(24hr)	(ft below TOC)	(ml/Min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(celcius)	(mV)	
0735	27.82	100	7.00	3.03	15	7.59	12.0	237	
0745	27.86	85	6.94	3.06	10	5.77	12.5	237	
0755	27.89	80	6.94	3.10	10	5.48	12.6	237	
0805	27.89	80	6.94	3.04	8	6.94	12.6	238	
0815	27.90		6.96	3.17	7	6.28	12.7	239	
0825	27.90		6.94	3.09	4	7.51	12.7	235	
0845	27.91		6.93	3.19	4	5.12	13.0	238	
0855	27.91		6.93	3.22	2	6.05	13.0	239	
0905	27.92		6.93	3.15	2	6.07	13.0	241	TEMP. INCREASE DUE
0915	27.92		6.94	3.17	2	6.50	13.1	242	TO SUN SHINE ON
0925	27.94		6.95	3.17	2	7.12	13.2	243	DISCHARGE TUBING
0935	27.94		6.93	3.19	2	5.79	13.2	246	& AIR TEMP. INCREASE
0945	27.95		6.94	3.19	2	6.44	13.2	247	
		START	SAMPLING	@ 0948					
		END	SAMPLING	@ 1010					
		END	WL =	27.94					

~~1 VOL = 100 MIN @ 50 ML/M~~ KS 0915

1 VOL = 137 MIN @ 80 ML/MIN 0942

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-006-01
Sample Location: 30-06
Sampled By: J. NEIL
C.O.C. No.: 321
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10/14/99	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 1025								
Method: Bladder Pump	CLEAR	7.06	3.24	12.4	1	7.17	224	NONE

PURGE DATA:

Date: 10/14/99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 44.90'								
Static Water Level (WL): 28.58'			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 2.7								
Start Purge (hrs): 0735								
End Purge (hrs): 1020								
Total Purge Time (min): 165								
Total Vol. Purged (gal/L): 2.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓

OBSERVATIONS / NOTES:

10' SCREEN
TOP OF SCREEN = 34.90'
Filtered one 500 mL poly for Cr^{6+} analysis.
Samples contain a multitude of tiny bubbles.

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 30-06
DATE: 10/14/99

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments	
(24 hr)	(ft. below TOC)	(mL/Min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Celcius)	(mV)		
0735	28.52							→	BEGIN PURGING.	
0740	28.86	69	6.79	3.11	19	8.71	11.3	264	~~REDUCE~~ REDUCE FLOW.	345
0750	28.92	60	6.95	3.22	23	8.45	11.1	258		
0800	28.94	60	6.97	3.16	7	7.81	11.0	249		
0810	28.97	60	6.97	3.27	7	8.70	10.8	241		
0820	28.97	60	6.99	3.29	4	9.73	10.7	240		
0830	29.00	60	7.01	3.23	9	8.45	10.9	237		
0840	28.96	60	6.99	3.20	8	7.82	11.4	234		
0850	28.97	60	7.02	3.20	3	7.58	12.0	233		
0900	28.98	60	7.00	3.21	4	7.65	11.9	234	INCREASE FLOW.	480
0910	29.00	64	6.98	3.21	5	4.76	12.1	233		
0920	29.02	64	7.04	3.21	3	7.97	12.1	230		
0930	29.02	64	7.03	3.30	1	7.47	12.2	229		
0940	29.03	64	7.03	3.27	0	5.69	12.2	230		
0950	29.03	64	7.04	3.26	0	7.51	12.3	226		
1000	29.03	64	7.05	3.27	1	7.05	12.4	223		
1010	29.03	64	7.05	3.25	0	7.45	12.4	226		
1020	29.03	64	7.06	3.24	1	7.17	12.4	224	END PURGING	510
	BEGIN SAMPLING @ 1025 - SAMPLE ID 030-GW-0006-01.									

SIGNATURE(S): Scott W. Neal

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-007-01
Sample Location: 30-07
Sampled By: K. SIMPSON
C.O.C. No.: 320
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 10·12·99 Time: 1440	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Method: Bladder Pump	CLEAR	6.91	4.41	14.0	7	3.12	195	NONE

PURGE DATA:

Date: 10·12·99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 45.20								
Static Water Level (WL): 25.76			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 3.2								
Start Purge (hrs): 1142								
End Purge (hrs): 1435								
Total Purge Time (min): 173								
Total Vol. Purged (gal/L): 3.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	6	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	4	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	2	✓
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	2	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	2	✓
Phosphorus (Dissolved) FILTERED	H_2SO_4/4°C	(1) 1000 mL Polyethylene	2	✓
Metals (Dissolved) FILTERED	HNO_3/4°C	(1) 1000 mL Polyethylene	2	✓
CR+6 FIELD TEST SAMPLED @		1720		
			DUP	
			2X VOL	
			COLLECTED	

OBSERVATIONS / NOTES:

10' SCREEN

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	DUP-GW-001-01

Signature(s): K. E. Simpson

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 30-07
DATE: 10.12.99

Time	Water Level	Flow	pH	S. Cond.	Turb.	DO	Temp.	ORP	Comments
	(ft)	(ml/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(degrees C)	(mV)	
1148	26.21	150	6.82	3.98	0	6.34	14.2	222	
1158	26.22	100	6.79	4.15	16.3	4.77	14.0	212	PH = 6.79
1208	26.23	80	6.81	4.09	31	4.65	14.0	212	
1218	26.24	80	6.80	4.10	18	4.98	14.1	212	
1230	26.25		6.81	4.29	7	4.37	14.1	214	
1240	26.25		6.81	4.21	6	4.53	14.1	216	
1250	26.25		6.83	4.23	6	4.29	14.2	216	
1300	26.26		6.82	4.39	6	3.69	14.2	220	
1310			6.84	4.30	7	5.06	14.1	219	
1320			6.86	4.31	7	6.52	14.2	219	
1330			6.85	4.44	7	4.56	14.2	223	
1340			6.85	4.47		4.00	14.2	223	
1350			6.82	4.39		4.31	14.1	222	
1400			6.83	4.48		3.77	14.1	218	
1415			6.82	4.39		3.92	14.1	214	
1425			6.82	4.39		3.90	14.0	206	
1435			6.81	4.41		3.12	14.0	195	
	END DEVELOPMENT			START	SAMPLING		1435		
				END	SAMPLING		1725		

150 min = 1 vol 1420

SIGNATURE(S): K. J. S. Simpson

ROUND 2
JANUARY 2000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-001-02
Sample Location: 30-01
Sampled By: T. ROJAHN
C.O.C. No.: 323
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1/12/00	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 1100								
Method: Bladder Pump	CLEAR	7.10	3.76	11.4	0.6	4.04	106	NONE

PURGE DATA:

Date: 1/12/99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 48.11								
Static Water Level (WL): 31.34			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 10.4								
Start Purge (hrs): 0827								
End Purge (hrs): 1057								
Total Purge Time (min): 150								
Total Vol. Purged (gal/L): 10.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) 500 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
CR^{+6}	FIELD TEST	(1) 500 ml PE	✓

OBSERVATIONS / NOTES:

5' SCREEN (TOP OF SCREEN = 43.11')

48.11
- 31.34
16.77 × .163 = 2.73 gal OR 10.35 L

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 030-GW-001-02
DATE: 30-01

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments	ACC VOL
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(NTU)	[illegible]	[illegible]	[illegible]		
0827	31.34	—	6.77	3.91	4.4	7.69	10.5	260	Start Purge	
0837	31.70	75	7.20	3.78	1.0	8.55	9.2	247	CLEAR	750
0847	31.77	75	7.02	3.79	1.2	5.26	9.7	235	CLEAR	~~1500~~ 1500
0857	31.80	75	7.02	3.67	1.3	8.97	10.1	227	CLEAR	2250
0907	31.81	72	7.02	3.69	1.2	4.30	10.3	218	CLEAR	2970
0917	31.83	72	7.04	3.67	1.2	4.23	10.5	212	CLEAR	3690
0927	31.83	71	7.06	3.70	0.9	4.46	10.3	207	CLEAR	4400
0937	31.84	70	7.08	3.70	0.6	4.72	10.6	201	CLEAR	5100
0947	31.84	71	7.10	3.72	0.8	4.88	10.5	197	CLEAR	5810
0957	31.84	71	7.10	3.72	0.2	4.31	10.7	189	CLEAR	6520
1007	31.85	70	7.08	3.74	0.8	3.92	10.7	177	CLEAR	7220
1017	31.85	70	7.10	3.74	1.4	4.08	10.8	157	CLEAR	7920
1027	31.86	70	7.12	3.75	0.6	4.25	11.0	139	CLEAR	8620
1037	31.87	71	7.12	3.75	0.8	4.18	11.1	125	CLEAR	9330
1047	31.86	70	7.12	3.76	0.6	4.08	11.3	113	CLEAR	10030
1057	31.87	70	7.10	3.76	0.6	4.04	11.4	106	CLEAR	10730
1100									Start Sampling	

SIGNATURE(S): Terry Rogers

10.4 L MI[illegible]OL

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-002-02
Sample Location: 30-02 (LANDFARM)
Sampled By: S. NEIL
C.O.C. No.: 323
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1/12/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1035	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	Clear	6.76	2.45	8.1	5.6	5.21	206	NONE

PURGE DATA:

Date: 1/12/00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 52.50								
Static Water Level (WL): 37.78			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 2.4								
Start Purge (hrs): 0830								
End Purge (hrs): 1030								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 2.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓

OBSERVATIONS / NOTES:

5 FT. SCREEN
TOP OF SCREEN = 47.50 FT.
FILLED ONE (1) 500mL unpres. POLY FOR Cr 6+ analysis (FIELD).
Final H_2O level = 38.02 FT.

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Scott Neil

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 30-02 (LANDFARM)
DATE: 1/12/00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0830	37.78	→						→	Begin purging.
0840	37.85	84	6.44	2.53	2.1	8.04	7.2	308	
0850	37.88	84	6.70	2.44	2.4	5.57	9.3	296	
0900	37.91	84	6.78	2.50	0	5.10	8.0	278	
0910	37.95	84	6.76	2.50	11.6	5.74	8.2	267	
0920	37.96	84	~~6.74~~ 6.79	2.54	15.4	5.36	8.0	248	
0930	37.97	84	6.78	2.53	4.3	5.19	7.9	233	
0940	37.97	84	6.75	2.51	5.1	5.64	7.6	229	
0950	37.98	84	6.76	2.50	6.7	5.33	7.3	214	
1000	37.98	84	6.76	2.47	5.5	5.69	7.5	214	
1010	37.98	84	6.78	2.46	5.8	5.13	7.9	216	
1020	37.99	84	6.74	2.46	4.6	5.51	8.1	210	
1030	37.98	84	6.76	2.45	5.6	5.21	8.1	206	END PURGING
	BEGIN SAMPLING @		1035 - SAMPLE # 030-GW-023-02.						
	END SAMPLING @		1200.						

SIGNATURE(S): Scott M. Reid

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Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-003-02
Sample Location: 30-03
Sampled By: T. ROJAHN
C.O.C. No.: 326
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1-13-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1055	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	CLEAR	6.58	2.42	10.8	0.1	4.79	192	NONE

PURGE DATA:

Date: 1-13-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 1.4								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 53.90								
Static Water Level (WL): 41.25			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 7.8								
Start Purge (hrs): 0842								
End Purge (hrs): 1052								
Total Purge Time (min): 130								
Total Vol. Purged (gal/L): 8.1								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cr^{+6}	FIELD TEST	(1) 500 ml	✓

OBSERVATIONS/NOTES:

53.90
- 41.25
12.65 x .163 = 2.06 gal = 7.8L
10' SCREEN (TOP OF SCREEN = 43.90')

Circle if Applicable:

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

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 030-GW-003-02
DATE: 30-03

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
[illegible]	(ft below TOC)	(ml/Min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Deg C)	(mV)	
0842	41.25	—	6.39	2.49	0.1	7.82	11.1	275	Start Purge
0852	41.55	62	6.73	2.44	13.2	7.86	10.3	260	CLEAR 620
0902	41.59	64	6.72	2.43	14.7	6.24	9.8	241	CLEAR 1260
0912	41.65	63	6.70	2.47	15.9	5.33	10.6	234	CLEAR 1890
0922	41.64	60	6.56	2.43	20.1	4.32	10.3	227	CLEAR 2490
0932	41.71	60	6.54	2.38	0.1	12.17	10.3	218	CLEAR 3090 → REPAIR DISCHARGE LEAK
0942	41.75	63	6.58	2.44	0.1	4.64	10.0	209	CLEAR 3720
0952	41.77	63	6.56	2.41	0.1	7.50	10.0	211	CLEAR 4350
1002	41.74	62	6.56	2.42	0.4	4.73	10.1	210	CLEAR 4970
1012	41.76	60	6.57	2.43	1.0	8.30	10.1	209	CLEAR 5570
1022	41.80	63	6.57	2.44	0.7	4.44	10.2	205	CLEAR 6200
1032	41.81	63	6.58	2.42	0.1	5.61	10.8	193	CLEAR 6830
1042	41.82	63	6.58	2.43	0.1	4.89	10.8	189	CLEAR 7460
1052	41.82	63	6.58	2.42	0.1	4.79	10.8	192	CLEAR 8090
1055									Start Sampling

SIGNATURE(S): Tony Rogers

MIN VOL [illegible] 7.8L

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-004-02
Sample Location: 30-04
Sampled By: T. ROJAHN
C.O.C. No.: 323
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1/11/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1455	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	CLEAR	6.70	4.87	11.7	0.1	3.08	103	NONE

PURGE DATA:

Date: 1-11-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 41.88								
Static Water Level (WL): 26.61			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 9.42								
Start Purge (hrs): 1223								
End Purge (hrs): 1453								
Total Purge Time (min): 150								
Total Vol. Purged (gal/L): 9.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cr+6	Field Test	(1) 500 ml PE	✓

OBSERVATIONS/NOTES:

41.88
-26.61
15.27 × .163 = 2.49 gal = 9.42 L
Top of Screen = 31.88

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 30-04
DATE: 1/11/00

Time (Hrs)	Water Level (Ft. below TOC)	Flow (ml/Min)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Deg C)	ORP (mV)	Comments	Acc. Vol.
									Start PURGE	
1223	26.61	—	6.64	4.90	0.1	6.77	11.5	239	Clear	670
1233	27.21	67	6.72	4.73	1.0	6.30	11.2	224	"	1340
1243	27.25	67	6.70	4.72	1.1	4.42	11.2	157	"	1990
1253	27.32	65	6.70	4.74	0.4	4.07	11.0	137	"	2610
1303	27.35	62	6.72	4.78	0.3	3.99	10.5	149	"	3230
1313	27.31	62	6.70	4.77	0.3	3.92	11.4	131	"	3870
1323	27.32	64	6.68	4.78	0.6	3.44	11.8	113	"	4510
1333	27.33	64	6.69	4.79	0.7	3.43	11.8	106	"	5150
1343	27.33	64	6.71	4.81	1.2	3.64	11.7	102	"	5780
1353	27.38	63	6.71	4.81	0.9	3.62	11.8	101	"	6430
1403	27.40	65	6.70	4.84	0.4	3.40	11.9	102	"	7070
1413	27.41	64	6.71	4.84	0.8	3.57	11.7	103	"	7710
1423	27.43	64	6.69	4.85	0.5	3.12	11.8	103	"	8360
1433	27.45	65	6.70	4.86	0.5	3.15	11.7	103	"	8980
1443	27.45	62	6.70	4.86	0.4	3.21	11.8	103	"	9630
1453	27.46	65	6.70	4.87	0.1	3.08	11.7	103	Start SAMPLING	
1455	—	—	—	—	—	—	—	—		

SIGNATURE(S): Terry Kogan

MIN VOL = 9.42 L

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 03q-GW-005-02
Sample Location: 30-05 (LANDFARM)
Sampled By: S. NEIL
C.O.C. No.: 323
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1/11/00	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 1530								
Method: Bladder Pump	CLEAR	6.89	3.00	11.6	0	3.60	~~175~~ 175	NONE

PURGE DATA:

Date: 1/11/00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 44.96								
Static Water Level (WL): 26.87			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 2.9								
Start Purge (hrs): 1245								
End Purge (hrs): 1525								
Total Purge Time (min): ~~220~~ 160								
Total Vol. Purged (gal/L): 3.0								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓

OBSERVATIONS / NOTES:

SCREEN LENGTH = 10 FT.
TOP OF SCREEN = 34.96 FT.
End sampling @ 1657
Final H2O level = 27.50 FT.

Circle if Applicable:

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

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 30-05 (LANDFARM)
DATE: 1/11/00

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(Hrs.)	(Ft. below TOC)	(ml/min)	(S.U.)	(mS/cm)	(NTU)	(mg/L)	(Celcius)	(mV)	
1245	26.87							→	
1250	27.15	78	6.82	2.94	8.7	3.86	13.0	189	
1255	27.20	78	6.83	2.94	13	2.94	13.1	186	Reduce flow rate.
1300	27.30	71	6.85	2.85	14	3.40	12.6	185	780
1305	27.33	71	6.91	2.81	0	3.17	13.6	188	
1315	27.35	71	6.81	2.77	0	4.49	12.6	186	
1325	27.36	71	6.88	2.85	5	3.91	12.9	177	
1335	27.38	71	6.81	2.89	12	2.65	13.2	170	
1345	27.38	71	6.85	2.87	0	3.17	13.1	179	
1355	27.37	71	6.89	2.84	0	3.05	12.6	173	
1405	27.37	71	6.91	2.94	0	3.25	12.9	168	
1415	27.38	71	6.90	2.87	0	3.39	12.8	164	
1425	27.39	71	6.90	2.90	0	3.47	12.8	163	
1435	27.41	71	6.92	2.92	0	3.13	12.6	160	
1445	27.42	71	6.90	2.97	0	3.34	12.3	157	
1455	27.42	71	6.90	2.95	0	3.56	12.0	162	
1505	27.43	71	6.91	2.96	0	3.30	11.9	167	
1515	27.43	71	6.89	2.98	0	3.52	11.7	167	
1525	27.42	71	6.89	3.00	0	3.60	11.6	175	End purging
	BEGIN SAMPLING @ 1530 - SAMPLE # 030-GW-005-02.								
	END SAMPLING @ 1657.								

SIGNATURE(S): [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-006-02
Sample Location: 30-06 (LANDFARM)
Sampled By: J. NEIL
C.O.C. No.: 326
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1/13/00 Time: 1205	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Method: Bladder Pump	CLEAR	6.85	3.15	10.4	0	3.59	162	NONE

PURGE DATA:

Date: 1/13/00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 44.90								
Static Water Level (WL): 28.42'			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume (gal/L): 2.7								
Start Purge (hrs): 0910								
End Purge (hrs): 1200								
Total Purge Time (min): 170								
Total Vol. Purged (gal/L): 2.8								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials x 2 = 6	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass x 2 = 4	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene x 2 = 2	✓
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene x 2 = 2	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene x 2 = 2	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene x 2 = 2	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene x 2 = 2	✓

OBSERVATIONS / NOTES:

SCREEN LENGTH = 10 FT.
TOP OF SCREEN = 34.90 FT.
FILLED one (1) 500 mL poly. for Cr^{6+} field analysis.
FINAL H2O LEVEL = 29.03 FT.
END SAMPLING @ 1457

Circle if Applicable:

MS/MSD

Duplicate ID No.: DUP-GW-001-02

Signature(s): Scott W. Neil

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19
WELL ID.: 30-06 (LANDFARM)
DATE: 1/13/00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0910	28.42								Begin purging.
0920	28.75	67	6.79	3.17	6.2	4.97	9.5	284	Reduced flow rate.
0930	28.80	62	6.91	3.12	0	5.39	9.6	274	
0940	28.82	62	6.92	3.12	0	5.74	9.4	270	
0950	28.85	62	6.90	3.10	0	5.96	9.3	269	
1000	28.89	62	6.88	3.08	0	3.18	10.1	257	
1010	28.90	62	6.87	3.15	0	2.81	10.2	246	
1020	28.90	62	6.88	3.08	0	3.42	10.3	233	
1030	28.91	62	6.88	3.11	0	3.39	10.3	206	
1040	28.93	62	6.88	3.10	0	2.68	10.3	194	
1050	28.93	62	6.84	3.14	0	3.90	10.5	195	
1100	28.93	62	6.86	3.10	0	3.74	10.6	196	
1110	28.95	62	6.85	3.10	0	3.36	10.6	196	
1120	28.98	62	6.84	3.15	0	4.07	10.5	185	
1130	28.99	62	6.85	3.11	0	3.18	10.7	180	
1140	28.99	62	6.84	3.12	0.9	3.29	10.6	180	
1150	28.98	62	6.86	3.16	0	3.51	10.4	175	
1200	28.99	62	6.85	3.15	0	3.59	10.4	162	End purging.
	Begin sampling @ 1205 : Sample ID # 030-GW-006-02.								
	End sampling @ 1457.								

SIGNATURE(S): Scott Reid

PAGE 1 OF 1

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-007-02
Sample Location: 30-07
Sampled By: T. ROJAHN
C.O.C. No.: 326
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 1-12-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1657	Visual	Standard	µS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	CLEAR	7.06	4.37	12.5	0.1	447	177	NONE

PURGE DATA:

Date: 1-12-99	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm): 0.0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 45.20								
Static Water Level (WL): 26.33			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 11.6								
Start Purge (hrs): 1415 ~~160 min~~ TR								
End Purge (hrs): 1655								
Total Purge Time (min): 160								
Total Vol. Purged (gal/L): 12.2								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	✓
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	✓
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cyanide	NaOH/4°C	(1) ~~500~~ 1000 mL Polyethylene	✓
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	✓
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	✓
Cr^{+6}	FIELD TEST	(1) 500 mL PE	✓

OBSERVATIONS / NOTES:

10' SCREEN (TOP OF SCREEN = 35.20')

45.20
-26.33
18.87 = 3.07 gal = 11.6 L

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): Terry Rojahn

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393/CTO 19

WELL ID.: 030-GW-007-02
DATE: 30-07

Time (Hrs)	Water Level (Ft below TOC)	Flow (ml/Min)	pH (S.U.)	Cond. (S/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Deg C)	ORP (mV)	Comments	ACC. VOL.
1415	26.33	—	7.07	4.26	0.1	7.49	12.7	184	START PURGE	
1425	26.62	76	7.19	4.17	0.6	7.37	12.5	176	CLEAR	760
1435	26.62	76	7.04	4.07	1.3	5.01	12.6	174	CLEAR	1520
1445	26.66	76	7.03	4.09	0.8	4.47	12.5	174	CLEAR	2280
1455	26.69	76	7.12	4.11	0.9	5.00	12.4	170	CLEAR	3040
1505	26.71	76	7.05	4.14	0.1	4.90	12.7	171	CLEAR	3800
1515	26.70	76	7.05	4.17	0.8	4.29	12.6	169	CLEAR	4560
1525	26.72	76	7.05	4.19	0.5	4.38	12.6	170	CLEAR	5320
1535	26.72	76	7.05	4.22	0.5	4.21	12.6	170	CLEAR	6080
1545	26.72	76	7.06	4.24	0.9	4.57	12.6	171	CLEAR	6840
1555	26.72	76	7.05	4.26	0.4	3.99	12.8	170	CLEAR	7600
1605	26.73	76	7.06	4.28	0.6	4.14	12.8	171	CLEAR	8360
1615	26.73	76	7.06	4.30	0.7	4.16	12.6	171	CLEAR	9120
1625	26.73	76	7.05	4.32	0.8	4.08	12.6	173	CLEAR	9880
1635	26.73	76	7.06	4.34	0.7	3.89	12.5	174	CLEAR	10640
1645	26.73	76	7.05	4.35	0.8	4.05	12.5	175	CLEAR	11400
1655		76	7.06	4.37	0.1	4.47	12.5	177	CLEAR	12160
1657									START SAMPLING	

SIGNATURE(S): Terry Rogers

MIN[illegible]L = 11.6 L

ROUND 3
APRIL 2000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-001-03
Sample Location: 30-01
Sampled By: S. NEIL
C.O.C. No.: 041800-3
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 4/18/00								
Time: 1630								
Method: Low Flow/Bladder Pump	Clear	7.20	3.77	12.9	0	1.98	162	None

PURGE DATA:

Date: 4/18/00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm):
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 48.11
Static Water Level (WL): 30.27
One Casing Volume(gal): 2.9
Start Purge (hrs): 1335
End Purge (hrs): 1625
Total Purge Time (min): 170
Total Vol. Purged (gal): 3.0

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	(3) L PE	✓
Cyanide	NaOH/ 4° C	(3) L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	(3) L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	(3) L PE	✓
Metals (Dissolved)	HNO_3 / 4° C	(3) L PE	✓
$Cr+^6$	Field Test	(1) 500 mL PE	✓

OBSERVATIONS / NOTES:

5' SCREEN, TOP @ 43.11'
Final water level = 30.81 FT.

Circle if Applicable:

MS/MSD: yes
Duplicate ID No.:

Signature(s): Scott Neil

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-01
DATE: 4/18/00

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
1335	30.27								Begin purging.
1345	30.62	70	6.98	3.70	14	4.63	13.5	268	60D/60R - settings on
1355	30.69	70	7.08	3.78	10	5.04	13.4	255	control box for flow
1405	30.71	70	7.10	3.78	9	4.81	13.2	241	rate.
1415	30.75	70	7.08	3.67	2	2.33	13.1	236	
1425	30.77	70	7.10	3.68	3	3.29	13.0	224	Lower pump rate. 350 ml.
1435	30.76	65	7.06	3.70	0	4.16	12.9	219	65D/65R for flow rate.
1445	30.76	65	7.12	3.82	3	1.68	13.1	208	
1455	30.77	65	7.19	3.70	0	2.10	13.1	201	
1505	30.76	65	7.24	3.82	1	2.31	13.1	196	
1515	30.76	65	7.21	3.72	2	2.44	13.2	194	
1525	30.76	65	7.25	3.73	2	2.19	13.3	190	
1535	30.77	65	7.23	3.85	0	2.04	13.1	184	
1545	30.76	65	7.20	3.74	0	2.13	13.0	177	
1555	30.76	65	7.25	3.83	0	1.84	13.0	172	
1605	30.76	65	7.21	3.74	0	2.06	12.9	169	
1615	30.77	65	7.22	3.74	3	2.14	13.0	167	
1625	30.76	65	7.20	3.77	0	1.98	12.9	162	End purging.

SIGNATURE(S): Scott W. Neil

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-002-03
Sample Location: 30-02
Sampled By: S. Nyk
C.O.C. No.: 041800-3
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 4/18/00								
Time: 0945								
Method: Low Flow/Bladder Pump	CLEAR	6.63	2.3	12.6	0	4.9	226	NONE

PURGE DATA:

Date: 4/18/00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0.0
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 52.50
Static Water Level (WL): 37.75
One Casing Volume(gal): 2.4
Start Purge (hrs): 0738
End Purge (hrs): 0938
Total Purge Time (min): 120
Total Vol. Purged (gal): 2.4

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	1 L PE	✓
Cyanide	NaOH/ 4° C	1 L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	1 L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	1 L PE	✓
Metals (Dissolved)	HNO_3 / 4° C	1 L PE	✓
$Cr+^6$	Field Test	1 500 mL PE	✓

OBSERVATIONS / NOTES:

5' Screen - Top @ 47.50'
Final water level = 38.08 ft.

Circle if Applicable:

MS/MSD
Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-02
DATE: 4/18/00

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
0738	37.75								Begin purging.
0748	37.96	84	6.63	2.50	6	5.9	11.8	275	Reduce pump rate.
0758	37.96	76	6.54	2.30	2	6.4	12.2	261	Set control box to
0808	37.98	76	6.53	2.3	0	5.3	12.2	254	SSD/SSR.
0818	37.98	76	6.53	2.4	0	5.1	12.2 ~~12.2~~	249	
0828	37.99	76	6.61	2.3	0	4.7	12.3	244	
0838	37.99	76	6.58	2.4	0	4.5	12.5	241	
0848	38.00	76	6.57	2.3	2	4.3	12.5	235	
0858	38.02	76	6.52	2.3	0	4.2	12.5	233	
0908	38.03	76	6.57	2.3	0	4.5	12.5	229	
0918	38.02	76	6.55	2.3	1	4.4	12.6	228	
0928	38.02	76	6.58	2.4	0	4.7	12.6	226	
0938	~~38.0~~ 38.03	76	6.63	2.3	0	4.9	12.6	226	

SIGNATURE(S): [illegible]

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NSWC Crane
Field Form
[illegible]ion: 0
Ja[illegible] 1999

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-003-03
Sample Location: 30-03
Sampled By: K. SIMPSON
C.O.C. No.: 041800-3
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 4.18.00								
Time: 1050								
Method: Low Flow/Bladder Pump	CLEAR	6.45	2.17	12.5	0	3.80	248	NONE

PURGE DATA:

Date: 4.18.00	See Attached Low Flow Purge Data Sheet for Purge Data
Method: Low Flow/Bladder Pump	
Monitor Reading (ppm):	
Well Casing Diameter & Material Type: 2" PVC	
Total Well Depth (TD): 53.90	
Static Water Level (WL): 39.98	
One Casing Volume(gal): 2.3	
Start Purge (hrs): 0746	
End Purge (hrs): 1043	
Total Purge Time (min): 177	
Total Vol. Purged (gal): 2.5	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	✓
Cyanide	NaOH/ 4° C	L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	L PE	✓
Metals (Dissolved)	HNO_3 / 4° C	L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

10' SCREEN, TOP @ 43.90'

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-03
DATE: 4·18·00

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
0750	39.98	100							START PURGE
0756	40.37	64	6.32	2.21	23	6.13	12.2	308	
0810	40.48	60	6.32	2.16	34	6.17	12.1	282	
0820	40.45	53	6.31	2.15	11	4.24	12.1	232	
0830	40.30		6.34	2.16	9	3.37	12.2	249	
0840	40.35		6.36	2.16	8	7.83	12.3	239	
0850	40.44		6.38	2.16	10	2.93	12.4	241	
0900	40.30		6.40	2.16	8	4.03	12.4	239	
0910	40.38		6.41	2.16	6	3.01	12.4	238	
0920			6.42	2.17	4	2.73	12.4	253	
0930			6.43	2.17	4	2.66	12.5	248	
0940			6.44	2.17	4	2.69	12.5	250	
0950			6.44	2.17	3	2.91	12.4	254	
1000			6.44	2.17	3	2.52	12.5	250	
1010			6.45	2.17	0	2.58	12.5	253	
1020			6.46	2.18	0	3.68	12.5	257	
1030			6.45	2.17	0	3.77	12.5	251	
1040			6.45	2.17	0	3.80	12.5	248	END PURGE
			START	SAMPLING	@	1043			
			END	SAMPLING	@	1145	WL	= 40.42	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-004-03
Sample Location: 30-04
Sampled By: R. SIMPSON
C.O.C. No.: 041800-3
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 4-18-00								
Time: 1600								
Method: Low Flow/Bladder Pump	CLEAR	6.64	4.45	13.2	1.0	4.37	118	NONE

PURGE DATA:

Date: 4.18.00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm):
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 41.88
Static Water Level (WL): 25.70
One Casing Volume(gal): 2.6
Start Purge (hrs): 1254
End Purge (hrs): 1550
Total Purge Time (min): 176
Total Vol. Purged (gal): 2.6

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	—
Cyanide	NaOH/ 4° C	L PE	—
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	—
Dissolved Phosphorus	H_2SO_4/ 4° C	L PE	—
Metals (Dissolved)	HNO_3 / 4° C	L PE	—
$Cr+^6$	Field Test	500 mL PE	—

OBSERVATIONS / NOTES:

10' SCREEN, TOP @ 31.88'

2X VOL COLLECTED FOR DUP

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	DUP-GW-001-03

Signature(s): [illegible]

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-4
DATE: 4-18-00

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
1255	25.70	65							START PURGE
1300	26.09	60	6.56	4.25	22	4.22	13.8	167	
1310	26.19	↓	6.54	4.26	17	4.65	13.3	156	
1320	26.42	55	6.58	4.36	10	6.81	13.2	131	
1330	26.40		6.61	4.35	3.3	4.52	13.5	130	
1340	26.44		6.64	4.38	2.2	3.78	13.3	121	
1350	26.40		6.65	4.38	1.4	4.40	13.3	119	
1400	26.39		6.71	4.28	1.0	4.88	13.4	115	
1410	26.40		6.68	4.41	1.0	5.30	13.1	114	
1420	26.40		6.68	4.28	1.0	6.63	13.2	113	
1430	26.41		6.68	4.38	1.0	6.01	13.0	116	
1440	26.42		6.71	4.42	1.1	6.31	13.2	112	
1450	26.43		6.68	4.43	1.0	5.85	13.3	117	
1500	26.44		6.68	4.41	1.0	5.16	13.5	114	
1510	26.44		6.70	4.44	1.3	5.14	13.1	114	
1520	26.45		6.67	4.42	1.1	5.07	13.4	116	
1530	26.47		6.66	4.42	1.1	5.30	13.4	117	
1540	26.46		6.64	4.41	1.0	4.08	13.4	119	
1550	26.45	↓	6.64	4.45	1.0	4.37	13.2	118	END PURGE
			START	SAMPLING		@ ~~1502~~	1552		
			END	SAMPLING		@	1828	WL = 26.58	

SIGNATURE(S): [illegible]

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Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-005-03
Sample Location: 30-05
Sampled By: S. NEIL
C.O.C. No.: 041800-3
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Date: 4/19/00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Time: 1110								
Method: Low Flow/Bladder Pump	CLEAR	6.72	3.12	13.9	2	1.29	159	NONE

PURGE DATA:

Date: 4/19/00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0.0
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 44.96
Static Water Level (WL): 27.10
One Casing Volume(gal): 2.9
Start Purge (hrs): 0756
End Purge (hrs): 1106
Total Purge Time (min): 190
Total Vol. Purged (gal): 3.1

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	1 L PE	✓
Cyanide	NaOH/ 4° C	1 L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	1 L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	1 L PE	✓
Metals (Dissolved)	HNO_3 / 4° C	1 L PE	✓
$Cr+^6$	Field Test	1 500 mL PE	✓

OBSERVATIONS / NOTES:

10' SCREEN, TOP @ 34.96'
Final water level = 27.57 ft.

Circle if Applicable:

MS/MSD —
Duplicate ID No.:

Signature(s): Scott A. Neil

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-05
DATE: 4/19/00

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
0756	27.10							→	Begin purging.
0806	27.36	65	6.74	3.04	6	7.01	12.3	174	65D/65R = pump settings.
0816	27.43	65	6.65	2.91	3	4.17	12.5	171	
0826	27.45	65	6.75	3.04	1	2.26	12.6	166	
0836	27.50	65	6.63	2.93	4	4.24	12.7	164	Reduce flow rate —
0846	27.48	60	6.70	2.96	0	4.49	12.7	161	70D/70R
0856	27.48	60	6.68	2.97	0	2.57	12.9	160	
0906	27.48	60	6.67	2.99	4	3.80	12.8	161	
0916	27.48	60	6.70	3.02	2	2.79	13.0	158	
0926	27.48	60	6.69	3.01	5	2.93	13.0	160	
0936	27.48	60	6.69	3.02	0	2.57	13.1	161	
0946	27.49	60	6.71	3.03	4	2.87	13.4	159	
0956	27.48	60	6.72	3.12	7	1.58	13.6	156	
1006	27.47	60	6.72	3.12	4	1.44	13.8	159	
1016	27.47	60	6.70	3.12	0	1.34	13.9	160	
1026	27.48	60	6.72	3.13	3	1.31	14.2	159	
1036	27.49	60	6.70	3.10	1	1.28	13.9	161	
1046	27.50	60	6.70	3.09	2	1.26	13.7	159	
1056	27.50	60	6.73	3.12	0	1.35	13.8	158	End purging.
1106	27.50	60	6.72	3.12	2	1.29	13.9	159	

SIGNATURE(S): Scott W. Neil

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Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-006-03
Sample Location: 30-06
Sampled By: R. SIMPSON
C.O.C. No.: 041800-3
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 4.19.00 Time: 1050 Method: Low Flow/Bladder Pump	CLEAR	6.88	3.01	12.9	0	4.99	249	NONE

PURGE DATA:

Date: 4.19.00	See Attached Low Flow Purge Data Sheet for Purge Data
Method: Low Flow/Bladder Pump	
Monitor Reading (ppm):	
Well Casing Diameter & Material Type: 2" PVC	
Total Well Depth (TD): 44.90	
Static Water Level (WL): 28.27	
One Casing Volume(gal): 2.7	
Start Purge (hrs): 0744	
End Purge (hrs): 1042	
Total Purge Time (min): 178	
Total Vol. Purged (gal): 2.8	

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	—
Cyanide	NaOH/ 4° C	L PE	—
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	—
Dissolved Phosphorus	H_2SO_4/ 4° C	L PE	—
Metals (Dissolved)	HNO_3 / 4° C	L PE	—
$Cr+^6$	Field Test	500 mL PE	—

OBSERVATIONS / NOTES:

10' SCREEN, TOP @ 34.90'

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): R. S. Simpson

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-06
DATE: 4.19.00

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
0744	28.27	70							START PURGE
0747	28.64	65	6.65	2.91	3.8	7.97	12.4	308	
0755	28.63	↓	6.73	2.89	0.4	6.22	12.0	291	
0805	28.71		6.79	2.92	0.1	4.99	12.0	279	
0810	28.91	60	6.81	2.93	0	4.81	12.1	278	
0820	28.73		6.79	2.94	0	6.87	12.1	251	
0830	28.80		6.80	2.94	0	4.61	12.2	256	
0840	28.78		6.83	2.95	0	6.00	12.3	259	
0850	28.77		6.83	2.96	0	7.62	12.3	256	
0900	28.75		6.84	2.97	0	7.48	12.4	256	
0910	28.79		6.86	2.88	0	7.67	12.6	255	
0920	28.82		6.87	2.97	0	4.88	12.6	255	
0930	28.80		6.86	2.98	0	7.21	12.6	258	
0940	28.76		6.88	2.98	0	7.01	12.6	260	
0950	28.80		6.88	2.98	0	6.73	12.9	257	
1000	28.83		6.88	2.97	0	4.56	12.9	248	
1010	28.85		6.87	2.98	0	3.54	12.9	246	
1020	28.82		6.89	3.00	0	4.83	12.9	247	
1030	28.82		6.88	3.00	0	5.15	12.9	239	
1040	28.82	↓	6.88	3.01	0	4.99	12.9	249	END PURGE
			START	SAMPLING @		1043			
			END	SAMPLING @		1201	WL =	28.99	

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-007-03
Sample Location: 30-07
Sampled By: R. SIMPSON
C.O.C. No.: 041800-3
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 4-19-00								
Time: 1640								
Method: Low Flow/Bladder Pump	CLEAR	6.94	4.31	14.4	0	6.41	244	NONE

PURGE DATA:

Date: 4-19-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm):
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 45.20
Static Water Level (WL): 25.33
One Casing Volume(gal): 3.2
Start Purge (hrs): 1327
End Purge (hrs): 1631
Total Purge Time (min): 184
Total Vol. Purged (gal): 3.4

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	✓
Cyanide	NaOH/ 4° C	L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	L PE	✓
Metals (Dissolved)	HNO_3 / 4° C	L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

10' SCREEN, TOP @ 35.20

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): R. T. Simpson

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-7
DATE: 4-19-00

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
1333	25.58	85	7.11	4.11	1.3	6.29	14.9	266	START PURGE
1340	25.65	70	6.85	4.02	0.9	4.71	14.8	243	
1350	25.65		6.83	4.03	0	3.91	14.4	244	
1400	25.72		6.88	4.08	0	6.35	14.4	245	
1410	25.69		6.88	4.06	0	5.37	14.3	237	
1420	25.71		6.91	4.06	0	4.90	15.1	225	
1430	25.73		6.94	4.11	0	5.78	14.7	222	
1440	25.74		6.93	4.11	0	5.81	14.5	222	
1450	25.75		6.93	4.13	0	5.86	14.4	223	
1500	25.76		6.93	4.14	0	6.10	14.5	225	
1510	25.76		6.93	4.15	0	6.77	14.6	227	
1520	25.76		6.94	4.20	0	5.99	14.6	225	
1530	25.76		6.95	4.24	0	5.15	14.6	224	
1540	25.76		6.95	4.26	0	5.23	14.7	234	
1550			6.95	4.26	0	6.04	14.5	229	
1600			6.95	4.26	0.2	5.49	14.5	225	
1610			6.95	4.29	0	6.23	14.6	231	
1620			6.95	4.34	0.2	6.33	14.5	237	
1630			6.94	4.31	0	6.41	14.4	244	END PURGE
			START	SAMPLING @		1633			
			END	SAMPLING @		1740	WL =	25.75	

SIGNATURE(S): [illegible]

PAGE 2 OF 2

ROUND 4
JULY 2000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-001-04
Sample Location: well 30-01
Sampled By: JPS
C.O.C. No.: 072500-1
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 7-26-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 11:59 am	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump ✓	clear	6.75	3.555	15.23	0.2	1.91	122	none

PURGE DATA:

Date: 7-26-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 48.11								
Static Water Level (WL): 30.57			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 10.7	L							
Start Purge (hrs): 09:45								
End Purge (hrs): 11:59								
Total Purge Time (min): 134								
Total Vol. Purged (gal/L): 15.64	L							

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Volatile Organics~~	~~HCl/4°C~~	(3) ~~40 mL~~ Glass Vials	X
~~Explosives~~	~~Dark/4°C~~	(2) ~~1000~~ mL Amber Glass	X
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	12:24 pm
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1 Liter	12:08 pm
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	12:15 pm
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) ~~1000 mL~~ Polyethylene 500 mL	~~12:38~~ pm 12:38
Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	12:35 pm
Hex Cr	4°C	(1) 1000 mL PE	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
none	none

Signature(s): Jeffrey P. Schubert

LOW FLOW PURGE DATA SHEET

Tetra Tech NUS, Inc.

PROJECT SITE NAME: NSWC Crane, IN
PROJECT NUMBER: 7393 CTO 19

WELL ID.: 30-01 GPS
DATE: 7-26-00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments	Flow Rate
09:45	30.57	pump turned on			40 sec recharge			15 sec discharge		
		600 mL/4:04 min								147.5 mL/min
09:47			6.72	4.164	0.0	3.49	15.41	228	V. clear	
10:02	600 mL/4:08 pump set to				50 sec fill		15 sec discharge			145.16 mL/min
10:04	31.50		6.82	3.444	0.2	2.91	14.85	220		
10:13	600 mL/4:30		6.76	3.420	0.1	2.87	14.80	219		133.33 mL/min
10:20	31.35 ; 600 mL/5:25		6.77	3.436	2.8	2.46	14.81	219	changed to 15 discharge 70 fill	{110.7 mL/.
10:40	31.31 ; 530 mL/5:30		6.74	3.479	2.7	2.59	15.23	218		96.4 mL/min
10:55	31.28	400 mL/4:20	6.73	3.499	6.1	2.29	15.22	191		
11:10	31.30	550 mL/5:40	6.73	3.520	0.2	2.10	15.22	103		97.0 mL/min
11:40	31.30	550 mL/5:40	6.75	3.543	0.1	1.90	15.22	122		97.06 mL/min
11:52	31.33	550 mL/5:40	6.76	3.555	0.2	1.91	15.23	122		97.06 mL/min.
11:59 am	started sampling									
12:45	finished sampling									
12:46	31.48			~~3.590~~						
12:50			6.78	3.590	0.5	1.91	15.81	110		
12:52	pump turned off									
	total pumped during purging = 15.643 L = 4.13 gallons									

SIGNATURE(S): Jeff Schubert

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Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-002-04
Sample Location: Landfarm Well 30-2
Sampled By: JRN
C.O.C. No.: 072500-1
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 7-26-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: ~~1300~~ 1213	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	Clear	6.25	2.235	16.70	0.5	5.55	212.4	None

PURGE DATA:

Date: 7-26-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 52.60								
Static Water Level (WL): 37.92			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 9.06	L							
Start Purge (hrs): 0843								
End Purge (hrs): 1213								
Total Purge Time (min): 210								
Total Vol. Purged (gal/L): 9.48	L							

SAMPLE COLLECTION INFORMATION:

	Analysis	Preservative	Container Requirements	Collected
	~~Volatile Organics~~	~~HCl/4°C~~	~~(3) 40 mL Glass Vials~~	~~X~~
	~~Explosives~~	~~Dark/4°C~~	~~(2) 1000 mL Amber Glass~~	~~X~~
3	Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene ✓	1234
1	Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000 mL ✓	1213
2	Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene ✓	1223
5	Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene ✓	1300
4	Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene ✓	1248
	Hex Cr	4°C	(1) 1000 mL / P.E. ✓	

OBSERVATIONS / NOTES:

1213 Started Sampling
1315 Finish Sampling

Circle if Applicable:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): [signature]

LOW FLOW PURGE DATA SHEET

Tetra Tech NUS, Inc.

PROJECT SITE NAME: NSWC CRANE LANDFARM

PROJECT NUMBER: 7393 CTO 19

WELL ID.: ~~030-BW-002-04~~ 30-2

DATE: 7-26-00

Starting water Level = 37.92

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0843	38.13		6.90	3.413	56.1	7.76	15.94	211.0	600ml/L @ 6min 30sec
0900	38.12		6.83	2.274	0.1	7.71	16.68	219.0	
0916	38.05		6.83	2.242	0.9	6.57	16.73	217.9	" " @ 11min 5sec.
0931	38.15		6.83	2.272	2.7	6.06	16.93	227.4	↓ ↓ ↓
0945	38.15		6.83	2.240	2.3	5.26	16.82	226.5	600ml/L @ 10min 10sec.
1000	38.25		6.77	2.242	4.6	5.57	16.72	228.9	" " @ 12min 30sec.
1017	38.05		6.75	2.242	1.6	5.41	16.96	228.5	" " @ 11min 48sec.
1034	38.07		6.38	2.237	2.7	5.50	17.68	227.8	" " @ 14min 6sec.
1053	38.10		6.72	2.243	1.1	5.33	17.80	227.6	" " @ 14min 30sec.
1127	38.11		6.73	2.244	0.8	5.35	17.75	227.7	" " @ 25min 20sec
1137	38.30		6.76	2.239	0	5.68	17.51	214.3	
1145	38.35		6.76	2.235	1.0	5.60	16.57	216.9	" " @ 5min 20sec.
1153	38.35		6.72	2.235	0.8	5.34	16.51	214.7	" " @ 5min 30sec
1200	38.37		6.71	2.224	0.5	5.16	16.69	189.6	" " @ 5min 35sec.
1211	38.35		6.75	2.235	0.5	5.55	16.70	212.4	" " @ 5min 40sec.
1213	start sampling		1315 Finish sampling						
1219	38.35								
1223	38.25								
1234	38.26								
1248	38.24								
1300	38.23								
1322	38.26		6.78	2.245	0.2	5.39	17.01	235.9	

NOTE: Pump does Not pump water every cycle

Discharge 15 sec.
Refill 120 sec.

Total Purge = 2.5 gals

SIGNATURE(S): J. [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-003-04
Sample Location: Land from Well 30-3
Sampled By: JPS/RH
C.O.C. No.: 072500-1
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 7-25-00	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 20:00								
Method: Bladder Pump	Clear	6.33	2.156	16.20	2.3	2.80	257.4	None

PURGE DATA:

Date: 7-25-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump	See	Low	Flow	Purge	Data	Sheet		
Monitor Reading (ppm): 0								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 53.90								
Static Water Level (WL): 40.11			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 8.46 L								
Start Purge (hrs): 17:42								
End Purge (hrs): 20:00								
Total Purge Time (min): 138								
Total Vol. Purged (gal/L): 9.48 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Volatile Organics~~	~~HCl/4°C~~	~~(3) 40 mL Glass Vials~~	~~[illegible]~~
~~Explosives~~	~~Dark/4°C~~	~~(2) 1000 mL Amber Glass~~	~~[illegible]~~
Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	2040
Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000 ml	2040
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	2024
Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	2130
Metals (Dissolved)	HNO_3/4°C	(1) ~~1000~~ mL Polyethylene 1000 ml	2100
Hex Cr (Field Lab)	4°C	(1) 1000 mL PE	

OBSERVATIONS / NOTES:

2000 Started filling sample Bottles.
2142 Finish Sampling.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): J. R. [illegible]

W.Q. Meter Ser. No. 217714R

Started Pumping H_2O

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

Bad Reading (Water Very Clear)

PROJECT SITE NAME: NSWC Crane

PROJECT NUMBER: 7393/CT019

WELL ID.: ~~030-GW-003-04~~ 30-3

DATE: 7-25-00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
~~0540~~	~~40.41~~			3.			~~17.70~~		600 m/L for 6min 20sec
1742	40.46		6.70	3.674	298.0	4.41	17.70	190.7	
1751	40.58								
1755	40.61		6.47	2.183	3.3	4.46	16.58	194.0	600 m/L @ 6min 4sec.
1806	40.65		6.40	2.163	2.2	3.81	16.47	213.7	" " " "
1818	40.68		6.33	2.151	1.7	2.55	16.51	228.9	600 m/L @ 8min 15sec.
1838	40.54		6.35	2.160	0.6	3.05	17.05	236.5	600 m/L @ 11min 23sec.
1849	40.74		6.34	2.157	1.0	2.45	16.04	231.7	" " @ 6min 30sec.
1900	40.65		6.35	2.159	2.0	2.60	16.14	239.1	" " @ 8min 16sec
1927	40.65		6.33	2.157	5.2	2.79	15.61	256.5	" " @ 6min 0sec
1944	40.60		6.35	2.157	1.9	2.67	16.47	255.2	" " @ 13min 16sec.
2000	40.57		6.33	2.156	2.3	2.80	16.20	257.4	" " @ 12min 50sec
2000	Started Sampling								Total Vol. Purged 2.5 gals
2013	40.58								
2025	40.54								
2042	40.52								
2105	40.48								
2131	40.36								
2146	40.50								
2153	40.52		6.33	2.145	0.58	2.61	15.10	275.0	

Cycle Rate
Discharge 5.0 sec.
Refill 30.0 sec.

1824 change Refill rate from 30 sec To 25 sec.

SIGNATURE(S): J.R. [illegible]

PAGE 1 OF 1

Note: 2.23 gals. = 1 well volume or 8.46 L.

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-004-04
Sample Location: Landfarm Well 30-4
Sampled By: JRD
C.O.C. No.: 072500-1
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 7-27-00	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 1109								
Method: Bladder Pump	Clear	6.36	9.413	16.40	1.0	2.99	223.4	None

PURGE DATA:

Date: 7-27-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 42.1								
Static Water Level (WL): 25.96			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 2.63 gal								
Start Purge (hrs): 0848								
End Purge (hrs): 1109								
Total Purge Time (min): 138								
Total Vol. Purged (gal/L): 10.61 L / 2.8 gal								

SAMPLE COLLECTION INFORMATION:

	Analysis	Preservative	Container Requirements	Collected
	~~Volatile Organics~~	~~HCl/4°C~~	~~(3) 40 mL Glass Vials~~	X
	~~Explosives~~	~~Dark/4°C~~	~~(2) 1000 mL Amber Glass~~	X
3	Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	1129
1	Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000 mL	1109
2	Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	1149
5	Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	1153
4	Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	1141
	Hex Cr (Fred Lab)	4°C	(1) 1000 mL PE	

OBSERVATIONS / NOTES:

1109 Started Sampling
1202 Finish Sampling

Circle if Applicable:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): J. R. Hill

LOW FLOW PURGE DATA SHEET

Tetra Tech NUS, Inc.

PROJECT SITE NAME: NSWC Crane

PROJECT NUMBER: 7393 CT019

WELL ID.: ~~030-660-004-04~~ 30-4

DATE: 7-27-00

Starting water Level = 25.96 Landfarm

0848: Started Pumping

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0853	26.61		6.95	5.678	8.9	5.88	16.06	233.9	600 mL @ 4min 43sec < Discharge Time 60 sec
0903	26.74		6.73	4.250	11.8	4.57	15.68	216.6	" @ 5min 36sec Refill 60 sec
0913	26.79		6.49	4.312	3.4	4.03	15.80	185.5	" @ 6min 37sec
0923	26.86		6.46	4.316	2.3	3.81	15.83	155.3	" @ 6min 39sec
0931	26.98		6.41	4.316	0.5	3.80	15.47	139.7	" @ 4min 41sec < Discharge Time To 8 sec
0940	27.04		6.42	4.319	0.7	3.82	15.64	132.5	" @ 5min 39sec < Discharge Time To 7 sec.
0945	27.09		6.42	4.343	0.7	3.49	15.69	130.0	" " "
0958	27.18	(DRY)	6.42	4.357	0.3	3.24	15.69	127.0	" " " Refill 60 sec.
1006	~~27.08~~ < 27.08		6.38	4.364	0	4.59	15.87	125.0	" " "
1017	~~27.10~~ < 27.10		6.37	4.378	0	3.45	15.96	126.5	" @ 5min 38 sec < Discharge Time To 6.5 sec.
1025	27.08		6.35	4.389	0	3.40	16.01	226.7	" " " Refill 60 sec
1034	27.14		6.36	4.390	0	3.09	16.16	224.4	" " "
1043	27.14		6.37	4.390	1.9	3.00	16.20	227.6	" @ 5min 40 sec.
1053	27.16		6.36	4.398	0.4	3.00	16.38	227.7	" " " "
1102	27.18		6.37	4.395	0.1	3.10	16.32	227.3	" " " "
1106	27.21		6.36	4.413	1.0	2.99	16.40	223.4	" " " " Total Purge 2.8 gals.
1109	Started sampling			1202: Finish Sampling					
1119	27.16								
1129	27.17								
1141	27.15								
1153	27.16								
1202	27.15								
			6.34	4.422	0.5	2.08	17.41	114.8	

SIGNATURE(S): J. R. [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-005-04
Sample Location: Well 30-5
Sampled By: JPS
C.O.C. No.: 072500-1
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 7-27-00	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Odor
Time: 11:00								
Method: Bladder Pump	clear	6.72	2.920	15.99	0.2	2.37	191	none

PURGE DATA:

Date: 7-27-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 44.9								
Static Water Level (WL): 27.36			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 2.86	gal / 10.84		L					
Start Purge (hrs): 08:46								
End Purge (hrs): 10:53								
Total Purge Time (min): 127								
Total Vol. Purged (gal/L): 4.9	gal / 18.57		L					

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatile Organics	HCl/4°C	(3) 40 mL Glass Vials	
Explosives	Dark/4°C	(2) 1000 mL Amber Glass	
Metals (Total)	HNO_3/4°C (2)	(1) 1000 mL Polyethylene	11:05 am
Cyanide	NaOH/4°C (2)	(1) ~~500 mL~~ Polyethylene 1000 mL	11:38 am
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C (2)	(1) 1000 mL Polyethylene + ~~(1) 500 mL PE~~	11:21 am
Phosphorus (Dissolved)	H_2SO_4/4°C (1)	(1) 1000 mL Polyethylene + (1) 500 mL PE	12:05 pm
Metals (Dissolved)	HNO_3/4°C (2)	(1) 1000 mL Polyethylene	11:53 am
Hexavalent Chromium	~~None~~ 4°C	(1) 1000 mL PE	12:11 pm

OBSERVATIONS / NOTES:

Collected two sets of bottles; one set is for MS. Did not collect MS bottle for Cr^{6+} field lab analysis. Sample water is very clear. No noticeable sediment on filter when filtering completed.

Circle if Applicable:

MS/MSD: MS

Duplicate ID No.: None

Signature(s): Jeffrey P. Schubert

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC Crane, IN

PROJECT NUMBER: 7393 CTO 19

WELL ID.: 30-5

DATE: 7-27-00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
8:43	27.36								
8:46	pump started								50 sec. fill, 15 sec. discharge
8:56	27.90	680 mL/5:40	6.83	3.251	0.2	3.18	16.01	180	
9:08	28.13	670 mL/5:25	6.78	2.702	5.1	2.72	15.42	177	
9:15	28.15	550 mL/4:19	6.74	2.724	0.4	2.70	15.35	179	
9:24		520 mL/4:20	6.70	2.747	0.9	2.75	15.62	183	
9:37	~~28~~	530 mL/4	6.70	2.774	1.3	2.62	15.50	188	changed to 50 sec fill
9:45	28.28	650 mL/5	6.68	2.806	2.1	2.30	15.48	189	10 sec discharge
9:57	28.36	520 mL/4	6.72	2.825	0.2	2.73	15.70	178	
10:13	28.34	510 mL/4	6.72	2.868	0.2	2.41	15.75	187	
10:29	~~28.40~~	520 mL/4	6.73	2.894	0.1	2.29	15.94	192	
10:37	28.40	520 mL/4	6.72	2.910	0.2	2.07	15.78	195	
10:46		520 mL/4	6.73	2.920	0.2	2.37	15.99	191	
10:53	stopped purging. Total purge volume ≅ about 14.9 gallons								
10:53	starting to sample well 30-5 and ~~ed~~ MS								sample
11:04	28.40								
11:19	28.46								
11:57	28.50								
12:11	sampling completed (bottles filled and in cooler with ice)								
12:12	28.50		6.73	3.016		1.88	~~16.32~~	~~77~~	
~~12~~							16.24	190	
12:27			~~6.74~~	3.026	0.2	1.90	16.28	200	
			6.72						

SIGNATURE(S): Jeff Schubert

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-006-04
Sample Location: Landfarm Well 30-6
Sampled By: JRH
C.O.C. No.: 072500-1
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 7-26-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1757	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	Clear	6.70	2.816	14.20	0	4.94	~~206.9~~ 207	None

PURGE DATA:

Date: 7-26-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 45.2								
Static Water Level (WL): 28.83			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 2.67	gal / 10.12		L					
Start Purge (hrs): 16:15								
End Purge (hrs): 17:57								
Total Purge Time (min): ~~82~~	102 min.							
Total Vol. Purged (gal/L): 2.7 /	10.23	L						

SAMPLE COLLECTION INFORMATION:

	Analysis	Preservative	Container Requirements	Collected
	~~Volatile Organics~~	~~HCl/4°C~~	~~(9) 40 mL Glass Vials~~	
	~~Explosives~~	~~None/4°C~~	~~(2) 1000 mL Amber Glass~~	
3	Metals (Total)	HNO_3/4°C	(1) 1000 mL Polyethylene	1814
1	Cyanide	NaOH/4°C	(1) ~~500 mL~~ Polyethylene 1000 mL	1757
2	Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	1805
5	Phosphorus (Dissolved)	H_2SO_4/4°C	(1) 1000 mL Polyethylene	1846
4	Metals (Dissolved)	HNO_3/4°C	(1) 1000 mL Polyethylene	1836
	Hex Cr. (field Lab)	~~None~~ 4°C	(1) 1000 mL PE	

OBSERVATIONS / NOTES:

1757 Started Sampling

Circle if Applicable:

MS/MSD	Duplicate ID No.:
None	None

Signature(s): J.R. [illegible]

LOW FLOW PURGE DATA SHEET

Tetra Tech NUS, Inc.

PROJECT SITE NAME: NSWC Crane
PROJECT NUMBER: 7393 CTO 19
WELL ID.: ~~030-GW-006-04~~ 30-6
DATE: 7-26-00

Starting Water Level = 28.83

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1615	28.95		6.87	4.097	1.4	5.61	15.99		600ml @3min 49sec Discharge @10 sec
1624	29.24		6.83	2.773	0.1	5.04	14.48	185.4	" @5min 55sec Refill @65 sec
1632	29.31		6.78	2.760	0.5	4.89	14.27	191.9	" @5min 3sec
1641	29.21		6.75	2.773	0.1	4.90	14.42	192.9	" @5min 14sec
1648	29.37		6.75	2.777	0.1	4.82	14.42	197.2	" @5min 0sec
1655	29.46		6.72	2.786	0.1	5.20	14.41	199.0	" " "
1702	29.48		6.69	2.793	0.0	4.12	14.24	198.4	" @5min 2sec
1708	29.47		6.68	2.802	0-1	4.43	14.14	199.4	" " "
1715	29.42		6.69	2.802	0	4.55	14.38	201.3	" " "
1724	29.27		6.69	2.807	0	4.28	14.39	201.7	" @5min 2sec
1731	29.32		6.69	2.817	0	4.05	14.21	195.2	" @5min 2sec
1740	29.45		6.69	2.816	0	4.47	14.35	192.8	" " " "
1746	29.51		6.69	2.818	0	3.91	14.21	191.7	" @5min 3sec
1753	29.50		6.70	2.816	0	4.94	14.20	206.9	" @5min 2sec Total Purged 2.7gals
1757	Start Sampling		1848	Finish sampling					
1805	29.49								
1814	29.46								
1836	29.41								
1848	29.42								
1857	29.42		6.68	2.837	0	3.58	14.34	236.9	

SIGNATURE(S): J. R. [illegible]

PAGE 1 OF 1

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane
Project No.: 7393/CTO 19

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

Sample ID No.: 030-GW-007-04
Sample Location: Well 30-07
Sampled By: JPS
C.O.C. No.: 072500-1
Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 7-26-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 15:58	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	
Method: Bladder Pump	clear	6.65	4.118	14.19	0.1	2.45	162	none

PURGE DATA:

Date: 7-26-00	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Odor
Method: Bladder Pump								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type: 2-inch PVC								
Total Well Depth (TD): 45.2 ft								
Static Water Level (WL): 25.78 ft			SEE LOW FLOW PURGE DATA SHEET					
One Casing Volume(gal/L): 3.17 gal. / 12.01 L								
Start Purge (hrs): 13:40								
End Purge (hrs): 15:58								
Total Purge Time (min): 138 min.								
Total Vol. Purged (gal/L): 5.2 gal / 19.71 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Volatile Organics~~	~~HCl/4°C~~	~~(3) 40 mL Glass Vials~~	
~~Explosives~~	~~DarkN/4°C~~	~~(2) 1000 mL Amber Glass~~	
Metals (Total)	HNO_3/4°C	(2) 1000 mL Polyethylene ✓	4:02 pm
Cyanide	NaOH/4°C	(2) ~~[illegible]~~ Polyethylene 1000 mL ✓	4:18
Ammonia, Nitrate/Nitrite, TKN, Phosphorus (T)	H_2SO_4/4°C	(2) 1000 mL Polyethylene ✓	4:31
Phosphorus (Dissolved)	H_2SO_4/4°C	(2) 1000 mL Polyethylene ✓	5:01
Metals (Dissolved)	HNO_3/4°C	(2) 1000 mL Polyethylene ✓	4:46
Hex Cr (field lab)	~~none~~ 4°C	(2) 1000 PE ✓	5:10

OBSERVATIONS / NOTES:

2 sets of bottles collected
1 set is for duplicate

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
none	~~030-GW~~ DUP-GW-001-04	Jeffrey P. Schubert

LOW FLOW PURGE DATA SHEET

Tetra Tech NUS, Inc.

PROJECT SITE NAME: NSWC Crane Landfarm
PROJECT NUMBER: 7393 CTO 19
WELL ID.: 30-7
DATE: 07-26-00

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
1:40	25.78								
1:55		pump turned on							fill 50 sec; discharge 15 sec.
2:01			6.98	4.650	0.2	4.18	15.48	196	
2:07		600 mL/4:00 min	6.75	3.772	0.1	3.37	14.43	191	
2:14		600 mL/4:00	6.72	3.720	0.0	3.06	14.16	196	
2:22	26.47	600 mL/4	6.64	3.773	0.2	3.07	14.16	207	
2:29	26.51	600 mL/4	6.66	3.831	0.5	2.92	14.18	206	
2:39	26.62	600 mL/4	6.64	3.888	2.8	2.95	14.21	209	
2:51	26.61	600 mL/4	6.65	3.951	0.2	2.84	14.30	167	
3:05		600 mL/4	6.66	4.013	0.1	2.71	14.22	165	
3:22		600 mL/4	6.66	4.054	0.2	2.79	14.25	181	
3:30	26.65	600 mL/4	6.65	4.068	0.1	2.53	14.06	182	
3:41		600 mL/4	6.66	4.091	0.1	2.65	14.19	172	
3:55	26.65		6.65	4.118	0.1	2.45	14.19	162	
3:58	end purging, start sampling					total vol. purged ≈ 5.2 gallons			
4:47	26.64 ft								
5:15	finished sampling			30-7	and	DUP-GW-	001-	04	
5:17	26.69		6.68	4.187	0.2	2.29	14.58	195	

pressure out of regulator = 90 psi

SIGNATURE(S): Jeff Schubert

ROUND 5
OCTOBER 2000

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-001-05
Sample Location: 30-01
Sampled By: FCW
C.O.C. No.: 101700-1
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 10-18-00								
Time: 0942								
Method: Low Flow/Bladder Pump	Clear	7.15	16.8	13.4	3	2.80	197	—

PURGE DATA:

Date: 10-18-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): —
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 48.11
Static Water Level (WL): 30.60
One Casing Volume(gal): 2.8
Start Purge (hrs): 0715
End Purge (hrs): 0942
Total Purge Time (min): 147
Total Vol. Purged (gal): 3.3

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	✓
Cyanide	NaOH/ 4° C	L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	500 ml PE	✓
Metals (Dissolved)	HNO_3 / 4° C	L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

Round 5

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): FCW

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-01
DATE: 10-18-00

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
0715	30.60								START PURGING
0724	31.07	80	7.18	16.8	4	2.19	12.9	383	
0736	31.22	88	7.15	16.1	7	5.28	12.9	351	
0747	31.28	86	7.16	16.2	4	4.01	12.9	343	
0758	31.32	85	7.15	16.2	4	3.99	12.9	342	
0811	31.15	80	7.15	16.3	3	2.72	12.9	344	
0828	31.39	85	7.15	16.5	4	2.92	13.1	345	
0839	31.39	85	7.16	16.5	5	2.27	13.1	338	7149
0851	31.38	85	7.17	15.9	3	2.67	13.2	317	
0909	31.37	85	7.15	16.9	2	2.22	13.3	269	
0920	31.39	85	7.15	16.7	5	4.29	13.3	258	
0932	31.38	85	7.15	16.7	3	2.96	13.3	223	
0942	31.34	85	7.15	16.8	3	2.80	13.4	197	START Sampling

SIGNATURE(S): [illegible]

PAGE 2 OF 2

NSWC Crane
Field Form
Revision: 0
January 1999

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-002-05
Sample Location: 30-02
Sampled By: K. SIMPSON
C.O.C. No.: 101700-1
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 10.17.00								
Time: 1045								
Method: Low Flow/Bladder Pump	CLEAR	6.34	9.29	13.7	2	5.3	206	NONE

PURGE DATA:

Date: 10.17.00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 52.50
Static Water Level (WL): 37.85
One Casing Volume(gal): 2.4
Start Purge (hrs): 0807
End Purge (hrs): 1040
Total Purge Time (min): 153
Total Vol. Purged (gal): 2.8

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	✓
Cyanide	NaOH/ 4° C	L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	500 ml PE	✓
Metals (Dissolved)	HNO_3 / 4° C	L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

Round 5

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): [illegible]

LOW FLOW PURGE DATA SHEET

ROUND 5

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-02
DATE: 10.17.00

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0810	37.85	100	—	—	—	—	—	—	START
0815	38.13	75	5.37	8.73	4	5.9	13.7	277	CLEAR, NO ODOR
0825	38.23	70	5.55	8.75	1	6.8	13.6	272	
0835	38.12		5.71	9.09	4	4.6	13.5	263	
0845	38.10		5.81	8.80	1	7.2	13.5	257	
0855	38.12		5.90	9.14	1	4.3	13.5	257	
0905	38.09		5.97	9.20	1	4.3	13.5	254	
0915	38.12		6.03	9.19	0	4.8	13.4	247	
0925	38.14		6.09	8.93	1	5.1	13.5	244	
0935	38.21		6.12	9.23	1	5.3	13.5	243	
0945	38.12		6.17	8.98	1	4.3	13.5	241	
0955	38.18		6.21	9.32	1	4.2	13.6	238	
1005	38.22		6.25	9.01	0	5.0	13.6	236	
1015	38.24		6.30	9.00	0	6.1	13.7	229	
1025	38.19		6.32	9.33	1	4.0	13.7	208	
1035	38.19		6.32	9.31	2	5.0	13.7	218	
1040	38.18		6.34	9.29	2	5.3	13.7	206	END PURGE

SIGNATURE(S): [illegible]

NSWC Crane
Field Form
Revision: 0
January 1999

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-003-05
Sample Location: 30-03
Sampled By: FGW
C.O.C. No.: 101700-1
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 10-17-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1000	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Low Flow/Bladder Pump	Clear	6.51	9.33	14.2	2	2.71	368	none

PURGE DATA:

Date: 10-17-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): —
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 53.90
Static Water Level (WL): 40.11
One Casing Volume(gal): 2.2
Start Purge (hrs): 0748
End Purge (hrs): 1000
Total Purge Time (min): 132
Total Vol. Purged (gal): 4.1

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	✓
Cyanide	NaOH/ 4° C	L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	500 ml PE	✓
Metals (Dissolved)	HNO_3 / 4° C	L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

Round 5

Circle if Applicable:

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

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-03
DATE: 10-17-00

Time (Hrs.)	Water Level (Ft. below TOC)	Pump Rate (mL/Min.)	pH (S.U.)	S. Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP mV	Comments
0748	40.11								START PURGING
0800	40.49	70	6.70	9.65	23	3.76	14.1	325	
0814	40.52	71	6.68	9.66	12	2.78	14.2	330	
0827	40.54	66	6.64	9.66	7	3.93	14.2	333	
0840	40.56	61	6.57	9.70	10	2.71	14.2	337	
0854	40.58	55	6.54	9.70	9	3.05	14.1	344	
0908	40.59	65	6.52	11.1	7	2.63	14.1	351	
0920	40.60	70	6.54	9.29	6	3.35	14.1	354	
0933	40.60	73	6.52	9.29	4	3.48	14.1	361	
0945	40.62	71	6.53	9.31	2	3.00	14.1	364	
1000	40.60	63	6.51	9.33	2	2.71	14.2	368	End purge START sample

SIGNATURE(S): [illegible]

PAGE 2 OF 2

NSWC Crane
Field Form
Revision: 0
January 1999

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-004-05
Sample Location: 30-04
Sampled By: R. SIMPSON
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 10.17.00								
Time: 1635								
Method: Low Flow/Bladder Pump	CLEAR	6.15	18.0	14.4	3	4.1	110	NONE

PURGE DATA:

Date: 10.17.00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 41.88
Static Water Level (WL): 25.87
One Casing Volume(gal): 2.6
Start Purge (hrs): 1323
End Purge (hrs): 1630
Total Purge Time (min): 187
Total Vol. Purged (gal): 2.7

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	3
Cyanide	NaOH/ 4° C	L PE	3
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	3
Dissolved Phosphorus	H_2SO_4/ 4° C	500 ml PE	3
Metals (Dissolved)	HNO_3 / 4° C	L PE	3
$Cr+^6$	Field Test	500 mL PE	✓
3X VOL FOR MS/MSD			

OBSERVATIONS / NOTES:

Round 5

Circle if Applicable:

MS/MSD	Duplicate ID No.:
YES	—

Signature(s): [signature]

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-04
DATE: 10.17.00

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
1325	25.87	70	—	—	—	—	—	—	START PURGE
1330	26.32	55	6.27	17.5	5	6.5	14.7	231	
1340	26.48		6.15	16.8	7	8.4	14.8	223	
1350	26.38		6.16	16.8	5	4.4	14.9	213	
1400	26.56		6.14	17.4	4	2.0	14.9	198	
1410	26.45		6.12	17.2	4	5.5	14.7	184	
1420	26.55		6.14	17.3	5	6.3	14.5	167	
1430	26.63		6.14	17.3	5	7.8	14.6	144	
1450	26.54		6.14	17.5	6	3.4	14.6	118	
1500	26.68		6.15	17.5	4	9.8	14.5	108	
1510	26.54		6.13	18.3	5	2.8	14.7	104	
1520	26.68		6.15	18.4	2	2.9	14.5	109	
1530	26.76		6.15	17.6	3	10.7	14.4	106	
1540	26.68		6.17	17.7	4	10.7	14.3	111	
1550	26.70		6.15	18.3	5	2.8	14.4	113	
1600	26.64		6.14	17.9	4	2.8	14.4	108	
1610	26		6.15	18.0	5	6.0	14.4	115	
1620	26.69		6.14	18.0	4	3.0	14.4	108	
1630			6.15	18.0	3	4.1	14.4	110	END PURGE

SIGNATURE(S): [illegible]

NSWC Crane
Field Form
Revision: 0
January 1999

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030 GW 005 05
Sample Location: 30-05
Sampled By: R. SIMPSON
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Date: 10.18.00	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Time: 1020								
Method: Low Flow/Bladder Pump	CLEAR	6.98	12.1	14.2	0	3.4	177	NONE

PURGE DATA:

Date: 10.18.00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): 0
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 44.96
Static Water Level (WL): 27.35
One Casing Volume(gal): 2.87
Start Purge (hrs): 0715
End Purge (hrs): 1015
Total Purge Time (min): 180
Total Vol. Purged (gal): 2.85

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	✓
Cyanide	NaOH/ 4° C	L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	500 ml PE	✓
Metals (Dissolved)	HNO_3 / 4° C	L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

Round 5

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s):

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-05
DATE: 10.18.00

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
0715	27.35	—	—	—	—	—	—	—	START PURGE
0725	27.73	60	6.51	11.7	0	4.3	12.1	227	CLEAR, NO ODOR
0735	27.78		6.82	11.8	0	2.7	12.6	224	
0745	27.79		6.86	11.4	0	8.5	12.8	223	
0755	27.89		6.89	11.3	0	4.1	12.7	223	
0805	27.94		6.91	11.4	0	8.6	12.6	226	
0815	27.76		6.90	11.6	0	2.8	12.7	221	
0825	27.95		6.92	11.5	0	3.8	12.9	221	
0835	27.90		6.95	11.5	0	8.5	13.0	216	
0845	27.81 ↓S		6.95	11.5	0	8.5	13.1	211	
0855	27.82		6.96	11.8	0	5.6	13.2	197	
0905	27.82		6.96	11.9	0	3.1	13.3	199	
0915	27.82		6.98	11.9	0	4.3	13.3	204	
0925	27.94		6.96	11.8	0	4.8	13.4*	206	*SUN MAY BE WARMING
0935	27.97		6.96	11.8	0	4.3	13.5	199	PURGE WATER
0945	27.83		6.97	12.0	0	2.7	13.9	157	
0955	27.95		6.98	12.1	0	2.9	14.2	162	
1005	27.81		7.00	11.9	0	4.0	14.2	170	
1015	27.93	↓	6.98	12.1	0	3.4	14.2	177	END PURGE

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-006-05
Sample Location: 30-06
Sampled By: FW
C.O.C. No.: 101700-1
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	ORP mV	Odor
Date: 10-18-00 Time: 1456 Method: Low Flow/Bladder Pump	Clear	7.09	14.4	13.7	4	4.66	358	–

PURGE DATA:

Date: 10-18-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): –
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 44.90
Static Water Level (WL): 28.66
One Casing Volume(gal): 2.6
Start Purge (hrs): 1303
End Purge (hrs): 1456
Total Purge Time (min): 113
Total Vol. Purged (gal): 2.6

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	L PE	✓
Cyanide	NaOH/ 4° C	L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	500 ml PE	✓
Metals (Dissolved)	HNO_3 / 4° C	L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

Round 5

Circle if Applicable:

MS/MSD –

Duplicate ID No.:

Signature(s): FW

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-06
DATE: 10-18-00

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
1303	28.66								START PURGING
1312	29.11	97	7.14	14.0	13	3.99	14.1	318	
1322	29.18	97	7.14	14.0	10	3.68	13.8	330	
1333	29.37	97	7.12	14.1	7	4.88	14.0	337	2910
1342	29.43	90	7.11	14.1	2	6.89	14.0	341	
1353	29.29	90	7.10	14.2	8	7.01	14.2	345	
1405	29.30	90	7.10	14.3	10	5.94	14.2	347	
1415	29.33	90	7.08	14.4	9	5.82	14.0	350	
1424	29.34	90	7.09	14.4	1	5.36	13.8	352	
1435	29.35	90	7.08	14.4	3	4.98	13.8	354	
1445	29.35	90	7.08	14.4	3	5.36	13.7	355	
1456	29.34	90	7.09	14.4	4	4.66	13.7	358	START sampling

SIGNATURE(S): [illegible]

NSWC Crane
Field Form
Revision: 0
January 1999

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSWC Crane, IN
Project No.: 7393 CTO 19

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

Sample ID No.: 030-GW-007-05
Sample Location: 30-07
Sampled By: FCW
C.O.C. No.: 101700-1
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

Date: 10-17-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Odor
Time: 1557	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	mV	
Method: Low Flow/Bladder Pump	Clear	6.86	20.0	13.8	5	3.29	348	—

PURGE DATA:

Date: 10-17-00
Method: Low Flow/Bladder Pump
Monitor Reading (ppm): —
Well Casing Diameter & Material
Type: 2" PVC
Total Well Depth (TD): 45.20
Static Water Level (WL): 25.68
One Casing Volume(gal): 3.1
Start Purge (hrs): 1322
End Purge (hrs): 1557
Total Purge Time (min): 155
Total Vol. Purged (gal): 3.7

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Metals (TOTAL)	HNO_3 / 4° C	2 L PE	✓
Cyanide	NaOH/ 4° C	2 L PE	✓
Ammonia, Nitrate/Nitrite, TKN, Total Phos.	H_2SO_4/ 4° C	2 L PE	✓
Dissolved Phosphorus	H_2SO_4/ 4° C	2 500 ml PE	✓
Metals (Dissolved)	HNO_3 / 4° C	2 L PE	✓
$Cr+^6$	Field Test	500 mL PE	✓

OBSERVATIONS / NOTES:

Round 5

Circle if Applicable:

MS/MSD —

Duplicate ID No.: DUP-GW-001-05-FCW

Signature(s): FCW

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NSWC CRANE
PROJECT NUMBER: CTO 19 7393

WELL ID.: 30-07
DATE: 10-17-00

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
1322	25.68								START PURGING
1333	26.02	95	6.83	18.4	10	2.61	14.1	349	
1344	26.09	92	6.84	18.4	8	2.34	14.0	351	
1355	26.14	92	6.83	18.6	10	2.16	13.9	352	
1407	26.15	92	6.85	18.8	6	1.92	13.9	352	
1417	26.18	92	6.84	19.0	8	1.88	13.9	348	
1428	26.21	92	6.86	19.1	7	2.19	13.8	350	
1440	26.20	92	6.84	19.4	8	2.01	13.8	346	
1451	26.23	92	6.83	19.5	6	1.88	13.7	346	
~~1452~~	26.24	92	6.84	19.6	7	1.96	13.7	349	
1514 1502	26.26	92	6.85	19.8	8	2.09	13.8	353	
1525	26.25	97	6.85	19.7	6	2.21	13.7	350	
1535	26.24	92	6.84	20.0	6	2.12	13.8	352	
1547	26.29	92	6.84	18.1	5	3.72	13.7	350	
1557	26.25	92	6.86	20.0	5	3.29	13.8	348	START Sampling

SIGNATURE(S): [illegible]

PAGE 2 OF 2

NSWC Crane
Field Form
Revision: 0
January 1999

APPENDIX I

FIELD ANALYSIS OF HEXAVALENT CHROMIUM FIELD FORMS

ROUND 1
OCTOBER 1999

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA

Date: 10.13.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1005	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BAILER PUMP	CLEAR	6.91	3.81	14.6	6	6.19	101

Sampled By: K. SIMPSON

Sample Number: 030-GW-001-01 Well Number: 30-01

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1140

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA

Date: 10.12.99 Time: 1326	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BLADDER PUMP	CLEAR	6.84	2.41	14.9	3	5.95	203

Sampled By: S. NEIL

Sample Number: 030-GW-002-01 Well Number: 30-02

Duplicate: yes (no) If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1810

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.02 mg/L

Filtered: yes (no)

Acid Reagent Added To Blank: yes (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.03 mg/L

Cr_2O_7: 0.03 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA

Date: 10-13-99 Time: 1025	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BLADDER PUMP	CLEAR	6.65	2.52	15.4	2	5.74	214

Sampled By: S. NEIL

Sample Number: 030-GW-003-01 Well Number: 30-03

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1147

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.03 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA

Date: 10.13.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1712	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	6.76	5.05	14.9	1	5.55	129

Sampled By: S. NEIL

Sample Number: 030-GW-004-01 Well Number: 30-04

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1840

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.02 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.03 mg/L

Cr_2O_7: 0.03 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA

Date: 10/4-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 0950	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	6.94	3.19	13.2	2	6.44	247

Sampled By: K. SIMPSON

Sample Number: 030-GW-005-01 Well Number: 30-05

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: RES

Program No.: 14 Time: 1205

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.01 mg/L

Cr_2O_7: 0.01 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA

Date: 10.14.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1025	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	7.06	3.24	12.4	1	7.17	224

Sampled By: S. NEIL

Sample Number: 030-GW-006-01 Well Number: 30-06

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1208

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.02 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.04 mg/L

Cr_2O_7: 0.03 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA

Date: 10.12.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1440	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	6.81	4.41	14.0	7	3.12	195

Sampled By: K. SIMPSON

Sample Number: 030-GW-007-01 Well Number: 30-07

Duplicate: (yes) / no If yes, duplicate number: DUP-GW-001-01

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1745

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.03 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.12.99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 0000	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	6.81	4.41	14.0	7	3.12	195

Sampled By: K. SIMPSON

Sample Number: DUP-GW-001-01 Well Number: 30-07

Duplicate: yes (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1800

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes (no)

Acid Reagent Added To Blank: yes (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

DUP OF WELL 30-07

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

DI BLANK

SAMPLE DATA

Date: 10-13-99	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time: NA							
Method: NA	CLEAR	NA	NA	NA	NA	NA	NA

Sampled By: KES

Sample Number: DI BLANK Well Number: ——

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1455

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.01 mg/L

Cr_2O_7: 0.01 mg/L

Notes: RICCA CHEM. CO DI CAT #9150-5
LOT 1809218 EXP 9/99

DI CUBE IS PAST EXP. DATE BY 2 WEEK
BUT WAS SEALED & IN THE FIELD TRAILER
FOR 6 MONTHS OPEN 10/12/99

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

CR STANDARD SOLUTION

SAMPLING DATA

Date: 10-13-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: —	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: —	—						

Sampled By: KES

Sample Number: —

Well Number: —

Duplicate: yes / no If yes, duplicate number: —

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter

Analyst: KES

Program No.: 14

Time: 1710

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0.50 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 1.11 mg/L

Cr_2O_7: 1.04 mg/L

Notes: HACH 50 mg/L CR, CAT.# 810-42, LOT 49081

PREPARED 0.50 mg/L CR^{+6} SOLUTION BY PIPETTING 10.00 ML OF CR STANDARD SOLUTION, 50.0 mg/L CR^{+6}, INTO A 1000 ML FLASK AND DILUTING TO MARK WITH DI WATER.

SEE PG 138 OF HACH DR/890 COLORIMETER MANUAL

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

IDW

SAMPLING DATA

Date: 10-14-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1310	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: DIRECT ALL	CLOUDY	7.72	3.06	13.8	31	11.90	205

Sampled By: KEITH SIMPSON

Sample Number: 030-IW-001-01 Well Number: IDW

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA

Equipment: HACH DR-850 Colorimeter Analyst: KES

Program No.: 14 Time: 1320

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.02 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.04 mg/L

Cr_2O_7: 0.04 mg/L

Notes:

ROUND 2
JANUARY 2000

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1/12/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time:	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Decl. Bladder Pump	CLEAR	7.10	3.76	11.4	0.6	4.04	106

Sampled By: TERRY ROJAHN

Sample Number: 030-GW-001-02 Well Number: 30-01

Duplicate: yes / (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1306

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1/12/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1035	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Ded. Bladder Pump	Clear	6.76	2.45	8.1	5.6	5.21	206

Sampled By: SCOTT NEIL

Sample Number: 030-GW-002-02 Well Number: 30-02

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1252

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1/13/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1055	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Bladder Pump	Clear	6.58	2.42	10.8	0.1	4.79	192

Sampled By: TERRY ROJAHN

Sample Number: 030-GW-003-02 Well Number: 30-03

Duplicate: yes / (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWR

Program No.: 14 Time: 1604

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.02mg/L

Cr_2O_7: 0.02mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1/11/99 Time: 1455	Color Visual	pH Standard	S.C. ~~mS/cm~~ (TB)	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: Bladder	CLEAR	6.70	4.87	11.7	0.1	3.08	103

Sampled By: T. ROJAHN

Sample Number: 030-GW-004-02 Well Number: 30-04

Duplicate: yes / no (no circled) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: TR

Program No.: 14 Time: 1744

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1/11/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1530	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Bladder Pump	Clear	6.89	3.00	11.6	0	3.60	175

Sampled By: Scott Neil

Sample Number: 030-GW-005-02 Well Number: 30-05

Duplicate: yes / (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1730

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.02 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.05 mg/L

Cr_2O_7: 0.05 mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1/13/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1205	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Bladder Pump	Clear	6.85	3.15	10.4	0	3.59	162

Sampled By: SCOTT NEIL

Sample Number: 030-GW-006-02 Well Number: 30-06

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1615

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1/13/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1205	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Bladder Pump	CLEAR	6.85	3.15	10.4	0	3.59	162

Sampled By: Scott Neil

Sample Number: 030-GW-006-02 Well Number: 30-06

Duplicate: (yes) / no If yes, duplicate number: DUP-GW-001-02

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1605

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.02 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.04 mg/L

Cr_2O_7: 0.04 mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 1-12-99	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1657	Visual	Standard	(T4) mS/cm	°C	NTU	mg/l	mV
Method: Bladder Pump	CLEAR	7.06	4.37	12.5	0.1	4.47	177

Sampled By: T. ROJAHN

Sample Number: 030-GW-007-02 Well Number: 30-07

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: TR

Program No.: 14 Time: 1850

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02

Cr_2O_7: 0.02

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

DI BLANK

SAMPLING DATA:

Date: 1/11/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: —	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: —	—	—	—	—	—	—	—

Sampled By: SCOTT NEIL

Sample Number: DI WATER

Well Number: NA

Duplicate: yes / (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: SWN

Program No.: 14

Time: 0825

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0.01 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

HACH DR-890 serial # 990290005165

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Cr^{6+} STANDARDS

SAMPLING DATA:

Date: 1/11/00 Time: ~~0955~~ (SW)	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: —	—	—	—	—	—	—	—

Sampled By: SCOTT NEIL

Sample Number: Cr^{6+} Standard Well Number: NA

Duplicate: yes / (no) If yes, duplicate number: NA

ANALYSIS DATA:

Equipment: HACH DR-850 Colorimeter Analyst: SWN

Program No.: 14 Time: 0955

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.50 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: —

Cr_2O_7: —

Notes: Refer to (HACH) colorimeter manual for preparation of standard solution for Hexavalent Chromium.

ROUND 3
APRIL 2000

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4.18.00 Time: 1630	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: Low Flow/ Bladder Pump	CLEAR	7.20	3.77	12.9	0	1.98	162

Sampled By: S. NEIL

Sample Number: 030 GW 001 03 Well Number: 30-1

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 1850

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.00 mg/L

Cr_2O_7: 0.00 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4/18/00 Time: 0415	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: Low Flow - Bladder Pump	CLEAR	4.63	2.3	12.6	0	4.9	-56

Sampled By: SCOTT NEIL

Sample Number: 030-GW-002-03 Well Number: 30-02

Duplicate: yes / (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1145

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.00 mg/L

Cr_2O_7: 0.00 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4/18/00 Time: 1050	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: LOW FLOW - Bladder Pump	CLEAR	6.45	2.17	12.5	0	3.80	248

Sampled By: Keith Simpson

Sample Number: 030-GW-003-03 Well Number: 30-03

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1155

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4.18.00 Time: 1600	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BLADDER PUMP	CLEAR	6.64	4.45	13.2	1.0	4.37	118

Sampled By: R. SIMPSON

Sample Number: 030 GW 004 03 Well Number: 30-4

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 1904

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.01 mg/L

Cr_2O_7: 0.01 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4-18-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1600	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	6.64	4.45	13.2	1.0	4.37	118

SAMPLE ID 030GW00403

Sampled By: K. SIMPSON

Sample Number: DUPGW 001 03 ↑

Well Number: 30-4

Duplicate: (yes) / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: KES

Program No.: 14

Time: 1857

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0.01 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.01 mg/L

Notes:

DUP

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4/19/00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1110	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: LOW FLOW/ BLADDER Pump	CLEAR	6.72	3.12	13.9	2	1.29	159

Sampled By: Scott Neil

Sample Number: 030-GW-005-03 Well Number: 30-05

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: SWN

Program No.: 14 Time: 1305

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.00 mg/L

Cr_2O_7: 0.00 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4-19-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time:	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	6.98	3.01	12.9	0	4.99	249

Sampled By: R. SIMPSON

Sample Number: 030-GW-006-03 Well Number: 30-6

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 1250

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.00 mg/L

Cr_2O_7: 0.00 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 4-19-00 Time: 1640	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BLADDER PUMP	CLEAN	6.94	4.31	14.4	0	6.41	244

Sampled By: K. SIMPSON

Sample Number: 030-GW-007-03 Well Number: 30-7

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 1750

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.00 mg/L

Cr_2O_7: 0.00 mg/L

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

CR STANDARD SOLUTION

SAMPLING DATA:

Date: 4.18.00	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time: —							
Method: ~~1930~~ RS							

Sampled By: KES

Sample Number: —

Well Number: —

Duplicate: yes / no If yes, duplicate number: —

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: KES

Program No.: 14

Time: 1934

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 52 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 1.14 mg/L

Cr_2O_7: 1.07 mg/L

Notes: HACH 50 mg/L CR, CAT # 810-42H LOT # A9298

SEE PG 138 OF HACH DR/890 COLORIMETER MANUAL

ROUND 4
JULY 2000

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-26-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 9:45	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Low Flow w/ Bladder Pump	Clear	6.75	3.555	15.23	0.2	1.91	122

Sampled By: J. Schubert

Sample Number: 030-GW-001-04 Well Number: 30-1

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: J.R. Hill

Program No.: 14

Time: 14:13

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-26-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 12:13	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Low Flow Bladder Pump	Clear	6.75	2.235	16.70	0.5	5.55	212.4

Sampled By: J.R. Hill

Sample Number: 030-GW-002-04 Well Number: 30-2

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: J.R. Hill

Program No.: 14 Time: 14:20

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.02 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-25-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: ~~29:30~~ 20:00	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Low Flow Bladder Pump	Clear	6.33	2.156	16.20	2.3	2.80	257.4

Sampled By: J. Schubert / J.R. Hill

Sample Number: 030-GW-003-04 Well Number: 30-3

Duplicate: yes / (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: J.R. Hill

Program No.: 14

Time: 9:30 7-26-00

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0.00 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-27-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 11:09	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Low Flow	Clear	6.36	4.413	16.40	1.0	2.99	223.4

Bladder Pump

Sampled By: J.R. Hill

Sample Number: 030-GW-004-04 Well Number: 30-4

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: J.R. Hill

Program No.: 14 Time: 17:39

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-27-00 Time: 11:00 Method: Low Flow Bladder Pump	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
	clear	6.72	2.920	15.99	0.2	2.37	191

Sampled By: Jeff Schubert

Sample Number: 030-GW-005-04 Well Number: 30-5

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: J.R. Hill

Program No.: 14 Time: 7-27-00 17:45

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-26-00 Time: 17:57	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: Low Flow Bladder Pump	Clear	6.70	2.816	14.20	0.0	4.94	207

Sampled By: J.R. Hill

Sample Number: 030-GW-006-04 Well Number: 30-6

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: J.R. Hill

Program No.: 14 Time: 7-26-00 17:57

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-26-00 Time: 15:58	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: Low Flow Bladder Pump	Clear	6.65	4.118	14.19	0.1	2.45	162

Sampled By: Jeff Schubert

Sample Number: 030-GW-007-04 Well Number: 30-7

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Program No.: 14

Reagent: ChromaVer 3 Accu Vac Ampul

Analyst: J.R. Hill

Time: 7-26-00 20:00

Result: 0.02 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 7-26-00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 15:58	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: Low Flow Bladder Pump	Clear	6.65	4.118	14.19	0.1	2.45	162

Sampled By: Jeff Schubert

Sample Number: DUP-GW-001-04 Well Number: 30-7

Duplicate: (yes) / no If yes, duplicate number: duplicate of 030-GW-007-04

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: J.R. Hill

Program No.: 14

Time: 7-26-00 20:06

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0.01 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.

Cr_2O_7: Not Appl.

Notes:

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Hexavalent Chromium Standard Solution

SAMPLING DATA:

Date:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time:							
Method:							

Sampled By:

Sample Number: Well Number:

Duplicate: yes / no If yes, duplicate number:

NA

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: J.R. Hill

Program No.: 14

Time: 7-25-00 9:30 am

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0.71 mg/L

Hach 50 mg/L Cr^{6+} solution
Cat. # 810-42H
Lot # A9298

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.
Cr_2O_7: Not Appl.

Notes: 1 mL of 50 mg/L Cr^{6+} diluted into 200 mL of dionized H_2O. Standard solution = 0.25 mg/L

Instrument indicates concentration of the standard solution is about three times higher than it should be.

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Hexavalent Chromium Standard Solution

SAMPLING DATA:

Date:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Time:							
Method:							

Sampled By:

Sample Number: Well Number:

Duplicate: yes / no If yes, duplicate number:

NA

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: J.R. Hill

Program No.: 14

Time: 7-25-00 10:25 am ~~pm~~

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 1.45 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Hach 50 mg/L Cr^{6+} solution
Cat. # 810-42H
Lot # A9298

Alternate forms of Cr^{6+}:

CrO_4: Not Appl.
Cr_2O_7: Not Appl.

Notes: 5 mL of 50 mg/L Cr^{6+} standard mixed into 495 ~~500~~ mL of dionized water. Cr^{6+} concentration of standard = 0.50 mg/L Cr^{6+}

Instrument indicates concentration of standard solution is about 3 times higher than it should be.

ROUND 5
OCTOBER 2000

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.18.00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time:	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER PUMP	CLEAR	7.15	16.8	13.4	3	2.80	197

Sampled By: F. WUDKWYCH

Sample Number: 030GW001 05 Well Number: 30-01

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 1030

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.01 "

Notes: TEST RUN @ WELL

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.17.00 Time: 1045	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BADGER	CLEAN	6.34	9.29	13.7	2	5.3	206

Sampled By: K. SIMPSON

Sample Number: 030 GW 002 05 Well Number: 30-02

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 1050

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/l

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0 mg/l

Cr_2O_7: 0 ↓

Notes: TEST RUN @ WELL

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10-17-00 Time: 1000	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BLADDER	CLEAN	6.51	9.33	14.2	2	2.71	368

Sampled By: FRANK W.

Sample Number: 030-GW-03-05 Well Number: 30-03

Duplicate: yes / no (no circled) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: RES

Program No.: 14 Time: 1020

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.00 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0

Cr_2O_7: 0

Notes: TEST RUN @ WELL 1020

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.17.00 / Time: 1635	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BLADDER PUMP	CLEAR	6.15	18.0	14.4	3	4.1	110

Sampled By: R. SIMPSON

Sample Number: 030 GW 004 05 Well Number: 30-04

Duplicate: yes / no (KS) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 1640

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.02 mg/L

Cr_2O_7: 0.02 "

Notes: TEST RUN @ WELL

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.18.00 / Time:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV
Method: BLADDER PUMP	CLEAR	6.98	12.1	14.2	0	3.4	177

Sampled By: R. SIMPSON

Sample Number: 030GW005 05 Well Number: 30-05

Duplicate: yes / (no) If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: RES

Program No.: 14 Time: 1025

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / (no)

Acid Reagent Added To Blank: yes / (no)

Alternate forms of Cr^{6+}:

CrO_4: 0.01 mg/L

Cr_2O_7: 0.01 "

Notes: TEST RUN @ WELL

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.18.00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1456	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADER	CLEAR	7.09	14.4	13.7	4	4.66	358

Sampled By: F W

Sample Number: 030 GW 006 05 Well Number: 03-06

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: KS ~~14~~ 1635

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.01 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0.01 mg/L

Cr_2O_7: 0.01 "

Notes: TEST RUN @ BLD 3245

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.17.00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 1557	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER	CLEAR	6.86	200	13.8	5	3.29	34.8

Sampled By: F. WUDKWYCH

Sample Number: 30-07 Well Number: 030 GW 007 05

Duplicate: yes / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: RES

Program No.: 14 Time: 1805

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0 mg/L

Cr_2O_7: 0 "

Notes: TEST RUN @ WELL

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10.17.00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time: 0000	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method: BLADDER	CLEAR	6.86	20.0	13.8	5	3.29	348

Sampled By: F. WUDRWYCH

Sample Number: DUP GW001 05

Well Number: DUP GW001 05 30-07

Duplicate: (yes) / no If yes, duplicate number:

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter

Analyst: RES

Program No.: 14

Time: 1910

Reagent: ChromaVer 3 Accu Vac Ampul

Result: 0 mg/L

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4: 0 mg/L

Cr_2O_7: 0 "

Notes: DUP OF 030 GW 007 05

TEST RUN @ WELL

FIELD ANALYSIS OF HEXAVALENT CHROMIUM
SWMU 30-LANDFARM AREA
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

SAMPLING DATA:

Date: 10·16·00	Color	pH	S.C.	Temp.	Turbidity	DO	ORP
Time:	Visual	Standard	mS/cm	°C	NTU	mg/l	mV
Method:							

Sampled By: NA

Sample Number: NA Well Number: NA

Duplicate: yes / no If yes, duplicate number:

STANDARD SOLUTION
0.50 MG/L CR^{6+}

ANALYSIS DATA:

Equipment: HACH DR-890 Colorimeter Analyst: KES

Program No.: 14 Time: 2000

Reagent: ChromaVer 3 Accu Vac Ampul Result: 0.51 ✓

Filtered: yes / no

Acid Reagent Added To Blank: yes / no

Alternate forms of Cr^{6+}:

CrO_4:

Cr_2O_7:

Notes: STANDARD = 0.50 mg/L RESULT = 0.51 mg/L
WITH-IN RANGE

SEE PG 160 OF HACH DR 890 HANDBOOK

CHROMIUM, HEXAVALENT STANDARD SOLUTION
50 MG/L AS CR
CAT. # 910-42H
LOT A0174

APPENDIX J

CHAIN-OF-CUSTODY RECORDS

ROUND 1
OCTOBER 1999

CHAIN OF CUSTODY RECORD

003

PROJECT NO.: CTO 19 7393

SITE NAME: NSWC CRANE IN

SAMPLERS (SIGNATURE): K. S. Simpson

STATION NO.	DATE 1999	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	AMMONIA NITRATE/NITRITE TKN, T. PHOS.	DIS. PHOS.	REMARKS
TB	10/13	1340		✓	030-TB-002-01	3	3							TRIP BLANK
FB	↓	1600		✓	030-FB-001-01	8	3	2	1	KS #	1	1		SOURCE (DI) WATER
LF	↓	1712		✓	030-GW-004-01	10	3	2	1	1	1	1	1	
↓	10/14	0950		✓	030-GW-005-01	10	3	2	1	1	1	1	1	
↓	↓	1025		✓	030-GW-006-01	10	3	2	1	1	1	1	1	
IDW	↓	1310		✓	030-IW-001-01	8	3	2	1		1	1		DEVELOPMENT & PURGE WATER

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
K. S. Simpson	10.14.99 1630	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: FEDEX AB # 8117 3683 5473 TEMP. BLANK AT SHIPMENT = 4°C	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 19 7393

SITE NAME: NSWC CRANE, IN

SAMPLERS (SIGNATURE): [illegible] / Scott [illegible]

STATION NO.	DATE 1999	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	AMMONIA, NITRATE/NITRITE, TKN, T. PHOS.	DIS. PHOS.	REMARKS
RB	10/11	1810		✓	030-RB-001-01	10	3	2	1	1	1	1	1	
TB	10/12	0715		✓	030-TB-001-01	3	3							
LF	↓	~~1440~~		✓	030-GW-007-01	10	3	2	1	1	1	1	1	
↓	↓	1326		✓	030-GW-002-01	30	9	6	3	3	3	3	3	RUN MS/MSD ALSO
↓	↓	0000		✓	DUP-GW-001-01	10	3	2	1	1	1	1	1	DUP OF 30-07
↓	10/13	1005		✓	030-GW-001-01	10	3	2	1	1	1	1	1	
↓	↓	1025		✓	030-GW-003-01	10	3	2	1	1	1	1	1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
[illegible]	10.13.99 1625	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: FED EX AB # 8117 3683 5451 TEMP BLANK AT SHIPMENT = 4°C	

Order No. 70440 (0693)

ROUND 2
JANUARY 2000

CHAIN OF CUSTODY RECORD

0032

PROJECT NO.: 7393/CTO 19

SITE NAME: NSWC CRANE, INDIANA

SAMPLERS (SIGNATURE): Scott W. Reid

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	METALS (T)	METALS (DIS)	CYANIDE	DIS. PHOS.	NH3, TKN, NITRATE, NITRITE, PHOS (T)	REMARKS
TB	1/11/00	1030		✓	030-TB-001-02	3	3							TRIP BLANK
LF	↓	1455		✓	030-GW-004-02	10	3	2	1	1	1	1	1	
LF	↓	1530		✓	030-GW-005-02	10	3	2	1	1	1	1	1	
~~TB~~	~~1/12/00~~	~~0730~~		~~✓~~	~~030-TB-002-02~~	~~3~~	~~3~~	~~2~~ SN						TRIP BLANK SN
LF	↓	1035		✓	030-GW-002-02	10	3	2	1	1	1	1	1	
LF	↓	1100		✓	030-GW-001-02	10	3	2	1	1	1	1	1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
Scott W. Reid	1/12/00 1600	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY(SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Temp. blank @ shipment = 4°C. FED EX AIR BILL #: 8166 8343 7177	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

00326

PROJECT NO.: 7393/CTO 19

SITE NAME: LANDFARM - NSWC CRANE, IN.

SAMPLERS (SIGNATURE): Scott W. Neil

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	DIS. PHOS.	NH3, TKN, NITRATE, NITRITE, PHOS (T)	REMARKS
TB	1/12/00	0720		✓	030-TB-002-02	3	3							TRIP BLANK
LF	↓	1657		✓	030-GW-007-02	10	3	2	1	1	1	1	1	
LF	1/13/00	1055		✓	030-GW-003-02	30	9	6	3	3	3	3	3	Run MS/MSD
LF	1/13/00	0000		✓	DUP-GW-001-02	10	3	2	1	1	1	1	1	Dup of 030-GW-006-02
LF	1/13/00	1205		✓	030-GW-006-02	10	3	2	1	1	1	1	1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
Scott W. Neil	1/14/00 1300	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: TEMP BLANK @ SHIPPING = 4°C FED EX AIR BILL # 8168 5343 7166	

Order No. 70440 (0693)

ROUND 3
APRIL 2000

TETRA TECH NUS, INC. CTO 19 CHAIN OF CUSTODY NUMBER 041800-3 PAGE 1 OF

PROJECT NO:	SITE NAME:	PROJECT MANAGER AND PHONE NUMBER	LABORATORY NAME AND CONTACT:
7393	NSWC CRANE	ROGER CLARK 412 921 7090	LAUCKS TESTING LAB
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER AND PHONE NUMBER: KEITH SIMPSON 412 921 7090	ADDRESS: 940 S. HARNEY ST.
		CARRIER/WAYBILL NUMBER: 8104314 13655	CITY, STATE: SEATTLE, WA 98108

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

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TOTAL METALS	DIS. METALS	CYANIDE	DIS. PHOS.	T. PHOS. AMMONIA, NITRATE/NITRITE, TKN				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						P	P	P	P	P				
PRESERVATIVE USED						HNO3	HNO3	NaOH	H2SO4	H2SO4				
4/18	0945	030-GW-002-03	GW	G	5	1	1	1	1	1				
	1050	030-GW-003-03	GW	G	5	1	1	1	1	1				
	1600	030-GW-004-03	GW	G	5	1	1	1	1	1				
	1630	030-GW-001-03	GW	G	15	3	3	3	3	3				RUN ALSO MS/MSD
	0000	DUP-GW-001-03	GW	G	5	1	1	1	1	1				DUP OF 030-GW-004-03
4/19	1050	030-GW-006-03	GW	G	5	1	1	1	1	1				
	1110	030-GW-005-03	GW	G	5	1	1	1	1	1				
	1640	030-GW-007-03	GW	G	5	1	1	1	1	1				

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	4.20.00	1000	1. RECEIVED BY FED EX	4.20.00	1000
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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

3/99
FORM NO. TtNUS-001

ROUND 4
JULY 2000

TETRA TECH NUS, INC. CTO 19 CHAIN OF CUSTODY | NUMBER 072500-1 | PAGE 1 OF 1

PROJECT NO: ~~3773~~ 7393 JPS	SITE NAME: NSWC Crane	PROJECT MANAGER AND PHONE NUMBER: Roger Clark 412-921-7090	LABORATORY NAME AND CONTACT: Lauks Testing Lab
SAMPLERS (SIGNATURE): Jeffrey P. Schubert, James R Neff		FIELD OPERATIONS LEADER AND PHONE NUMBER: Jeff Schubert 412-921-8794	ADDRESS: 940 S. Harney St.
		CARRIER/WAYBILL NUMBER: 818826282321	CITY, STATE: Seattle, WA 98108

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

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	Total Metals	Dissolved Metals (Filtered)	Cyanide	Tot. Phos., Ammonia, Nitrate/Nitrite, TKN	Dissolved Phos. (Filtered)				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						P	P	P	P	P				
PRESERVATIVE USED						HNO_3	HNO_3	NaOH	H_2SO_4	H_2SO_4				
7/25	20:00	030-GW-003-04	GW	G	5	1	1	1	1	1				
7/26	11:59	030-GW-001-04	GW	G	5	1	1	1	1	1				
7/26	12:13	030-GW-002-04	GW	G	5	1	1	1	1	1				
7/26	15:58	030-GW-007-04	GW	G	5	1	1	1	1	1				
7/26	0000	DUP-GW-001-04	GW	G	5	1	1	1	1	1				
7/26	17:57	030-GW-006-04	GW	G	5	1	1	1	1	1				
7/27	11:00	030-GW-005-04	GW	G	10	2	2	2	2	2				Extra bottles for MS
7/27	11:09	030-GW-004-04	GW	G	5	1	1	1	1	1				

1. RELINQUISHED BY: Jeffrey P. Schubert	DATE: 7-27-00	TIME: 15:00	1. RECEIVED BY: Fed Ex	DATE: 7-27-00	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

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

3/99
FORM NO. TtNUS-001

ROUND 5
OCTOBER 2000

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER 101700 - 1 PAGE 1 OF 1

PROJECT NO: CTO-19 / 7393	SITE NAME: NSWC CRANE	PROJECT MANAGER AND PHONE NUMBER: ROGER CLARK 412-921-7090	LABORATORY NAME AND CONTACT: LAUKS TESTING
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: Keith SIMPSON 412-921	ADDRESS: 940 S. HARNEY ST.
		CARRIER/WAYBILL NUMBER: FEDEX 8216 5043 7731	CITY, STATE: SEATTLE WA 98108

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

DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TOTAL Metals	DISSOLVED Metals	Cyanide	Total Phos. Ammonia Nitrate/Nitrite TKN	DISSOLVED Phos.				COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						P	P	P	P	P				
PRESERVATIVE USED						HNO_3	HNO_3	NaOH	H_2SO_4	H_2SO_4				
10-17	1045	030-GW-002-05	GW	G	5	X	X	X	X	X				
	1000	030-GW-003-05			5	X	X	X	X	X				
	1557	030-GW-007-05			5	X	X	X	X	X				
	0000	DUP-GW-001-05			5	X	X	X	X	X				DUP of 030-GW-007-05
	1635	030-GW-004-05			15	X	X	X	X	X				00 MS/MSD
10-18	0942	030-GW-001-05			5	X	X	X	X	X				
	1020	030-GW-005-05			5	X	X	X	X	X				
	1456	030-GW-006-05			3	X	X	X	X	X				

1. RELINQUISHED BY: [signature]	DATE 10.19.00	TIME 1200	1. RECEIVED BY FED EX	DATE 10.19.00	TIME 1200
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME
COMMENTS					

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

APPENDIX K

INVESTIGATION-DERIVED WASTE ANALYTICAL RESULTS

INVESTIGATIVE DERIVED WASTE (IDW)
ANALYTICAL RESULTS

nsample	030-IW-001-01
sample	030-IW-001-01
sample_dat	10/14/99
qc_type	NM
sacode	NORMAL
coll_metho	GRAB
matrix	GW
validated	Y
proj_manag	Clark, R.
cto_proj	019
background	QC
filtering	UNF
OV 1,1,1,2-TETRACHLOROETHANE UG/L	0.5 U
OV 1,1,1-TRICHLOROETHANE UG/L	0.5 U
OV 1,1,2,2-TETRACHLOROETHANE UG/L	0.5 U
OV 1,1,2-TRICHLOROETHANE UG/L	0.5 U
OV 1,1-DICHLOROETHANE UG/L	0.5 U
OV 1,1-DICHLOROETHENE UG/L	0.5 U
OV 1,2,3-TRICHLOROPROPANE UG/L	1 U
OV 1,2-DIBROMO-3-CHLOROPROPANE UG/L	1 U
OV 1,2-DIBROMOETHANE UG/L	0.5 U
OV 1,2-DICHLOROETHANE UG/L	0.5 U
OV 1,2-DICHLOROPROPANE UG/L	0.5 U
OV 2-BUTANONE UG/L	10 UR
OV 2-HEXANONE UG/L	10 UR
OV 4-METHYL-2-PENTANONE UG/L	10 UR
OV ACETONE UG/L	10 UR
OV ACROLEIN UG/L	10 UR
OV ACRYLONITRILE UG/L	3 UR
OV ALLYL CHLORIDE UG/L	10 U
OV BENZENE UG/L	0.5 U
OV BROMODICHLOROMETHANE UG/L	0.5 U
OV BROMOFORM UG/L	0.5 U
OV BROMOMETHANE UG/L	1 U
OV CARBON DISULFIDE UG/L	0.5 U
OV CARBON TETRACHLORIDE UG/L	0.3 U
OV CHLOROBENZENE UG/L	0.5 U
OV CHLOROETHANE UG/L	0.5 UJ
OV CHLOROFORM UG/L	0.3 U
OV CHLOROMETHANE UG/L	0.5 UJ
OV CHLOROPRENE UG/L	3 U
OV CIS-1,3-DICHLOROPROPENE UG/L	0.3 U
OV DIBROMOCHLOROMETHANE UG/L	0.5 U
OV DIBROMOMETHANE UG/L	0.5 U
OV DICHLORODIFLUOROMETHANE UG/L	0.5 U
OV ETHYL METHACRYLATE UG/L	1 U
OV ETHYLBENZENE UG/L	0.5 U
OV METHACRYLONITRILE UG/L	1 UR
OV METHYL METHACRYLATE UG/L	2 UR
OV METHYLENE CHLORIDE UG/L	3 U
OV STYRENE UG/L	0.5 U
OV TETRACHLOROETHENE UG/L	0.5 U
OV TOLUENE UG/L	0.5 U
OV TRANS-1,2-DICHLOROETHENE UG/L	0.5 U
OV TRANS-1,3-DICHLOROPROPENE UG/L	0.5 U
OV TRANS-1,4-DICHLORO-2-BUTENE UG/L	10 UR
OV TRICHLOROETHENE UG/L	0.5 U
OV TRICHLOROFLUOROMETHANE UG/L	0.5 U
OV VINYL ACETATE UG/L	0.5 U
OV VINYL CHLORIDE UG/L	0.5 U
OV XYLENES, TOTAL UG/L	1 U

INVESTIGATIVE DERIVED WASTE (IDW)
ANALYTICAL RESULTS

nsample	030-IW-001-01
sample	030-IW-001-01
sample_dat	10/14/99
qc_type	NM
sacode	NORMAL
coll_metho	GRAB
matrix	GW
validated	Y
proj_manag	Clark, R.
cto_proj	019
background	QC
filtering	UNF
EXP 1,3,5-TRINITROBENZENE UG/L	1.5 U
EXP 1,3-DINITROBENZENE UG/L	1.5 U
EXP 2,4,6-TRINITROTOLUENE UG/L	1.5 U
EXP 2,4-DINITROTOLUENE UG/L	1.5 U
EXP 2,6-DINITROTOLUENE UG/L	1.5 U
EXP 2-AMINO-4,6-DINITROTOLUENE UG/L	1.5 U
EXP. 2-NITROTOLUENE UG/L	1.5 U
EXP 3-NITROTOLUENE UG/L	1.5 U
EXP 4-AMINO-2,6-DINITROTOLUENE UG/L	1.5 U
EXP 4-NITROTOLUENE UG/L	1.5 U
EXP HMX UG/L	1.5 U
EXP NITROBENZENE UG/L	1.5 U
EXP RDX UG/L	1.4 U
EXP TETRYL UG/L	1.5 U
M ANTIMONY UG/L	1.1 U
M ARSENIC UG/L	2.8
M BARIUM UG/L	13.8
M BERYLLIUM UG/L	1.1 U
M CADMIUM UG/L	1.1 U
M CHROMIUM UG/L	5.6 U
M COBALT UG/L	3.3 U
M COPPER UG/L	4.3
M LEAD UG/L	1.4
M MERCURY UG/L	0.2 U
M NICKEL UG/L	11.1 U
M SELENIUM UG/L	5.6 U
M SILVER UG/L	3.3 U
M THALLIUM UG/L	1.1 U
M TIN UG/L	1.1 U
M VANADIUM UG/L	2.2 U
M ZINC UG/L	47.8
MISC AMMONIA, AS NITROGEN MG/L	0.01 U
MISC CYANIDE MG/L	0.01 U
MISC NITRATE/NITRITE, AS N MG/L	1.2
MISC TOTAL KJELDAHL NITROGEN MG/L	0.6
MISC TOTAL PHOSPHORUS AS P MG/L	0.1 U

APPENDIX L

EPA APPROVAL LETTER FOR ELIMINATION OF VOCs AND EXPLOSIVES

DW-8J

Mr. Tom Brent
Naval Surface Warfare Center
EPD, Code 095 B-3260
300 Highway 361
Crane, IN 47522-5001

Re: Letter of Approval
Request to Eliminate VOC and
Explosives Monitoring at
SWMU #30 - Landfarm

Dear Mr. Brent:

We have examined the first two rounds of GW data submitted for SWMU #30 - Landfarm. Your request to eliminate VOC and explosives sampling from future rounds of monitoring is approved. Sampling will continue in accordance with the approved Work Plan and Quality Assurance Project Plan for a reduced set of parameters.

In the future, the laboratory should take corrective measures to minimize the occurrence of data marked as "UR" in order to eliminate data gaps. Additionally, in future data submissions, please include both the data summary tables as well as information defining the laboratory's performance on all relevant QC samples. This added information will provide us with a clearer understanding of the overall quality of data submitted in the summary table. We wish to prevent situations contributing to (uncorrected) difficulties which could potentially lead to a need for resampling/reanalysis in order to fill data gaps.

If you have any questions regarding this matter, please contact me at (312) 886-7890.

Regards,

Peter Ramanauskas
Environmental Engineer
WMB, Corrective Action Section

Filename: Landfarm Param Reduction Approval.wpd

cc: NSWC Core Team Members: Bill Gates, SOUTHDIV

Project Team Members: Allen Debus, USEPA

APPENDIX M

SAMPLE CALCULATION SHEETS FOR STATISTICAL ANALYSES

TETRA TECH NUS, INC. **CALCULATION WORKSHEET**

CLIENT: NSWC CRANE	JOB NUMBER: CTO 19
SUBJECT: SAMPLE CALCULATIONS OF STATISTICAL ANALYSIS	
BASED ON: GW UPGRADIENT TOTAL ARSENIC RESULTS	DRAWING NUMBER:
BY: TSK / CHECKED BY: DEL	APPROVED BY: / DATE: 4/20/01

THE DATA USED FOR THE FOLLOWING RESULTS FOR THE SAMPLE CALCULATIONS ARE THE TOTAL ARSENIC RESULTS FROM UPGRADIENT GROUNDWATER SAMPLES.

LOCATION (i)	ROUND (J)	RESULTS	QUAL	VALUE (X_{ij})	RESIDUAL (R_{ij})
GW-001	01	4.3		4.3	1.67
GW-001	02	3.1		3.1	0.47
GW-001	03	3.8	J	3.8	1.17
GW-001	04	1.1	U	0.55	-2.08
GW-001	05	1.4		1.4	-1.23
GW-003	01	1.1	U	0.55	0
GW-003	02	1.1	U	0.55	0
GW-003	03	1.1	U	0.55	0
GW-003	04	1.1	U	0.55	0
GW-003	05	1.1	U	0.55	0

* ½ DETECTION LIMIT USED FOR RESULTS WITH "U" QUALIFIERS

① FIND RESIDUALS (R_{ij})

$$R_{ij} = X_{ij} - \bar{X}$$ (WHERE i^{TH} LOCATION AND j^{TH} ROUND)

LET GW-001 = 1ST LOCATION

$$\bar{X}_1 = \frac{\sum_{j=1}^{5} X_{1j}}{n_i} = \frac{4.3 + 3.1 + 3.8 + 0.55 + 1.4}{5}$$

$$= 13.15/5 = 2.63$$

THEREFORE, RESIDUALS OF GW-001:

$$R_{1j} = X_{1j} - 2.63$$

THEN COMPUTE $\bar{X}_2$ (FOR GW-003) AND FIND R_{2j}

CLIENT NSWC CRANE	JOB NUMBER CTO 19
SUBJECT SAMPLE CALCULATIONS OF STATISTICAL ANALYSIS	
BASED ON GW UPGRADIENT TOTAL ARSENIC RESULTS	DRAWING NUMBER
BY TSK / CHECKED BY BEL	APPROVED BY / DATE 04/20/01

② CALCULATE THE ARITHMETIC MEAN OF RESIDUALS ($\bar{R}$):

(BY DEFINITION = 0)

$$\bar{R} = \frac{\sum_{i=1}^{2}\sum_{j=1}^{5} R_{ij}}{N} \qquad * N = n_1 + n_2$$

$$\sum_{i=1}^{2}\sum_{j}^{5} R_{ij} = (1.67)+(0.47)+(1.17)+(-2.08)+(-1.23)+(0)+(0)+(0)+(0)+(0)$$

$$= 0 \qquad \bar{R} = \frac{0}{10} = 0$$

③ CALCULATE THE STANDARD DEVIATION OF RESIDUALS (S_R):

$$S_R = \sqrt{\frac{\sum_{i=1}^{2}\sum_{j=1}^{5}(R_{ij}-\bar{R})^2}{N-1}}$$

$$\sum_{i=1}^{2}\sum_{j=1}^{5}(R_{ij}-\bar{R})^2 = (1.67-0)^2+(0.47-0)^2+(1.17-0)^2+(-2.08-0)^2+(-1.23-0)^2+$$
$$(0-0)^2+(0-0)^2+(0-0)^2+(0-0)^2+(0-0)^2$$

$$'' = 2.7889 + .2209 + 1.3689 + 4.3264 + 1.5129$$
$$+0 \quad +0 \quad +0 \quad +0 \quad +0$$

$$'' = 10.218$$

$$S_R = \sqrt{\frac{10.218}{9}} = \sqrt{1.135333} = 1.0655$$

④ CALCULATE THE SHAPIRO - WILK W STATISTIC (USING RESIDUALS):

$$W_{CALC} = \left[\frac{b}{S_R\sqrt{N-1}}\right]^2$$

CLIENT: NSWC CRANE	JOB NUMBER: CTO 19
SUBJECT: SAMPLE CALCULATION OF STATISTICAL ANALYSIS	
BASED ON: GW UPGRADIENT TOTAL ARSENIC RESULTS	DRAWING NUMBER:
BY: TSK / CHECKED BY: BEL	APPROVED BY: / DATE: 04/20/01

CALCULATE b BY CREATING THE FOLLOWING TABLE:

COLUMN 1: RESULTS ORDERED BY SMALLEST TO LARGEST (R_i)

COLUMN 2: RESULTS ORDERED BY LARGEST TO SMALLEST (R_{n-i+1})

COLUMN 3: COLUMN 2 − COLUMN 1 $= (R_{n-i+1} - R_i)$

COLUMN 4: COEFFICIENT a_i FROM SAMPLE CALC TABLE 1

COLUMN 5: COLUMN 3 × COLUMN 4 $= b_i = a_i (R_{n-i+1} - R_i)$

$$b = \sum_{i=1}^{K^*} b_i = \sum_{i=1}^{5} b_i$$

* WHERE K IS THE GREATEST INTEGER LESS THAN OR EQUAL TO $n/2$

$K \rightarrow n/2 = 10/2 = 5 = K$

R_i	R_{n-i+1}	$R_{n-i+1} - R_i$	a_i	b_i	i
-2.08	1.67	3.75	0.5739	2.152125	1
-1.23	1.17	2.40	0.3291	0.78984	2
0	0.47	0.47	0.2141	.100627	3
0	0	0	0.1224	0	4
0	0	0	0.0399	0	5
0	0			+	6
0	0				7
0.47	0			$b = 3.042592$	8
1.17	-1.23				9
1.67	-2.08				10

$$W_{CALC} = \left[\frac{3.042592}{1.0655\,(\sqrt{9})}\right]^2 = \left[\frac{3.042592}{3.1965}\right]^2 = [.95185]^2 = .90602$$

- DETERMINE W_{TEST} AT 5% SIGNIFICANCE LEVEL WITH N = 10 FROM SAMPLE CALC TABLE 2:

$$W_{TEST} = 0.842$$

CLIENT NSWC CRANE	JOB NUMBER CTO 19
SUBJECT SAMPLE CALCULATIONS OF STATISTICAL ANALYSIS	
BASED ON GW UPGRADIENT TOTAL ARSENIC RESULTS	DRAWING NUMBER
BY TSK / CHECKED BY BEL	APPROVED BY / DATE 04/20/01

$W_{CALC} = 0.96602 > 0.842 = W_{TEST}$

SINCE $W_{CALC} > W_{TEST}$, WE ACCEPT THE NULL HYPOTHESIS THAT THE DATA SET HAS A NORMAL DISTRIBUTION.

(5) PERFORM THE WILCOXON RANK-SUM NON-PARAMETRIC ANOVA.

a) RANK RESULTS FROM LOWEST TO HIGHEST

VALUE	GRADIENT	RANK	ADJUSTED RANK *	VALUE	GRADIENT	RANK	ADJUSTED RANK
0.55	UP	1	8.5	1.4	UP	21	21.5
0.55	UP	2	8.5	1.4	DOWN	22	21.5
0.55	UP	3	8.5	1.6	DOWN	23	23
0.55	UP	4	8.5	1.7	DOWN	24	24.5
0.55	UP	5	8.5	1.7	DOWN	25	24.5
0.55	UP	6	8.5	1.8	DOWN	26	26.5
0.55	DOWN	7	8.5	1.8	DOWN	27	26.5
0.55	DOWN	8	8.5	2.2	DOWN	28	28.5
0.55	DOWN	9	8.5	2.2	DOWN	29	28.5
0.55	DOWN	10	8.5	2.3	DOWN	30	30
0.55	DOWN	11	8.5	2.6	DOWN	31	31
0.55	DOWN	12	8.5	2.8	DOWN	32	32
0.55	DOWN	13	8.5	3	DOWN	33	33
0.55	DOWN	14	8.5	3.1	UP	34	34.5
0.55	DOWN	15	8.5	3.1	DOWN	35	34.5
0.58	DOWN	16	8.5	3.4	DOWN	36	36.5
1.1	DOWN	17	17	3.4	DOWN	37	36.5
1.3	DOWN	18	19	3.8	UP	38	38
1.3	DOWN	19	19	4	DOWN	39	39
1.3	DOWN	20	19	4.3	UP	40	40

* RANK ADJUSTED FOR TIES BY USING THE MEDIAN (MIDDLE) RANK OF THE TIED RANKS FOR ALL TIED VALUES.

CLIENT NSWC Crane	JOB NUMBER CTO 19
SUBJECT Sample Calculations of Statistical Analysis	
BASED ON GW Upgradient Total Arsenic Results	DRAWING NUMBER
BY TSK / CHECKED BY BEL	APPROVED BY / DATE 04/20/01

B) Sum the ranks (adj) of downgradient and upgradient results:

$$WRS = \sum_{i=1}^{18} R_{ADJ\ DOWN\ GRADIENT} = 10(8.5) + 17 + 3(19) + 21.5 + 23 + 2(24.5) + 2(26.5) + 2(28.5) + 30 + 31 + 32 + 33 + 34.5 + 2(36.5) + 38 =$$

$$WRS = 635$$

$$SUM_{UP} = \sum_{i=1}^{10} R_{ADJ\ UP\ GRADIENT} = 6(8.5) + 21.5 + 34.5 + 38 + 40$$

$$SUM_{UP} = 185$$

Check ✓ Rank Sums

$$WRS_{DOWN} + SUM_{UP} = \sum_{i=1}^{40} i = 40/2\,(40+1)$$

$$635 + 185 = 1 + 2 + 3 + \cdots + 38 + 39 + 40$$

$$820 = 40\,(21)$$

$$820 = 820 \checkmark$$

C) Calculate the downgradient Z-Score (Z_{RS}):

$$Z_{RS} = \frac{WRS_{UP} - \frac{n_1(n+1)}{2}}{\sqrt{\frac{n_1 n_2 (n+1)}{12}}}$$

where $n_1 = 30$ = # downgradient results

$n_2 = 10$ = # upgradient results

$n = n_1 + n_2$ = Total # of results = 40

$$Z_{RS} = \frac{635 - \frac{30(41)}{2}}{\sqrt{\frac{(30)(10)(41)}{12}}} = \frac{635 - 615}{32.0156}$$

$$Z_{RS} = +0.6247$$

CLIENT	JOB NUMBER
NSWC Crane	CTO 19

SUBJECT: Sample Calculations of Statistical Analysis

BASED ON: GW Upgradient Total Arsenic Results

DRAWING NUMBER:

BY	CHECKED BY	APPROVED BY	DATE
JSK	BEL		04/20/01

From Sample Calc Table 4 A Zrs score of +0.6247 corresponds to a P-level of 0.53 because 0.537 > 0.10

The downgradient arsenic concentrations are not statistically higher than upgradient arsenic concentrations at a 95% confidence level.

⑥ Perform the Parametric ANOVA.

$$X = \sum_{i=1}^{i}\left[\sum_{j=1}^{5} X_{ij}\right] = 16(0.55) + 1.1 + 3(1.3) + 2(1.4) + 1.6 + 2(1.7) + 2(1.8) + 2(2.2) + 2.3 + 2.6 + 2.8 + 3 + 2(3.1) + 2(3.4) + 3.8 + 4 + 4.3$$

$$X = 65.4$$

$$N = n_1 + n_2 = 30 + 10 = 40 \qquad \bar{X} = X/N = 65.4/40 = 1.635$$

Find $X_i = \sum_{j=1}^{5} X_{ij}$ $\qquad X_{1\,(GW\text{-}001)} = 0.55 + 1.4 + 3.1 + 3.8 + 4.3 = 13.15$

$$\bar{X}_i = X_i/n_i \qquad \bar{X}_{1\,(GW\text{-}001)} = 13.15/5 = 2.63$$

$$X_{2\,(GW\text{-}002)} = 0.55 + 0.55 + 1.7 + 3.1 + 3.4 = 9.3$$

$$\bar{X}_{2\,(GW\text{-}002)} = 9.3/5 = 1.86$$

$$X_{3\,(GW\text{-}003)} = 0.55 + 0.55 + 0.55 + 0.55 + 0.55 = 2.75$$

$$\bar{X}_{3\,(GW\text{-}003)} = 2.75/5 = 0.55$$

CLIENT: NSWC Crane	JOB NUMBER: CTO 19
SUBJECT: Sample Calculations of Statistical Analys	
BASED ON: GW Updated Total Arsenic Results	DRAWING NUMBER:
BY: TSK / CHECKED BY: BEL	APPROVED BY: / DATE: 04/20/01

$X_{4\,(GW-004)} = 1.4 + 1.8 + 2.6 + 2.8 + 3.4 + 4 = 16$

$\bar{X}_{4\,(GW-004)} = 16/6 = 2.67$

$X_{5\,(GW-005)} = 0.55 + 0.55 + 1.3 + 2.2 + 3 = 7.6$

$\bar{X}_5 = 7.6/5 = 1.52$

$X_{6\,(GW-006)} = 0.55 + 0.55 + 1.3 + 1.3 + 2.2 + 2.3 = 8.2$

$\bar{X}_{6\,(GW-006)} = 8.2/6 = 1.367$

$X_{7\,(GW-007)} = 1.8 + 1.7 + 1.6 + 1.1 + .55 + .55 + .55 + .55 = 8.4$

$\bar{X}_{7\,(GW-007)} = 8.4/8 = 1.05$

i	$\bar{X}_i$	$\bar{X}$	n_i	$(\bar{X}_i - \bar{X})$	$(\bar{X}_i - \bar{X})^2$	$n_i(\bar{X}_i - \bar{X})^2$
1	2.63	1.635	5	.995	.990025	4.950125
2	1.86	1.635	5	.225	0.050625	0.253125
3	0.55	1.635	5	-1.085	1.1025	5.5125
4	2.67	1.635	6	1.035	1.071225	6.42735
5	1.52	1.635	5	-0.115	0.013225	0.066125
6	1.367	1.635	6	-0.268	0.071824	0.430944
7	1.05	1.635	+ 8	-0.585	0.342225	+ 2.7378

$N = 40$

$SS_{SAMPLE} = 20.377969$

$$SS_{SAMPLE} = \sum_{i=1}^{K} n_i(\bar{X}_i - \bar{X})^2$$

where n_i = # of samples from well i

K = # of wells

CLIENT: NSWC Crane	JOB NUMBER: CTO 19
SUBJECT: Sample Calculations of Statistical Analysis	
BASED ON: GW Upgradient Total Arsenic Results	DRAWING NUMBER:
BY: TSK / CHECKED BY: BEZ	APPROVED BY: / DATE: 04/20/01

$$SS_{TOTAL} = \sum_{i=1}^{K}\sum_{j=1}^{n_i}(x_{ij}-\bar{x})^2 = 16(0.55-1.635)^2 + (1.1-1.635)^2$$

$$+ 3(1.3-1.635)^2 + 2(1.4-1.635)^2 + (1.6-1.635)^2 +$$

$$2(1.7-1.635)^2 + 2(1.8-1.635)^2 + 2(2.2-1.635)^2 + (2.3-1.635)^2$$

$$(2.6-1.635)^2 + (2.8-1.635)^2 + (3-1.635)^2 + 2(3.1-1.635)^2$$

$$+ 2(3.4-1.635)^2 + (3.8-1.635)^2 + (4-1.635)^2 + (4.3-1.635)^2$$

$$SS_{TOTAL} = 18.8356 + 0.286225 + 0.336675 + 0.11045 + 0.001225$$

$$+ 0.00845 + 0.05445 + 0.63845 + 0.442225 + 0.931225$$

$$+ 1.357225 + 1.863225 + 4.29245 + 6.23045 + 4.687225$$

$$+ 5.583225 + 7.102225$$

$$SS_{TOTAL} = 52.771$$

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Squares	F value
Effect (between Locations)	$SS_{SAMPLE} = 20.37969$	$V_1 = K-1 = 6$	$MS_{EFFECT} = 3.396328$	$= 3.45997$
Error (within Locations)	$SS_{ERROR} = 32.393031$	$V_2 = N-K = 33$	$MS_{ERROR} = 0.981607$	
Total	$SS_{TOTAL} = 52.771$	$N-1 = 39$		

CLIENT: NSWC CRANE	JOB NUMBER: CTO 19
SUBJECT: SAMPLE CALCULATIONS FOR STATISTICAL ANALYSIS	
BASED ON: GW UNFILTERED TOTAL ARSENIC RESULTS	DRAWING NUMBER:
BY: TSK / CHECKED BY: BEL	APPROVED BY: / DATE: 04/20/01

* WHERE:

$$SS_{TOTAL} - SS_{SAMPLE} = SS_{ERROR}$$

$$SS_{SAMPLE} / K-1 = MS_{EFFECT}$$

$$SS_{ERROR} / N-K = MS_{ERROR}$$

$$F = MS_{EFFECT} / MS_{ERROR}$$

FROM SAMPLE CALC TABLE 3, THE F-STATISTIC FOR $V_1 = 6$ AND $V_2 = 33$ IS 3.80

$$F_{VALUE} = 3.45997 < 3.80 = F_{STATISTIC}$$

SINCE $F_{VALUE} < F_{STATISTIC}$, WE ACCEPT THE NULL HYPOTHESIS OF EQUAL WELL MEANS AND CONCLUDE THERE IS NO STATISTICALLY SIGNIFICANT DIFFERENCE BETWEEN ARSENIC CONCENTRATIONS IN THE SEVEN WELLS.

SAMPLE CALCULATIONS TABLE 1
COEFFICIENTS A_i FOR W TEST OF NORMALITY FOR N=2 to 50

i/n	2	3	4	5	6	7	8	9	10
1	0.7071	0.7071	0.6872	0.6646	0.6431	0.6233	0.6052	0.5888	0.5739
2			0.1677	0.2413	0.2806	0.3031	0.3164	0.3244	0.3291
3					0.0875	0.1401	0.1743	0.1976	0.2141
4							0.0561	0.0947	0.1224
5									0.0399

i/n	11	12	13	14	15	16	17	18	19	20
1	0.5601	0.5475	0.5359	0.5251	0.5150	0.5056	0.4968	0.4886	0.4808	0.4734
2	0.3315	0.3325	0.3325	0.3318	0.3306	0.3290	0.3273	0.3253	0.3232	0.3211
3	0.2260	0.2347	0.2412	0.2460	0.2495	0.2521	0.2540	0.2553	0.2561	0.2565
4	0.1429	0.1586	0.1707	0.1802	0.1878	0.1939	0.1988	0.2027	0.2059	0.2085
5	0.0695	0.0922	0.1099	0.1240	0.1353	0.1447	0.1524	0.1587	0.1641	0.1686
6		0.0303	0.0539	0.0727	0.0880	0.1005	0.1109	0.1197	0.1271	0.1334
7				0.0240	0.0433	0.0593	0.0725	0.0837	0.0932	0.1013
8						0.0196	0.0359	0.0496	0.0612	0.0711
9								0.0163	0.0303	0.0422
10										0.0140

i/n	21	22	23	24	25	26	27	28	29	30
1	0.4643	0.4590	0.4542	0.4493	0.4450	0.4407	0.4366	0.4328	0.4291	0.4254
2	0.3185	0.3156	0.3126	0.3098	0.3069	0.3043	0.3018	0.2992	0.2968	0.2944
3	0.2578	0.2571	0.2563	0.2554	0.2543	0.2533	0.2522	0.2510	0.2499	0.2487
4	0.2119	0.2131	0.2139	0.2145	0.2148	0.2151	0.2152	0.2151	0.2150	0.2148
5	0.1736	0.1764	0.1787	0.1807	0.1822	0.1836	0.1848	0.1857	0.1864	0.1870
6	0.1399	0.1443	0.1480	0.1512	0.1539	0.1563	0.1584	0.1601	0.1616	0.1630
7	0.1092	0.1150	0.1201	0.1245	0.1283	0.1316	0.1346	0.1372	0.1395	0.1415
8	0.0804	0.0878	0.0941	0.0997	0.1046	0.1089	0.1128	0.1162	0.1192	0.1219
9	0.0530	0.0618	0.0696	0.0764	0.0823	0.0876	0.0923	0.0965	0.1002	0.1036
10	0.0263	0.0368	0.0459	0.0539	0.0610	0.0672	0.0728	0.0778	0.0822	0.0862
11		0.0122	0.0228	0.0321	0.0403	0.0476	0.0540	0.0598	0.0650	0.0697
12				0.0107	0.0200	0.0284	0.0358	0.0424	0.0483	0.0537
13						0.0094	0.0178	0.0253	0.0320	0.0381
14								0.0084	0.0159	0.0227
15										0.0076

i/n	31	32	33	34	35	36	37	38	39	40
1	0.4220	0.4188	0.4156	0.4127	0.4096	0.4068	0.4040	0.4015	0.9689	0.3964
2	0.2921	0.2898	0.2876	0.2854	0.2834	0.2813	0.2794	0.2774	0.2755	0.2737
3	0.2475	0.2463	0.2451	0.2439	0.2427	0.2415	0.2403	0.2391	0.2380	0.2368
4	0.2145	0.2141	0.2137	0.2132	0.2127	0.2121	0.2116	0.2110	0.2104	0.2098
5	0.1874	0.1878	0.1880	0.1882	0.1883	0.1883	0.1883	0.1881	0.1880	0.1878
6	0.1641	0.1651	0.1660	0.1667	0.1673	0.1678	0.1683	0.1686	0.1689	0.1691
7	0.1433	0.1449	0.1463	0.1475	0.1487	0.1496	0.1503	0.1513	0.1520	0.1526
8	0.1243	0.1265	0.1284	0.1301	0.1317	0.1331	0.1344	0.1356	0.1366	0.1376
9	0.1066	0.1093	0.1118	0.1140	0.1160	0.1179	0.1196	0.1211	0.1225	0.1237
10	0.0899	0.0931	0.0961	0.0988	0.1013	0.1036	0.1056	0.1075	0.1092	0.1108
11	0.0739	0.0777	0.0821	0.0844	0.0873	0.0900	0.0924	0.0947	0.0967	0.0986
12	0.0585	0.0629	0.0669	0.0706	0.0739	0.0770	0.0798	0.0824	0.0848	0.0870
13	0.0435	0.0485	0.0530	0.0572	0.0610	0.0645	0.0677	0.0706	0.0733	0.0759
14	0.0289	0.0344	0.0395	0.0441	0.0484	0.0523	0.0559	0.0592	0.0622	0.0651
15	0.0144	0.0206	0.0262	0.0314	0.0361	0.0404	0.0444	0.0481	0.0515	0.0546
16		0.0068	0.0131	0.0187	0.0239	0.0287	0.0331	0.0372	0.0409	0.0444
17				0.0062	0.0119	0.0172	0.0220	0.0264	0.0305	0.0343
18						0.0057	0.0110	0.0158	0.0203	0.0244
19								0.0053	0.0101	0.0146
20										0.0049

i/n	41	42	43	44	45	46	47	48	49	50
1	0.3940	0.3917	0.3894	0.3872	0.3850	0.3830	0.3808	0.3789	0.3770	0.3751
2	0.2719	0.2701	0.2684	0.2667	0.2651	0.2635	0.2620	0.2604	0.2589	0.2574
3	0.2357	0.2345	0.2334	0.2323	0.2313	0.2302	0.2291	0.2281	0.2271	0.2260
4	0.2091	0.2085	0.2078	0.2072	0.2065	0.2058	0.2052	0.2045	0.2038	0.2032
5	0.1876	0.1874	0.1871	0.1868	0.1865	0.1862	0.1859	0.1855	0.1851	0.1847
6	0.1693	0.1694	0.1695	0.1695	0.1695	0.1695	0.1695	0.1693	0.1692	0.1691
7	0.1531	0.1535	0.1539	0.1542	0.1545	0.1548	0.1550	0.1551	0.1553	0.1554
8	0.1384	0.1392	0.1398	0.1405	0.1410	0.1415	0.1420	0.1423	0.1427	0.1430
9	0.1249	0.1259	0.1269	0.1278	0.1286	0.1293	0.1300	0.1306	0.1312	0.1317
10	0.1123	0.1136	0.1149	0.1160	0.1170	0.1180	0.1189	0.1197	0.1205	0.1212
11	0.1004	0.1020	0.1035	0.1049	0.1062	0.1073	0.1085	0.1095	0.1105	0.1113
12	0.0891	0.0909	0.0927	0.0943	0.0959	0.0972	0.0986	0.0998	0.1010	0.1020
13	0.0782	0.0804	0.0824	0.0842	0.0860	0.0876	0.0892	0.0906	0.0919	0.0932
14	0.0677	0.0701	0.0724	0.0745	0.0775	0.0785	0.0801	0.0817	0.0832	0.0846
15	0.0575	0.0602	0.0628	0.0651	0.0673	0.0694	0.0713	0.0731	0.0748	0.0764
16	0.0476	0.0506	0.0534	0.0560	0.0584	0.0607	0.0628	0.0648	0.0667	0.0685
17	0.0379	0.0411	0.0442	0.0471	0.0497	0.0522	0.0546	0.0568	0.0588	0.0608
18	0.0283	0.0318	0.0352	0.0383	0.0412	0.0439	0.0465	0.0489	0.0511	0.0532
19	0.0188	0.0227	0.0263	0.0296	0.0328	0.0357	0.0385	0.0411	0.0436	0.0459
20	0.0094	0.0136	0.0175	0.0211	0.0245	0.0277	0.0307	0.0335	0.0361	0.0386
21		0.0045	0.0087	0.0126	0.0163	0.0197	0.0229	0.0259	0.0288	0.0314
22				0.0042	0.0081	0.0188	0.0153	0.0185	0.0215	0.0244
23						0.0039	0.0076	0.0111	0.0143	0.0174
24								0.0037	0.0071	0.0104
25										0.0350

SAMPLE CALCULATION TABLE 2
PERCENTAGE POINTS OF THE W TEST FOR N=3 to 50

n	0.01	0.05
3	0.753	0.767
4	0.687	0.748
5	0.686	0.762
6	0.713	0.788
7	0.730	0.803
8	0.749	0.818
9	0.764	0.829
10	0.781	0.842
11	0.792	0.850
12	0.805	0.859
13	0.814	0.866
14	0.825	0.874
15	0.835	0.881
16	0.844	0.887
17	0.851	0.892
18	0.858	0.897
19	0.863	0.901
20	0.868	0.905
21	0.873	0.908
22	0.878	0.911
23	0.881	0.914
24	0.884	0.916
25	0.888	0.918
26	0.891	0.920
27	0.894	0.923
28	0.896	0.924
29	0.898	0.926
30	0.900	0.927

n	0.01	0.05
31	0.902	0.929
32	0.904	0.930
33	0.906	0.931
34	0.908	0.933
35	0.910	0.934
36	0.912	0.935
37	0.914	0.936
38	0.916	0.938
39	0.917	0.939
40	0.919	0.940
41	0.920	0.941
42	0.922	0.942
43	0.923	0.943
44	0.924	0.944
45	0.926	0.945
46	0.927	0.945
47	0.928	0.946
48	0.929	0.947
49	0.929	0.947
50	0.930	0.947

Sample Calculation Table 3

95th PERCENTILES OF F-DISTRIBUTION WITH v_1 and v_2 DEGREES OF FREEDOM

v_1/v_2	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	33	40	60	120
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5	241.9	243.9	245.9	248.0	249.1	250.1	250.4	251.1	252.2	253.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45	19.45	19.46	19.46	19.47	19.48	19.49
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62	8.61	8.59	8.57	8.55
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75	5.74	5.72	5.69	5.66
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.49	4.46	4.43	4.40
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.80	3.77	3.74	3.70
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.37	3.34	3.30	3.27
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.07	3.04	3.01	2.97
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86	2.85	2.83	2.79	2.72
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.69	2.66	2.62	2.58
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.56	2.53	2.49	2.45
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.46	2.43	2.38	2.34
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.37	2.34	2.30	2.25
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31	2.30	2.27	2.22	2.18
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.24	2.20	2.16	2.11
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.18	2.15	2.11	2.06
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.14	2.10	2.06	2.01
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.10	2.06	2.02	1.97
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.06	2.03	1.98	1.93
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.20	2.12	2.08	2.04	2.03	1.99	1.95	1.90
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.18	2.10	2.05	2.01	2.00	1.96	1.92	1.87
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.97	1.94	1.89	1.84
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.95	1.91	1.86	1.81
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.93	1.89	1.84	1.79
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.91	1.87	1.82	1.77
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.89	1.85	1.80	1.75
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.87	1.84	1.79	1.73
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.86	1.82	1.77	1.71
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.84	1.81	1.75	1.70
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.83	1.79	1.74	1.68
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.73	1.69	1.64	1.58
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.84	1.75	1.70	1.65	1.63	1.59	1.53	1.47
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.54	1.50	1.43	1.35

NOTE: v_1: Degrees of Freedom for numerator
v_2: Degrees of freedom for denominator

SAMPLE CALCULATION TABLE 4
p LEVELS FROM Z SCORES FOR 2 SIDED TESTS

Z	p	Z	p	Z	p	Z	p	Z	p	Z	p	Z	p	Z	p
0.00	1.0000	0.50	0.6171	1.00	0.3173	1.50	0.1336	2.00	0.0455	2.50	0.0124	3.00	0.0027	3.50	0.0005
0.01	0.9920	0.51	0.6101	1.01	0.3125	1.51	0.1310	2.01	0.0444	2.51	0.0121	3.01	0.0026	3.51	0.0004
0.02	0.9840	0.52	0.6031	1.02	0.3077	1.52	0.1285	2.02	0.0434	2.52	0.0117	3.02	0.0025	3.52	0.0004
0.03	0.9761	0.53	0.5961	1.03	0.3030	1.53	0.1260	2.03	0.0424	2.53	0.0114	3.03	0.0024	3.53	0.0004
0.04	0.9681	0.54	0.5892	1.04	0.2983	1.54	0.1236	2.04	0.0414	2.54	0.0111	3.04	0.0024	3.54	0.0004
0.05	0.9601	0.55	0.5823	1.05	0.2937	1.55	0.1211	2.05	0.0404	2.55	0.0108	3.05	0.0023	3.55	0.0004
0.06	0.9522	0.56	0.5755	1.06	0.2891	1.56	0.1188	2.06	0.0394	2.56	0.0105	3.06	0.0022	3.56	0.0004
0.07	0.9442	0.57	0.5687	1.07	0.2846	1.57	0.1164	2.07	0.0385	2.57	0.0102	3.07	0.0021	3.57	0.0004
0.08	0.9362	0.58	0.5619	1.08	0.2801	1.58	0.1141	2.08	0.0375	2.58	0.0099	3.08	0.0021	3.58	0.0003
0.09	0.9283	0.59	0.5552	1.09	0.2757	1.59	0.1118	2.09	0.0366	2.59	0.0096	3.09	0.0020	3.59	0.0003
0.10	0.9203	0.60	0.5485	1.10	0.2713	1.60	0.1096	2.10	0.0357	2.60	0.0093	3.10	0.0019	3.60	0.0003
0.11	0.9124	0.61	0.5419	1.11	0.2670	1.61	0.1074	2.11	0.0349	2.61	0.0091	3.11	0.0019	3.61	0.0003
0.12	0.9045	**0.6247**	**0.5322**	1.12	0.2627	1.62	0.1052	2.12	0.0340	2.62	0.0088	3.12	0.0018	3.62	0.0003
0.13	0.8966	0.63	0.5287	1.13	0.2585	1.63	0.1031	2.13	0.0332	2.63	0.0085	3.13	0.0017	3.63	0.0003
0.14	0.8887	0.64	0.5222	1.14	0.2543	1.64	0.1010	2.14	0.0324	2.64	0.0083	3.14	0.0017	3.64	0.0003
0.15	0.8808	0.65	0.5157	1.15	0.2501	1.65	0.0989	2.15	0.0316	2.65	0.0080	3.15	0.0016	3.65	0.0003
0.16	0.8729	0.66	0.5093	1.16	0.2460	1.66	0.0969	2.16	0.0308	2.66	0.0078	3.16	0.0016	3.66	0.0003
0.17	0.8650	0.67	0.5029	1.17	0.2420	1.67	0.0949	2.17	0.0300	2.67	0.0076	3.17	0.0015	3.67	0.0002
0.18	0.8572	0.68	0.4965	1.18	0.2380	1.68	0.0930	2.18	0.0293	2.68	0.0074	3.18	0.0015	3.68	0.0002
0.19	0.8493	0.69	0.4902	1.19	0.2340	1.69	0.0910	2.19	0.0285	2.69	0.0071	3.19	0.0014	3.69	0.0002
0.20	0.8415	0.70	0.4839	1.20	0.2301	1.70	0.0891	2.20	0.0278	2.70	0.0069	3.20	0.0014	3.70	0.0002
0.21	0.8337	0.71	0.4777	1.21	0.2263	1.71	0.0873	2.21	0.0271	2.71	0.0067	3.21	0.0013	3.71	0.0002
0.22	0.8259	0.72	0.4715	1.22	0.2225	1.72	0.0854	2.22	0.0264	2.72	0.0065	3.22	0.0013	3.72	0.0002
0.23	0.8181	0.73	0.4654	1.23	0.2187	1.73	0.0836	2.23	0.0257	2.73	0.0063	3.23	0.0012	3.73	0.0002
0.24	0.8103	0.74	0.4593	1.24	0.2150	1.74	0.0819	2.24	0.0251	2.74	0.0061	3.24	0.0012	3.74	0.0002
0.25	0.8026	0.75	0.4533	1.25	0.2113	1.75	0.0801	2.25	0.0244	2.75	0.0060	3.25	0.0012	3.75	0.0002
0.26	0.7949	0.76	0.4473	1.26	0.2077	1.76	0.0784	2.26	0.0238	2.76	0.0058	3.26	0.0011	3.76	0.0002
0.27	0.7872	0.77	0.4413	1.27	0.2041	1.77	0.0767	2.27	0.0232	2.77	0.0056	3.27	0.0011	3.77	0.0002
0.28	0.7795	0.78	0.4354	1.28	0.2005	1.78	0.0751	2.28	0.0226	2.78	0.0054	3.28	0.0010	3.78	0.0002
0.29	0.7718	0.79	0.4295	1.29	0.1971	1.79	0.0735	2.29	0.0220	2.79	0.0053	3.29	0.0010	3.79	0.0002
0.30	0.7642	0.80	0.4237	1.30	0.1936	1.80	0.0719	2.30	0.0214	2.80	0.0051	3.30	0.0010	3.80	0.0001
0.31	0.7566	0.81	0.4179	1.31	0.1902	1.81	0.0703	2.31	0.0209	2.81	0.0050	3.31	0.0009	3.81	0.0001
0.32	0.7490	0.82	0.4122	1.32	0.1868	1.82	0.0688	2.32	0.0203	2.82	0.0048	3.32	0.0009	3.82	0.0001
0.33	0.7414	0.83	0.4065	1.33	0.1835	1.83	0.0672	2.33	0.0198	2.83	0.0047	3.33	0.0009	3.83	0.0001
0.34	0.7339	0.84	0.4009	1.34	0.1802	1.84	0.0658	2.34	0.0193	2.84	0.0045	3.34	0.0008	3.84	0.0001
0.35	0.7263	0.85	0.3953	1.35	0.1770	1.85	0.0643	2.35	0.0188	2.85	0.0044	3.35	0.0008	3.85	0.0001
0.36	0.7188	0.86	0.3898	1.36	0.1738	1.86	0.0629	2.36	0.0183	2.86	0.0042	3.36	0.0008	3.86	0.0001
0.37	0.7114	0.87	0.3843	1.37	0.1707	1.87	0.0615	2.37	0.0178	2.87	0.0041	3.37	0.0008	3.87	0.0001
0.38	0.7039	0.88	0.3789	1.38	0.1676	1.88	0.0601	2.38	0.0173	2.88	0.0040	3.38	0.0007	3.88	0.0001
0.39	0.6965	0.89	0.3735	1.39	0.1645	1.89	0.0588	2.39	0.0168	2.89	0.0039	3.39	0.0007	3.89	0.0001
0.40	0.6892	0.90	0.3681	1.40	0.1615	1.90	0.0574	2.40	0.0164	2.90	0.0037	3.40	0.0007	3.90	0.0001
0.41	0.6818	0.91	0.3628	1.41	0.1585	1.91	0.0561	2.41	0.0160	2.91	0.0036	3.41	0.0006	3.91	0.0001
0.42	0.6745	0.92	0.3576	1.42	0.1556	1.92	0.0549	2.42	0.0155	2.92	0.0035	3.42	0.0006	3.92	0.0001
0.43	0.6672	0.93	0.3524	1.43	0.1527	1.93	0.0536	2.43	0.0151	2.93	0.0034	3.43	0.0006	3.93	0.0001
0.44	0.6599	0.94	0.3472	1.44	0.1499	1.94	0.0524	2.44	0.0147	2.94	0.0033	3.44	0.0006	3.94	0.0001
0.45	0.6527	0.95	0.3421	1.45	0.1471	1.95	0.0512	2.45	0.0143	2.95	0.0032	3.45	0.0006	3.95	0.0001
0.46	0.6455	0.96	0.3371	1.46	0.1443	**1.96**	**0.0500**	2.46	0.0139	2.96	0.0031	3.46	0.0005	3.96	0.0001
0.47	0.6384	0.97	0.3320	1.47	0.1416	1.97	0.0488	2.47	0.0135	2.97	0.0030	3.47	0.0005	3.97	0.0001
0.48	0.6312	0.98	0.3271	1.48	0.1389	1.98	0.0477	2.48	0.0131	2.98	0.0029	3.48	0.0005	3.98	0.0001
0.49	0.6241	0.99	0.3222	1.49	0.1362	1.99	0.0466	2.49	0.0128	2.99	0.0028	3.49	0.0005	3.99	0.0001

APPENDIX N

DATA VALIDATION LETTERS

ROUND 1
OCTOBER 1999

7393-

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-12-9-082

TO:	ROGER CLARK	DATE:	DECEMBER 17, 1999
FROM:	SEAN NIXON	COPIES:	DV FILE
SUBJECT:	ORGANIC DATA VALIDATION – VOAS/EXP CTO 019 – NSWC CRANE SDG – C1901		

SAMPLES: 13/Aqueous

030-FB-001-01	030-GW-001-01	030-GW-002-01	030-GW-003-01
030-GW-004-01	030-GW-005-01	030-GW-006-01	030-GW-007-01
030-IW-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01
DUP-GW-001-01			

Overview

The sample set for CTO 019, NSWC Crane, SDG C1901, consists of thirteen (13) aqueous environmental samples including two (2) trip blanks, one (1) rinse blank, and 1 field blank. One (1) field duplicate pair (samples 030-GW-007-01/ DUP-GW-001-01) was included within this SDG. Sample 030-GW-001-01 was specified by the field crew for Matrix Spike/ Matrix Spike Duplicate (MS/MSD) analysis in this SDG.

All of the samples, except the trip blank, were analyzed for the volatiles and explosives as specified in the Crane QAPP (the trip blanks were analyzed for volatiles only). The samples were collected by Tetra Tech NUS on October 11 - 14, 1999 and analyzed by Laucks Testing Labs - Washington under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. The volatiles analyses were conducted using Gas Chromatography/Mass Spectrometry according to SW-846 Method 8260B. The explosives analyses were conducted according to SW-846 Method 8330. These data were evaluated based on the following parameters:

* • Data completeness
* • Holding times
* • GC/MS tuning and system performance
• Initial and continuing calibrations
• Laboratory method and field quality control blank results
* • Internal standard areas
* • Surrogate spike recoveries
* • MS/MSD results
* • Laboratory Control Samples (LCS)
* • Field duplicate precision
* • Compound identification
* • Compound quantitation
* • Detection limits

* - All quality control criteria were met for this parameter.

Volatiles

- The initial calibrations of 08-26-99 and 09-24-99 contained Relative Response Factors (RRFs) below the 0.05 quality control limit for acetone, 2-butanone, 4-methyl-2-pentanone, 2-hexanone, acrylonitrile, methacrylonitrile, methyl methacrylate, trans-1,4-dichloro-2-butene, and acrolein. The nondetected results for the aforementioned compounds were qualified as rejected, UR, in all of the samples.

- The continuing calibration of 10-19-99 contained RRFs below the 0.05 quality control limit for acetone, 2-butanone, 4-methyl-2-pentanone, 2-hexanone, acrylonitrile, methacrylonitrile, methyl methacrylate, trans-1,4-dichloro-2-butene, and acrolein. The nondetected results for the aforementioned compounds were qualified as rejected, UR, in all of the samples.

- The continuing calibration of 10-19-99 contained Percent Differences (%Ds) above the 25% quality control limit for chloromethane and chloroethane. The nondetected results for the aforementioned compounds were qualified as estimated, UJ, in all of the samples.

Explosives

- The laboratory was to have reported all nondetected results for the explosive compounds at either the lowest calibration standard (50 ug/L) or at the limit specified in the QAPP, whichever was lower. For all of the compounds except RDX, the laboratory correctly reported to the lowest calibration standard. For RDX, the laboratory should have reported the nondetected results at concentrations that would have corresponded to a lowest calibration standard of 46.97 ug/L (back calculated from the value of 0.61 ug/L that was listed in the QAPP for RDX). The data reviewer has amended the Form Is, and the electronic data, to reflect the correct reporting limit for RDX for each sample.

Notes

The following table summarizes the maximum concentrations of volatile organic compounds found in the method blanks.

Compound	Maximum amount	Aqueous Action Level (ug/L)
toluene	0.57 ug/L	2.85

Blank Actions

Value < action level; report RL followed by U.
Value > action level; report value followed by a J.

Dilution factors and percent moisture were taken into consideration during the application of all action levels. No positive results were reported for toluene. It should be noted that field quality control blanks were not qualified for method blank contamination.

Initial calibration Percent Relative Standard Deviations (%RSDs) were noted above the 30% quality control limit for the volatile compounds 2-hexanone and methacrylonitrile. Because the nondetected results for the aforementioned compounds were rejected for gross calibration noncompliances, no further action was taken.

Volatile continuing calibration contained a %D above the 25% quality control limit for 2-hexanone. Because the nondetected results for the aforementioned compound were rejected for gross calibration noncompliances, no further action was taken.

The laboratory applied LCS accuracy criteria that did not concur with the accuracy criteria as specified in the QAPP. The data reviewer applied the LCS accuracy criteria listed in the QAPP and all recoveries were within quality control limits.

The laboratory applied MS and MSD accuracy and precision criteria that did not concur with the accuracy and precision criteria as specified in the QAPP.

The volatile MS analysis of 030-GW-002-01 yielded Percent Recoveries (%Rs) above the quality control limits for chloroethane, chloromethane, and acetone. The nondetected results for chloroethane and chloromethane were qualified as estimated, UJ in sample 030-GW-002-01, while the nondetected result for acetone was rejected for a more severe calibration noncompliance.

The volatile MSD analysis of 030-GW-002-01 yielded a %R above the quality control limit for chloromethane. The nondetected result for chloromethane was qualified as estimated, UJ in sample 030-GW-002-01,

Executive Summary

Laboratory Performance Issues: Nondetected results for acetone, 2-butanone, 4-methyl-2-pentanone, 2-hexanone, acrylonitrile, methacrylonitrile, methyl methacrylate, trans-1,4-dichloro-2-butene, and acrolein were rejected for gross calibration noncompliances. Incorrect accuracy and/or precision criteria were applied by the laboratory for the volatile MS/MSD and LCS analyses. Nondetected results for chloromethane and chloroethane were estimated for a continuing calibration noncompliances and MS/MSD noncompliances. The laboratory reported an incorrect reporting limit, which required amending, for RDX in all of the samples.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review" February 1994, EPA Region V Standard Operating Procedures for Validation of CLP Organic Data", September 1993, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Sean T. Nixon
Chemist/Data Validator
Tetra Tech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer
Tetra Tech NUS

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

APPENDIX A
Qualified Analytical Results

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-FB-001-01			030-GW-001-01			030-GW-002-01			030-GW-003-01		
SAMPLE DATE:	10/13/99			10/13/99			10/12/99			10/13/99		
LABORATORY ID:	9910417-02			9910380-05			9910380-03			9910380-06		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1,2-TETRACHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,1-TRICHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE	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	
1,1-DICHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
1,2,3-TRICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	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	
1,2-DICHLOROPROPANE	0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
2-HEXANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
4-METHYL-2-PENTANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACETONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACROLEIN	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACRYLONITRILE	3	UR	C	3	UR	C	3	UR	C	3	UR	C
ALLYL CHLORIDE	10	U		10	U		10	U		10	U	
BENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
BROMOFORM	0.5	U		0.5	U		0.5	U		0.5	U	
BROMOMETHANE	1	U		1	U		1	U		1	U	
CARBON DISULFIDE	0.5	U		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROBENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROETHANE	0.5	UJ	C	0.5	UJ	C	0.5	UJ	CD	0.5	UJ	C
CHLOROFORM	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROMETHANE	0.5	UJ	C	0.5	UJ	C	0.5	UJ	CD	0.5	UJ	C
CHLOROPRENE	3	U		3	U		3	U		3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U		0.3	U		0.3	U		0.3	U	
DIBROMOCHLOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
DIBRO[illegible]ETHANE	0.5	U		[illegible]	U		0.5	U		0.5	U	
DICHL[illegible]IFLUOROMETHANE	0.5	U		[illegible]	U		0.5	U		0.5	U	
ETHYL METHACRYLATE	1	U		1	U		1	U		1	U	

CTO - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-FB-001-01			030-GW-001-01			030-GW-002-01			030-GW-003-01		
SAMPLE DATE:	10/13/99			10/13/99			10/12/99			10/13/99		
LABORATORY ID:	9910417-02			9910380-05			9910380-03			9910380-06		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
ETHYLBENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
METHACRYLONITRILE	1	UR	C	1	UR	C	1	UR	C	1	UR	C
METHYL METHACRYLATE	2	UR	C	2	UR	C	2	UR	C	2	UR	C
METHYLENE CHLORIDE	3	U		3	U		3	U		3	U	
STYRENE	0.5	U		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
TOLUENE	0.6			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	
TRANS-1,3-DICHLOROPROPENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRANS-1,4-DICHLORO-2-BUTENE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
TRICHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRICHLOROFLUOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
VINYL ACETATE	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	
XYLENES, TOTAL	1	U		1	U		1	U		1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-004-01			030-GW-005-01			030-GW-006-01			030-GW-007-01		
SAMPLE DATE:	10/13/99			10/14/99			10/14/99			10/12/99		
LABORATORY ID:	9910417-03			9910417-04			9910417-05			9910380-02		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1,2-TETRACHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,1-TRICHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE	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	
1,1-DICHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
1,2,3-TRICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	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	
1,2-DICHLOROPROPANE	0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
2-HEXANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
4-METHYL-2-PENTANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACETONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACROLEIN	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACRYLONITRILE	3	U		3	U		3	U		3	U	
ALLYL CHLORIDE	10	U		10	U		10	U		10	U	
BENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
BROMOFORM	0.5	U		0.5	U		0.5	U		0.5	U	
BROMOMETHANE	1	U		1	U		1	U		1	U	
CARBON DISULFIDE	0.5	U		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROBENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROETHANE	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
CHLOROFORM	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROMETHANE	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
CHLOROPRENE	3	U		3	U		3	U		3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U		0.3	U		0.3	U		0.3	U	
DIBROMOCHLOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
DIBR[illegible]ETHANE	0.5	U		[illegible]	U		0.5	U		0.5	U	
DICHL[illegible]IFLUOROMETHANE	0.5	U		[illegible]	U		0.5	U		0.5	U	
ETHYL METHACRYLATE	1	U		1	U		1	U		1	U	

CTO - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-004-01			030-GW-005-01			030-GW-006-01			030-GW-007-01		
SAMPLE DATE:	10/13/99			10/14/99			10/14/99			10/12/99		
LABORATORY ID:	9910417-03			9910417-04			9910417-05			9910380-02		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
ETHYLBENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
METHACRYLONITRILE	1	UR	C	1	UR	C	1	UR	C	1	UR	C
METHYL METHACRYLATE	2	UR	C	2	UR	C	2	UR	C	2	UR	C
METHYLENE CHLORIDE	3	U		3	U		3	U		3	U	
STYRENE	0.5	U		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
TOLUENE	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	
TRANS-1,3-DICHLOROPROPENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRANS-1,4-DICHLORO-2-BUTENE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
TRICHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRICHLOROFLUOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
VINYL ACETATE	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	
XYLENES, TOTAL	1	U		1	U		1	U		1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-IW-001-01			030-RB-001-01			030-TB-001-01			030-TB-002-01		
SAMPLE DATE:	10/14/99			10/11/99			10/12/99			10/13/99		
LABORATORY ID:	9910417-06			9910380-01			9910380-13			9910417-01		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1,2-TETRACHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,1-TRICHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
1,1,2-TRICHLOROETHANE	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	
1,1-DICHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
1,2,3-TRICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	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	
1,2-DICHLOROPROPANE	0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
2-HEXANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
4-METHYL-2-PENTANONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACETONE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACROLEIN	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACRYLONITRILE	3	UR	C	3	UR	C	3	UR	C	3	UR	C
ALLYL CHLORIDE	10	U		10	U		10	U		10	U	
BENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
BROMODICHLOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
BROMOFORM	0.5	U		0.5	U		0.5	U		0.5	U	
BROMOMETHANE	1	U		1	U		1	U		1	U	
CARBON DISULFIDE	0.5	U		0.5	U		0.5	U		0.5	U	
CARBON TETRACHLORIDE	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROBENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
CHLOROETHANE	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
CHLOROFORM	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROMETHANE	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C	0.5	UJ	C
CHLOROPRENE	3	U		3	U		3	U		3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U		0.3	U		0.3	U		0.3	U	
DIBROMOCHLOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
DIBRO[illegible]ETHANE	0.5	U		[illegible]	U		0.5	U		0.5	U	
DICHL[illegible]DIFLUOROMETHANE	0.5	U		[illegible]	U		0.5	U		0.5	U	
ETHYL METHACRYLATE	1	U		1	U		1	U		1	U	

CTO - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-IW-001-01	030-RB-001-01	030-TB-001-01	030-TB-002-01
SAMPLE DATE:	10/14/99	10/11/99	10/12/99	10/13/99
LABORATORY ID:	9910417-06	9910380-01	9910380-13	9910417-01
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
ETHYLBENZENE	0.5	U		0.5	U		0.5	U		0.5	U	
METHACRYLONITRILE	1	UR	C	1	UR	C	1	UR	C	1	UR	C
METHYL METHACRYLATE	2	UR	C	2	UR	C	2	UR	C	2	UR	C
METHYLENE CHLORIDE	3	U		3	U		3	U		3	U	
STYRENE	0.5	U		0.5	U		0.5	U		0.5	U	
TETRACHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
TOLUENE	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	
TRANS-1,3-DICHLOROPROPENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRANS-1,4-DICHLORO-2-BUTENE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
TRICHLOROETHENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRICHLOROFLUOROMETHANE	0.5	U		0.5	U		0.5	U		0.5	U	
VINYL ACETATE	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	
XYLENES, TOTAL	1	U		1	U		1	U		1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	DUP-GW-001-01											
SAMPLE DATE:	10/12/99			/ /			/ /			/ /		
LABORATORY ID:	9910380-04											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:	030-GW-001-01											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1,2-TETRACHLOROETHANE	0.5	U										
1,1,1-TRICHLOROETHANE	0.5	U										
1,1,2,2-TETRACHLOROETHANE	0.5	U										
1,1,2-TRICHLOROETHANE	0.5	U										
1,1-DICHLOROETHANE	0.5	U										
1,1-DICHLOROETHENE	0.5	U										
1,2,3-TRICHLOROPROPANE	1	U										
1,2-DIBROMO-3-CHLOROPROPANE	1	U										
1,2-DIBROMOETHANE	0.5	U										
1,2-DICHLOROETHANE	0.5	U										
1,2-DICHLOROPROPANE	0.5	U										
2-BUTANONE	10	UR	C									
2-HEXANONE	10	UR	C									
4-METHYL-2-PENTANONE	10	UR	C									
ACETONE	10	UR	C									
ACROLEIN	10	UR	C									
ACRYLONITRILE	3	UR	C									
ALLYL CHLORIDE	10	U										
BENZENE	0.5	U										
BROMODICHLOROMETHANE	0.5	U										
BROMOFORM	0.5	U										
BROMOMETHANE	1	U										
CARBON DISULFIDE	0.5	U										
CARBON TETRACHLORIDE	0.3	U										
CHLOROBENZENE	0.5	U										
CHLOROETHANE	0.5	UJ	C									
CHLOROFORM	0.3	U										
CHLOROMETHANE	0.5	UJ	C									
CHLOROPRENE	3	U										
CIS-1,3-DICHLOROPROPENE	0.3	U										
DIBROMOCHLOROMETHANE	0.5	U										
DIBRO[illegible]ETHANE	0.5	U										
DICHL[illegible]IFLUOROMETHANE	0.5	U										
ETHYL METHACRYLATE	1	U										

SAMPLE NUMBER:	DUP-GW-001-01											
SAMPLE DATE:	10/12/99			/ /			/ /			/ /		
LABORATORY ID:	9910380-04											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:	030-GW-001-01											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
ETHYLBENZENE	0.5	U										
METHACRYLONITRILE	1	UR	C									
METHYL METHACRYLATE	2	UR	C									
METHYLENE CHLORIDE	3	U										
STYRENE	0.5	U										
TETRACHLOROETHENE	0.5	U										
TOLUENE	0.5	U										
TRANS-1,2-DICHLOROETHENE	0.5	U										
TRANS-1,3-DICHLOROPROPENE	0.5	U										
TRANS-1,4-DICHLORO-2-BUTENE	10	UR	C									
TRICHLOROETHENE	0.5	U										
TRICHLOROFLUOROMETHANE	0.5	U										
VINYL ACETATE	0.5	U										
VINYL CHLORIDE	0.5	U										
XYLENES, TOTAL	1	U										

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-FB-001-01			030-GW-001-01			030-GW-002-01			030-GW-003-01		
SAMPLE DATE:	10/13/99			10/13/99			10/12/99			10/13/99		
LABORATORY ID:	9910417-02			9910380-05			9910380-03			9910380-06		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
EXPLOSIVES												
1,3,5-TRINITROBENZENE	0.71	U		0.27	U		0.73	U		1.2	U	
1,3-DINITROBENZENE	0.71	U		0.27	U		0.73	U		1.2	U	
2,4,6-TRINITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
2,4-DINITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
2,6-DINITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
2-AMINO-4,6-DINITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
2-NITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
3-NITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
4-AMINO-2,6-DINITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
4-NITROTOLUENE	0.71	U		0.27	U		0.73	U		1.2	U	
HMX	0.71	U		0.27	U		0.73	U		1.2	U	
NITROBENZENE	0.71	U		0.27	U		0.73	U		1.2	U	
RDX	0.67	U		0.26	U		0.68	U		1.1	U	
TETRYL	0.71	U		0.27	U		0.73	U		1.2	U	

CTO - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-004-01			030-GW-005-01			030-GW-006-01			030-GW-007-01		
SAMPLE DATE:	10/13/99			10/14/99			10/14/99			10/12/99		
LABORATORY ID:	9910417-03			9910417-04			9910417-05			9910380-02		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
EXPLOSIVES												
1,3,5-TRINITROBENZENE	1.4	U		0.83	U		1.0	U		1.2	U	
1,3-DINITROBENZENE	1.4	U		0.83	U		1.0	U		1.2	U	
2,4,6-TRINITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
2,4-DINITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
2,6-DINITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
2-AMINO-4,6-DINITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
2-NITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
3-NITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
4-AMINO-2,6-DINITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
4-NITROTOLUENE	1.4	U		0.83	U		1.0	U		1.2	U	
HMX	1.4	U		0.83	U		1.0	U		1.2	U	
NITROBENZENE	1.4	U		0.83	U		1.0	U		1.2	U	
RDX	1.3	U		0.78	U		0.94	U		1.2	U	
TETRYL	1.4	U		0.83	U		1.0	U		1.2	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-IW-001-01	030-RB-001-01	DUP-GW-001-01	
SAMPLE DATE:	10/14/99	10/11/99	10/12/99	/ /
LABORATORY ID:	9910417-06	9910380-01	9910380-04	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	0.0 %	0.0 %	0.0 %	100.0 %
UNITS:	UG/L	UG/L	UG/L	
FIELD DUPLICATE OF:			030-GW-001-01	

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
EXPLOSIVES												
1,3,5-TRINITROBENZENE	1.5	U		0.66	U		1.4	U				
1,3-DINITROBENZENE	1.5	U		0.66	U		1.4	U				
2,4,6-TRINITROTOLUENE	1.5	U		0.66	U		1.4	U				
2,4-DINITROTOLUENE	1.5	U		0.66	U		1.4	U				
2,6-DINITROTOLUENE	1.5	U		0.66	U		1.4	U				
2-AMINO-4,6-DINITROTOLUENE	1.5	U		0.66	U		1.4	U				
2-NITROTOLUENE	1.5	U		0.66	U		1.4	U				
3-NITROTOLUENE	1.5	U		0.66	U		1.4	U				
4-AMINO-2,6-DINITROTOLUENE	1.5	U		0.66	U		1.4	U				
4-NITROTOLUENE	1.5	U		0.66	U		1.4	U				
HMX	1.5	U		0.66	U		1.4	U				
NITROBENZENE	1.5	U		0.66	U		1.4	U				
RDX	1.4	U		0.62	U		1.3	U				
TETRYL	1.5	U		0.66	U		1.4	U				

APPENDIX B
Results as reported by the Laboratory

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030FB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019011.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec. _____

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.6	
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030FB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019011.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030FB00101

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec.

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: (uL)

Lab Sample ID: 9910417-02

Lab File ID: U1019011.D

Date Received: 10/15/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019015.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec. _____

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019015.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019015.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00201

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-03

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019021.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec. _____

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1:0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00201

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-03

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019021.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00201

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec.

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: (uL)

Lab Sample ID: 9910380-03

Lab File ID: U1019021.D

Date Received: 10/14/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00301

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec. _____

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: _____ (uL)

Lab Sample ID: 9910380-06

Lab File ID: U1019016.D

Date Received: 10/14/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00301

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec. _____

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: _____ (uL)

Lab Sample ID: 9910380-06

Lab File ID: U1019016.D

Date Received: 10/14/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00301

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-06

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019016.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00401

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-03

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019017.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00401

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec. _____

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: _____ (uL)

Lab Sample ID: 9910417-03

Lab File ID: U1019017.D

Date Received: 10/15/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00401

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-03

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019017.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00501

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019018.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00501

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019018.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00501

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019018.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00601

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019019.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00601

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec.

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: (uL)

Lab Sample ID: 9910417-05

Lab File ID: U1019019.D

Date Received: 10/15/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00601

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019019.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00701

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019013.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00701

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019013.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00701

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019013.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030IW00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-06

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019020.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030IW00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-06

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019020.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030IW00101

SDG No.: C1901

Lab Name: Laucks Testing Labs

Lab Sample ID: 9910417-06

Matrix: (soil/water) WATER

Lab File ID: U1019020.D

Sample wt/vol: 25.0 (g/ml) ML

Date Received: 10/15/99

Level: (low/med) LOW

Date Analyzed: 10/19/99

% Moisture: not dec. _____

Dilution Factor: 1.0

GC Column: DB-624 ID: 0.45 (mm)

Soil Aliquot Volume: _____ (uL)

Soil Extract Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030RB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019012.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030RB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019012.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030RB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019012.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec. _____

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030TB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-13

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019009.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec. _____

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	10	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	0.5	U
75-15-0	Carbon disulfide	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone		

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030TB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-13

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019009.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030TB00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-13

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019009.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030TB00201

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec. _____

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: _____ (uL)

Lab Sample ID: 9910417-01

Lab File ID: U1019010.D

Date Received: 10/15/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030TB00201

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019010.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030TB00201

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910417-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019010.D

Level: (low/med) LOW

Date Received: 10/15/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

DUPGW00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019014.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl chloride	0.5	U
75-35-4	1,1-Dichloroethene	0.5	U
156-60-5	trans-1,2-Dichloroethene	0.5	U
79-01-6	Trichloroethene	0.5	U
75-00-3	Chloroethane	0.5	U
75-09-2	Methylene chloride	3.0	U
75-34-3	1,1-Dichloroethane	0.5	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	0.5	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	0.5	U
107-06-2	1,2-Dichloroethane	0.5	U
108-88-3	Toluene	0.5	U
100-41-4	Ethylbenzene	0.5	U
127-18-4	Tetrachloroethene	0.5	U
75-71-8	Dichlorodifluoromethane	0.5	U
74-87-3	Chloromethane	0.5	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	0.5	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	0.5	U
10061-01-5	cis-1,3-Dichloropropene	0.3	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	0.5	U
124-48-1	Dibromochloromethane	0.5	U
108-90-7	Chlorobenzene	0.5	U
630-20-6	1,1,1,2-Tetrachloroethane	0.5	U
100-42-5	Styrene	0.5	U
75-25-2	Bromoform	0.5	U
79-34-5	1,1,2,2-Tetrachloroethane	0.5	U
74-95-3	Dibromomethane	0.5	U
106-93-4	1,2-Dibromoethane	0.5	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon disulfide	0.5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U

FORM I VOA

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

DUPGW00101

Lab Name: Laucks Testing Labs

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U1019014.D

Level: (low/med) LOW

Date Received: 10/14/99

% Moisture: not dec.

Date Analyzed: 10/19/99

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (ug/L or ug/Kg)	UG/L	Q
95-47-6	Xylene (total)	1.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

DUPGW00101

SDG No.: C1901

Lab Name: Laucks Testing Labs

Matrix: (soil/water) WATER

Sample wt/vol: 25.0 (g/ml) ML

Level: (low/med) LOW

% Moisture: not dec.

GC Column: DB-624 ID: 0.45 (mm)

Soil Extract Volume: (uL)

Lab Sample ID: 9910380-04

Lab File ID: U1019014.D

Date Received: 10/14/99

Date Analyzed: 10/19/99

Dilution Factor: 1.0

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	0.5	U
107-13-1	Acrylonitrile	3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	3.0	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	2.0	U
97-63-2	Ethyl methacrylate	1.0	U

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-FB-001-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 5500 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910417-02

Lab File ID: 3A19917.D

Date Collected: 10/13/99

Date Received: 10/15/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	0.71	U	0.71
121-82-4	RDX	0.67 ~~0.71~~	U	0.71
99-35-4	1,3,5-Trinitrobenzene	0.71	U	0.71
99-65-0	1,3-Dinitrobenzene	0.71	U	0.71
479-45-8	Tetryl	0.71	U	0.71
98-95-3	Nitrobenzene	0.71	U	0.71
118-96-7	2,4,6-Trinitrotoluene	0.71	U	0.71
1946-51-0	4-Amino-2,6-Dinitrotoluene	0.71	U	0.71
35572-78-2	2-Amino-4,6-Dinitrotoluene	0.71	U	0.71
606-20-2	2,6-Dinitrotoluene	0.71	U	0.71
121-14-2	2,4-Dinitrotoluene	0.71	U	0.71
88-72-2	2-Nitrotoluene	0.71	U	0.71
99-99-0	4-Nitrotoluene	0.71	U	0.71
99-08-1	3-Nitrotoluene	0.71	U	0.71

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-001-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 2100 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910380-05

Lab File ID: 3A19915.D

Date Collected: 10/13/99

Date Received: 10/14/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	0.27	U	0.27
121-82-4	RDX	0.26 ~~0.27~~	U	0.27
99-35-4	1,3,5-Trinitrobenzene	0.27	U	0.27
99-65-0	1,3-Dinitrobenzene	0.27	U	0.27
479-45-8	Tetryl	0.27	U	0.27
98-95-3	Nitrobenzene	0.27	U	0.27
118-96-7	2,4,6-Trinitrotoluene	0.27	U	0.27
1946-51-0	4-Amino-2,6-Dinitrotoluene	0.27	U	0.27
35572-78-2	2-Amino-4,6-Dinitrotoluene	0.27	U	0.27
606-20-2	2,6-Dinitrotoluene	0.27	U	0.27
121-14-2	2,4-Dinitrotoluene	0.27	U	0.27
88-72-2	2-Nitrotoluene	0.27	U	0.27
99-99-0	4-Nitrotoluene	0.27	U	0.27
99-08-1	3-Nitrotoluene	0.27	U	0.27

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-002-01

Lab Name: LAUCKS TESTING LABS

Matrix (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 5600 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910380-03

Lab File ID: 3A19909.D

Date Collected: 10/12/99

Date Received: 10/14/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	0.73	U	0.73
121-82-4	RDX	0.68 ~~0.79~~	U	0.73
99-35-4	1,3,5-Trinitrobenzene	0.73	U	0.73
99-65-0	1,3-Dinitrobenzene	0.73	U	0.73
479-45-8	Tetryl	0.73	U	0.73
98-95-3	Nitrobenzene	0.73	U	0.73
118-96-7	2,4,6-Trinitrotoluene	0.73	U	0.73
1946-51-0	4-Amino-2,6-Dinitrotoluene	0.73	U	0.73
35572-78-2	2-Amino-4,6-Dinitrotoluene	0.73	U	0.73
606-20-2	2,6-Dinitrotoluene	0.73	U	0.73
121-14-2	2,4-Dinitrotoluene	0.73	U	0.73
88-72-2	2-Nitrotoluene	0.73	U	0.73
99-99-0	4-Nitrotoluene	0.73	U	0.73
99-08-1	3-Nitrotoluene	0.73	U	0.73

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-003-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 9000 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910380-06

Lab File ID: 3A19916.D

Date Collected: 10/13/99

Date Received: 10/14/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.2	U	1.2
121-82-4	RDX	1.1 ~~1.2~~	U	1.2
99-35-4	1,3,5-Trinitrobenzene	1.2	U	1.2
99-65-0	1,3-Dinitrobenzene	1.2	U	1.2
479-45-8	Tetryl	1.2	U	1.2
98-95-3	Nitrobenzene	1.2	U	1.2
118-96-7	2,4,6-Trinitrotoluene	1.2	U	1.2
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.2	U	1.2
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.2	U	1.2
606-20-2	2,6-Dinitrotoluene	1.2	U	1.2
121-14-2	2,4-Dinitrotoluene	1.2	U	1.2
88-72-2	2-Nitrotoluene	1.2	U	1.2
99-99-0	4-Nitrotoluene	1.2	U	1.2
99-08-1	3-Nitrotoluene	1.2	U	1.2

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-004-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 10500 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910417-03

Lab File ID: 3A19918.D

Date Collected: 10/13/99

Date Received: 10/15/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.4	U	1.4
121-82-4	RDX	1.3 ~~1.4~~	U	1.4
99-35-4	1,3,5-Trinitrobenzene	1.4	U	1.4
99-65-0	1,3-Dinitrobenzene	1.4	U	1.4
479-45-8	Tetryl	1.4	U	1.4
98-95-3	Nitrobenzene	1.4	U	1.4
118-96-7	2,4,6-Trinitrotoluene	1.4	U	1.4
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.4	U	1.4
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.4	U	1.4
606-20-2	2,6-Dinitrotoluene	1.4	U	1.4
121-14-2	2,4-Dinitrotoluene	1.4	U	1.4
88-72-2	2-Nitrotoluene	1.4	U	1.4
99-99-0	4-Nitrotoluene	1.4	U	1.4
99-08-1	3-Nitrotoluene	1.4	U	1.4

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-005-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 6400 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910417-04

Lab File ID: 3A19919.D

Date Collected: 10/14/99

Date Received: 10/15/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	0.83	U	0.83
121-82-4	RDX	0.78 ~~0.83~~	U	0.83
99-35-4	1,3,5-Trinitrobenzene	0.83	U	0.83
99-65-0	1,3-Dinitrobenzene	0.83	U	0.83
479-45-8	Tetryl	0.83	U	0.83
98-95-3	Nitrobenzene	0.83	U	0.83
118-96-7	2,4,6-Trinitrotoluene	0.83	U	0.83
1946-51-0	4-Amino-2,6-Dinitrotoluene	0.83	U	0.83
35572-78-2	2-Amino-4,6-Dinitrotoluene	0.83	U	0.83
606-20-2	2,6-Dinitrotoluene	0.83	U	0.83
121-14-2	2,4-Dinitrotoluene	0.83	U	0.83
88-72-2	2-Nitrotoluene	0.83	U	0.83
99-99-0	4-Nitrotoluene	0.83	U	0.83
99-08-1	3-Nitrotoluene	0.83	U	0.83

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-006-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 7700 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910417-05

Lab File ID: 3A19920.D

Date Collected: 10/14/99

Date Received: 10/15/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.0	U	1.0
121-82-4	RDX	0.94 ~~1.0~~	U	1.0
99-35-4	1,3,5-Trinitrobenzene	1.0	U	1.0
99-65-0	1,3-Dinitrobenzene	1.0	U	1.0
479-45-8	Tetryl	1.0	U	1.0
98-95-3	Nitrobenzene	1.0	U	1.0
118-96-7	2,4,6-Trinitrotoluene	1.0	U	1.0
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.0	U	1.0
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.0	U	1.0
606-20-2	2,6-Dinitrotoluene	1.0	U	1.0
121-14-2	2,4-Dinitrotoluene	1.0	U	1.0
88-72-2	2-Nitrotoluene	1.0	U	1.0
99-99-0	4-Nitrotoluene	1.0	U	1.0
99-08-1	3-Nitrotoluene	1.0	U	1.0

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-007-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 9500 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910380-02

Lab File ID: 3A19908.D

Date Collected: 10/12/99

Date Received: 10/14/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.2	U	1.2
121-82-4	RDX	1.2	U	1.2
99-35-4	1,3,5-Trinitrobenzene	1.2	U	1.2
99-65-0	1,3-Dinitrobenzene	1.2	U	1.2
479-45-8	Tetryl	1.2	U	1.2
98-95-3	Nitrobenzene	1.2	U	1.2
118-96-7	2,4,6-Trinitrotoluene	1.2	U	1.2
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.2	U	1.2
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.2	U	1.2
606-20-2	2,6-Dinitrotoluene	1.2	U	1.2
121-14-2	2,4-Dinitrotoluene	1.2	U	1.2
88-72-2	2-Nitrotoluene	1.2	U	1.2
99-99-0	4-Nitrotoluene	1.2	U	1.2
99-08-1	3-Nitrotoluene	1.2	U	1.2

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-IW-001-01

Lab Name: LAUCKS TESTING LABS

Matrix (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 11500 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910417-06

Lab File ID: 3A19921.D

Date Collected: 10/14/99

Date Received: 10/15/99

Date Prepared: 10/18/99

Date Analyzed: 10/20/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.5	U	1.5
121-82-4	RDX	1.4 ~~1.5~~	U	1.5
99-35-4	1,3,5-Trinitrobenzene	1.5	U	1.5
99-65-0	1,3-Dinitrobenzene	1.5	U	1.5
479-45-8	Tetryl	1.5	U	1.5
98-95-3	Nitrobenzene	1.5	U	1.5
118-96-7	2,4,6-Trinitrotoluene	1.5	U	1.5
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.5	U	1.5
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.5	U	1.5
606-20-2	2,6-Dinitrotoluene	1.5	U	1.5
121-14-2	2,4-Dinitrotoluene	1.5	U	1.5
88-72-2	2-Nitrotoluene	1.5	U	1.5
99-99-0	4-Nitrotoluene	1.5	U	1.5
99-08-1	3-Nitrotoluene	1.5	U	1.5

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-RB-001-01

Lab Name: LAUCKS TESTING LABS

SDG No.: C1901

Matrix: (soil/water) WATER

Lab Sample ID: 9910380-01

Sample wt/vol: 770 (g/ml) ml

Lab File ID: 3A19907.D

% Moisture: N/A

Date Collected: 10/11/99

Extraction: SALTING OUT

Date Received: 10/14/99

Concentrated Extract Volume: 5100 (uL)

Date Prepared: 10/18/99

Dilution Factor: 2.0

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	0.66	U	0.66
121-82-4	RDX	0.62 ~~0.66~~	U	0.66
99-35-4	1,3,5-Trinitrobenzene	0.66	U	0.66
99-65-0	1,3-Dinitrobenzene	0.66	U	0.66
479-45-8	Tetryl	0.66	U	0.66
98-95-3	Nitrobenzene	0.66	U	0.66
118-96-7	2,4,6-Trinitrotoluene	0.66	U	0.66
1946-51-0	4-Amino-2,6-Dinitrotoluene	0.66	U	0.66
35572-78-2	2-Amino-4,6-Dinitrotoluene	0.66	U	0.66
606-20-2	2,6-Dinitrotoluene	0.66	U	0.66
121-14-2	2,4-Dinitrotoluene	0.66	U	0.66
88-72-2	2-Nitrotoluene	0.66	U	0.66
99-99-0	4-Nitrotoluene	0.66	U	0.66
99-08-1	3-Nitrotoluene	0.66	U	0.66

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

DUP-GW-001-01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 10500 (uL)

Dilution Factor: 2.0

SDG No.: C1901

Lab Sample ID: 9910380-04

Lab File ID: 3A19914.D

Date Collected: 10/12/99

Date Received: 10/14/99

Date Prepared: 10/18/99

Date Analyzed: 10/19/99

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.4	U	1.4
121-82-4	RDX	1.3 ~~1.4~~	U	1.4
99-35-4	1,3,5-Trinitrobenzene	1.4	U	1.4
99-65-0	1,3-Dinitrobenzene	1.4	U	1.4
479-45-8	Tetryl	1.4	U	1.4
98-95-3	Nitrobenzene	1.4	U	1.4
118-96-7	2,4,6-Trinitrotoluene	1.4	U	1.4
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.4	U	1.4
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.4	U	1.4
606-20-2	2,6-Dinitrotoluene	1.4	U	1.4
121-14-2	2,4-Dinitrotoluene	1.4	U	1.4
88-72-2	2-Nitrotoluene	1.4	U	1.4
99-99-0	4-Nitrotoluene	1.4	U	1.4
99-08-1	3-Nitrotoluene	1.4	U	1.4

APPENDIX C
Support Documentation

991038 C1901 0 20

CHAIN OF CUSTODY RECORD

PROJECT NO.: FTO 19 7393

SITE NAME: NSWC CRANE, IN

SAMPLERS (SIGNATURE): T. S. Sampier / Scott Reid

	STATION NO.	DATE 1999	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	AMMONIA, NITRATE/NITRITE, TKN, T. PHOS.	DIS. PHOS.	REMARKS
1,7	RB	10/11	1810		✓	030-RB-001-01	10	3	2	1	1	1	1	1	
13	TB	10/12	0715		✓	030-TB-001-01	3	3							
2,8	LF	↓	1440		✓	030-GW-007-01	10	3	2	1	1	1	1	1	
3,9	↓	↓	1326		✓	030-GW-002-01	30	9	6	3	3	3	3	3	RUN MS/MSD ALSO
4,10	↓	↓	0000		✓	DUP-GW-001-01	10	3	2	1	1	1	1	1	
5,11	↓	10/13	1005		✓	030-GW-001-01	10	3	2	1	1	1	1	1	
6,12	↓	↓	1025		✓	030-GW-003-01	10	3	2	1	1	1	1	1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
T. S. Sampier	10.13.99 1625	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: FED EX AB# 8117 3683 5451	
			10/14/99 0830	TEMP BLANK AT SHIPMENT = 4°C	

Order No. 70440 (0693)

9910417 C1901

00321

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7393 ICT019

SITE NAME: NSWC CRANE, IN

SAMPLERS (SIGNATURE): K. S. Simpson

STATION NO.	DATE 1999	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	AMMONIA NITRATE/NITRITE TKN, T. PHOS.	DIS. PHOS.	REMARKS
TB	10/13	1340		✓	030-TB-002-01	3	3							TRIP BLANK
FB	↓	1600		✓	030-FB-001-01	8	3	2	1	13 #	1	1		SOURCE (DI) WATER
LF	↓	1712		✓	030-GW-004-01	10	3	2	1	1	1	1	1	
↓	10/14	0930		✓	030-GW-005-01	10	3	2	1	1	1	1	1	
↓	↓	1025		✓	030-GW-006-01	10	3	2	1	1	1	1	1	DEVELOPMENT & PURGE WATER
IDW	↓	1310		✓	030-IW-001-01	8	3	2	1		1	1		

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
K. S. Simpson	10/14/99 1630	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: FED EX AB # 8117 3683 5473	
			10/15/99 0830	TEMP. BLANK AT SHIPMENT = 4°C	

Order No. 70[illegible]

LAUCKS TESTING - 7 - 8 - 9
10/15/99 FRI 13:45 FAX 787 5083

Units	Usample	Lab Id	Qc Type	Sdg	ort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DAT TO ANAL_DATE	AMP_DATE TO ANAL_DATE
MG/L	030-GW-004-01-F	9910417-07	NORMAL	C1901	DPHO	10/13/99	11/08/99	11/09/99	26	1	27
MG/L	030-GW-005-01-F	9910417-08	NORMAL	C1901	DPHO	10/14/99	11/08/99	11/09/99	25	1	26
MG/L	030-GW-006-01-F	9910417-09	NORMAL	C1901	DPHO	10/14/99	11/08/99	11/09/99	25	1	26
MG/L	030-GW-007-01-F	9910380-08	NORMAL	C1901	DPHO	10/12/99	11/08/99	11/09/99	27	1	28
MG/L	030-RB-001-01-F	9910380-07	NORMAL	C1901	DPHO	10/11/99	11/08/99	11/09/99	28	1	29
MG/L	DUP-GW-001-01-F	9910380-10	NORMAL	C1901	DPHO	10/12/99	11/08/99	11/09/99	27	1	28
UG/L	030-FB-001-01	9910417-02	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-001-01	9910380-05	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-002-01	9910380-03	NORMAL	C1901	EXP	10/12/99	10/18/99	10/19/99	6	1	7
UG/L	030-GW-003-01	9910380-06	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-004-01	9910417-03	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-005-01	9910417-04	NORMAL	C1901	EXP	10/14/99	10/18/99	10/19/99	4	1	5
UG/L	030-GW-006-01	9910417-05	NORMAL	C1901	EXP	10/14/99	10/18/99	10/19/99	4	1	5
UG/L	030-GW-007-01	9910380-02	NORMAL	C1901	EXP	10/12/99	10/18/99	10/19/99	6	1	7
UG/L	030-IW-001-01	9910417-06	NORMAL	C1901	EXP	10/14/99	10/18/99	10/20/99	4	2	6
UG/L	030-RB-001-01	9910380-01	NORMAL	C1901	EXP	10/11/99	10/18/99	10/19/99	7	1	8
UG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	EXP	10/12/99	10/18/99	10/19/99	6	1	7
UG/L	030-FB-001-01	9910417-02	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-001-01	9910380-05	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-002-01	9910380-03	NORMAL	C1901	HG	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-GW-003-01	9910380-06	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-004-01	9910417-03	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-005-01	9910417-04	NORMAL	C1901	HG	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-GW-006-01	9910417-05	NORMAL	C1901	HG	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-GW-007-01	9910380-02	NORMAL	C1901	HG	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-IW-001-01	9910417-06	NORMAL	C1901	HG	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-RB-001-01	9910380-01	NORMAL	C1901	HG	10/11/99	11/03/99	11/04/99	23	1	24

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-007-01-F	9910380-08	NORMAL	C1901	MF	10/12/99	11/02/99	11/03/99	21	1	22
UG/L	030-RB-001-01-F	9910380-07	NORMAL	C1901	MF	10/11/99	11/02/99	11/03/99	22	1	23
UG/L	DUP-GW-001-01-F	9910380-10	NORMAL	C1901	MF	10/12/99	11/02/99	11/03/99	21	1	22
MG/L	030-FB-001-01	9910417-02	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-001-01	9910380-05	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-002-01	9910380-03	NORMAL	C1901	NTIA	10/12/99	11/08/99	11/08/99	27	0	27
MG/L	030-GW-003-01	9910380-06	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-004-01	9910417-03	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-005-01	9910417-04	NORMAL	C1901	NTIA	10/14/99	11/08/99	11/08/99	25	0	25
MG/L	030-GW-006-01	9910417-05	NORMAL	C1901	NTIA	10/14/99	11/08/99	11/08/99	25	0	25
MG/L	030-GW-007-01	9910380-02	NORMAL	C1901	NTIA	10/12/99	11/08/99	11/08/99	27	0	27
MG/L	030-IW-001-01	9910417-06	NORMAL	C1901	NTIA	10/14/99	11/08/99	11/08/99	25	0	25
MG/L	030-RB-001-01	9910380-01	NORMAL	C1901	NTIA	10/11/99	11/08/99	11/08/99	28	0	28
MG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	NTIA	10/12/99	11/08/99	11/08/99	27	0	27
UG/L	030-FB-001-01	9910417-02	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-001-01	9910380-05	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-002-01	9910380-03	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	0	7
UG/L	030-GW-003-01	9910380-06	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-004-01	9910417-03	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-005-01	9910417-04	NORMAL	C1901	OV	10/14/99	10/19/99	10/19/99	5	0	5
UG/L	030-GW-006-01	9910417-05	NORMAL	C1901	OV	10/14/99	10/19/99	10/19/99	5	0	5
UG/L	030-GW-007-01	9910380-02	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	0	7
UG/L	030-IW-001-01	9910417-06	NORMAL	C1901	OV	10/14/99	10/19/99	10/19/99	5	0	5
UG/L	030-RB-001-01	9910380-01	NORMAL	C1901	OV	10/11/99	10/19/99	10/19/99	8	0	8
UG/L	030-TB-001-01	9910380-13	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	0	7
UG/L	030-TB-002-01	9910417-01	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	IP-GW-001-01	9910380-04	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	0	7

2A

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: Laucks Testing Labs Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C1901

	SAMPLE NO.	SMC1 DCA) #	SMC2 (TOL) #	SMC3 (BFB) #	SMC4 (DFM) #	TOT OUT
01	VBLKU1	89	105	113	88	0
02	VBLKSPKU1	92	103	113	90	0
03	030TB00101	89	105	115	88	0
04	030TB00201	92	103	117	90	0
05	030FB00101	91	104	115	89	0
06	030RB00101	87	106	114	88	0
07	030GW00701	95	103	115	90	0
08	DUPGW00101	96	103	116	93	0
09	030GW00101	93	104	114	90	0
10	030GW00301	93	103	117	90	0
11	030GW00401	96	102	114	92	0
12	030GW00501	94	103	113	91	0
13	030GW00601	93	104	114	90	0
14	030IW00101	94	103	116	90	0
15	030GW00201	96	103	115	91	0
16	030GW00201MS	96	108	107	86	0
17	030GW00201MSD	100	104	106	88	0

				QC LIMITS
SMC1	(DCA)	=	1,2-Dichloroethane-d4	(62-139)
SMC2	(TOL)	=	Toluene-d8	(75-125)
SMC3	(BFB)	=	4-Bromofluorobenzene	(75-125)
SMC4	(DFM)	=	Dibromofluoromethane	(60-140)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Laucks Testing Labs SAS No.: _____ SDG No.: C1901

Lab File ID: U0826007.D BFB Injection Date: 08/26/99

Instrument ID: URSULA BFB Injection Time: 14:20

GC Column: DB-624 ID: 0.45 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	23.9
75	30.0 - 66.0% of mass 95	50.1
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.8
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	64.3
175	4.0 - 9.0% of mass 174	4.5 (7.0)1
176	93.0 - 101.0% of mass 174	62.1 (96.6)1
177	5.0 - 9.0% of mass 176	4.6 (7.4)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD010	10 UG/L LAB STD	U0826010.D	08/26/99	16:11
02	VSTD005	5 UG/L LAB STD	U0826011.D	08/26/99	16:47
03	VSTD001	1 UG/L LAB STD	U0826012.D	08/26/99	17:23
04	VSTD025	25 UG/L LAB STD	U0826013.D	08/26/99	17:59
05	VSTD050	50 UG/L LAB STD	U0826014.D	08/26/99	18:35
06	VSTD100	100 UG/L LAB STD	U0826015.D	08/26/99	19:11

RRF < 0.05

Ace.
2-But.
$4CH_3 2P$.
2 Hex. @ 33%
acrylonitrile.
methacrylonitrile 35% too
methyl methacrylate.
t-1,4-DC-2-butene.
1,2-Dibromo-3-chloropropane.

acrolein.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Laucks Testing Labs Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C1901

Instrument ID: URSULA Calibration Date(s): 08/26/99 08/26/99

Heated Purge (Y/N): N Calibration Times: 16:11 19:11

GC Column: DB-624 ID: 0.45 (mm)

LAB FILE ID: RRF1 = U0826012.D RRF5 = U0826011.D RRF100 = U0826015.D
RRF10 = U0826010.D RRF25 = U0826013.D RRF50 = U0826014.D

COMPOUND	RRF1	RRF5	RRF10	RRF25	RRF50	RRF100	$\overline{RRF}$	% RSD
Dichlorodifluoromethane	0.222	0.221	0.218	0.234	0.239		0.227	4.1
Chloromethane	0.190	0.190	0.186	0.197	0.206		0.194	4.1
Vinyl chloride	0.219	0.217	0.215	0.231	0.232		0.223	3.6
Bromomethane	0.250	0.246	0.240	0.258	0.239		0.247	3.1
Chloroethane	0.140	0.138	0.131	0.138	0.132		0.136	2.9
Trichlorofluoromethane	0.488	0.490	0.472	0.519	0.535		0.501	5.1
1,1-Dichloroethene	0.251	0.244	0.235	0.262	0.259		0.250	4.4
Acetone		0.007	0.008	0.009	0.009	0.009	0.008	7.4
Carbon disulfide	0.903	0.871	0.868	0.913	0.925		0.896	2.8
Methylene chloride	0.292	0.213	0.207	0.217	0.217		0.229	15.4
trans-1,2-Dichloroethene	0.309	0.296	0.290	0.319	0.315		0.306	4.1
1,1-Dichloroethane	0.507	0.501	0.483	0.527	0.534		0.510	4.0
2-Butanone		0.012	0.009	0.014	0.015	0.013	0.012	16.0
Chloroform	0.594	0.540	0.521	0.564	0.578		0.559	5.2
1,1,1-Trichloroethane	0.422	0.426	0.407	0.463	0.474		0.439	6.5
Carbon tetrachloride	0.427	0.426	0.404	0.458	0.469		0.436	6.0
1,2-Dichloroethane-d4	0.169	0.165	0.173	0.158	0.158	0.168	0.165	3.6
Benzene	0.714	0.641	0.659	0.707	0.703		0.685	4.8
1,2-Dichloroethane	0.153	0.149	0.151	0.164	0.165		0.157	4.8
Trichloroethene	0.392	0.368	0.358	0.400	0.389		0.381	4.6
1,2-Dichloropropane	0.236	0.225	0.231	0.255	0.249		0.239	5.2
Dibromomethane	0.153	0.154	0.151	0.163	0.170		0.158	5.1
Bromodichloromethane	0.446	0.423	0.429	0.465	0.465		0.446	4.4
cis-1,3-Dichloropropene	0.224	0.229	0.240	0.267	0.271		0.246	8.7
4-Methyl-2-pentanone		0.024	0.027	0.035	0.041	0.046	0.034	27.0
Toluene-d8	1.266	1.270	1.259	1.248	1.238	1.190	1.245	2.4
Toluene	0.734	0.702	0.680	0.728	0.718		0.712	3.1
trans-1,3-Dichloropropene	0.204	0.211	0.229	0.258	0.267		0.234	12.0
1,1,2-Trichloroethane	0.172	0.170	0.173	0.184	0.183		0.176	3.9
Tetrachloroethene	0.660	0.660	0.613	0.676	0.680		0.658	4.1
2-Hexanone			0.017	0.026	0.037	0.037	0.029	33.0
Dibromochloromethane	0.408	0.407	0.405	0.433	0.446		0.420	4.4
1,2-Dibromoethane	0.261	0.274	0.278	0.302	0.309		0.285	7.0
Chlorobenzene	0.832	0.827	0.785	0.844	0.846		0.827	3.0
1,1,1,2-Tetrachloroethane	0.381	0.365	0.363	0.397	0.403		0.382	4.7
Ethylbenzene	1.379	1.353	1.312	1.448	1.439		1.386	4.1
m,p-Xylene	0.495	0.484	0.459	0.501	0.491		0.486	3.3

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VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1901

Instrument ID: URSULA Calibration Date(s): 08/26/99 08/26/99

Heated Purge (Y/N): N Calibration Times: 16:11 19:11

GC Column: DB-624 ID: 0.45 (mm)

LAB FILE ID: RRF1 = U0826012.D RRF5 = U0826011.D RRF100 = U0826015.D
RRF10 = U0826010.D RRF25 = U0826013.D RRF50 = U0826014.D

COMPOUND	RRF1	RRF5	RRF10	RRF25	RRF50	RRF100	$\overline{RRF}$	% RSD
o-Xylene	0.423	0.440	0.423	0.444	0.442		0.434	2.4
Styrene	0.593	0.601	0.599	0.661	0.671		0.625	6.0
Bromoform	0.190	0.197	0.200	0.219	0.238		0.209	9.4
4-Bromofluorobenzene	1.646	1.575	1.548	1.510	1.496	1.690	1.578	4.9
1,1,2,2-Tetrachloroethane	0.541	0.501	0.491	0.504	0.496		0.507	3.9
Dibromofluoromethane	0.602	0.587	0.595	0.597	0.601	0.616	0.600	1.6
1,2,3-Trichloropropane	0.248	0.250	0.255	0.270	0.274		0.259	4.6
1,2-Dibromo-3-chloropropane	0.039	0.060	0.060	0.066	0.072		0.059	20.9
Average % RSD								10.0

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VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Laucks Testing Labs SAS No.: _____ SDG No.: C1901

Lab File ID: U0924002.D BFB Injection Date: 09/24/99

Instrument ID: URSULA BFB Injection Time: 09:34

GC Column: DB-624 ID: 0.45 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	22.8
75	30.0 - 66.0% of mass 95	48.0
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.6
173	Less than 2.0% of mass 174	0.4 (0.6)1
174	50.0 - 120.0% of mass 95	68.7
175	4.0 - 9.0% of mass 174	4.9 (7.2)1
176	93.0 - 101.0% of mass 174	64.7 (94.1)1
177	5.0 - 9.0% of mass 176	4.2 (6.5)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD010	10 UG/L LAB STD	U0924015.D	09/24/99	17:31
02	VSTD005	5 UG/L LAB STD	U0924016.D	09/24/99	18:07
03	VSTD001	1 UG/L LAB STD	U0924017.D	09/24/99	18:43
04	VSTD025	25 UG/L LAB STD	U0924019.D	09/24/99	19:56
05	VSTD050	50 UG/L LAB STD	U0924020.D	09/24/99	20:32
06	VSTD100	100 UG/L LAB STD	U0924021.D	09/24/99	21:08

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1901

Instrument ID: URSULA Calibration Date(s): 09/24/99 09/24/99

Heated Purge (Y/N): N Calibration Times: 17:31 21:08

GC Column: DB-624 ID: 0.45 (mm)

LAB FILE ID: RRF1 = U0924017.D RRF5 = U0924016.D RRF100 = U0924021.D

RRF10 = U0924015.D RRF25 = U0924019.D RRF50 = U0924020.D

COMPOUND	RRF1	RRF5	RRF10	RRF25	RRF50	RRF100	$\overline{RRF}$	% RSD
Acrolein		0.005	0.005	0.005	0.005	0.005	0.005	1.6
Allyl chloride	0.620	0.700	0.760	0.823	0.855		0.752	12.6
Acrylonitrile	0.006	0.008	0.006	0.008	0.009		0.007	21.5
Vinyl acetate	0.118	0.110	0.125	0.138	0.152		0.129	12.8
Chloroprene	0.425	0.383	0.398	0.402	0.403		0.402	3.8
Methacrylonitrile	0.014	0.008	0.013	0.016	0.021		0.014	35.0
Dibromofluoromethane	0.573	0.566	0.566	0.568	0.575	0.580	0.571	1.0
1,2-Dichloroethane-d4	0.147	0.147	0.146	0.149	0.151	0.152	0.149	1.7
Methyl methacrylate	0.039	0.031	0.040	0.044	0.052		0.041	18.5
Toluene-d8	1.217	1.224	1.226	1.229	1.204	1.216	1.219	0.8
Ethyl methacrylate	0.069	0.102	0.113	0.130	0.139		0.111	24.7
trans-1,4-Dichloro-2-butene		0.021	0.022	0.024	0.029	0.031	0.025	17.2
4-Bromofluorobenzene	1.626	1.599	1.573	1.602	1.623	1.593	1.603	1.2
Average % RSD								11.7

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Laucks Testing Labs
SAS No.: _____ SDG No.: C1901
Lab File ID: U1019004.D
BFB Injection Date: 10/19/99
Instrument ID: URSULA
BFB Injection Time: 10:50
GC Column: DB-624 ID: 0.45 (mm)
Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	26.3
75	30.0 - 66.0% of mass 95	48.4
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.7
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	64.0
175	4.0 - 9.0% of mass 174	5.1 (8.0)1
176	93.0 - 101.0% of mass 174	61.4 (95.9)1
177	5.0 - 9.0% of mass 176	4.1 (6.7)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD010/25	10 UG/L LAB STD	U1019005.D	10/19/99	11:19
02	VBLKU1	B101999MVOWU1	U1019007.D	10/19/99	12:42
03	VBLKSPKU1	S101999MVOWU1	U1019008.D	10/19/99	13:18
04	030TB00101	9910380-13	U1019009.D	10/19/99	13:54
05	030TB00201	9910417-01	U1019010.D	10/19/99	14:30
06	030FB00101	9910417-02	U1019011.D	10/19/99	15:07
07	030RB00101	9910380-01	U1019012.D	10/19/99	15:43
08	030GW00701	9910380-02	U1019013.D	10/19/99	16:19
09	DUPGW00101	9910380-04	U1019014.D	10/19/99	16:55
10	030GW00101	9910380-05	U1019015.D	10/19/99	17:31
11	030GW00301	9910380-06	U1019016.D	10/19/99	18:07
12	030GW00401	9910417-03	U1019017.D	10/19/99	18:43
13	030GW00501	9910417-04	U1019018.D	10/19/99	19:19
14	030GW00601	9910417-05	U1019019.D	10/19/99	19:55
15	030IW00101	9910417-06	U1019020.D	10/19/99	20:32
16	030GW00201	9910380-03	U1019021.D	10/19/99	21:08
17	030GW00201MS	9910380-03MS	U1019022.D	10/19/99	21:43
18	030GW00201MSD	9910380-03MSD	U1019023.D	10/19/99	22:20

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1901

Instrument ID: URSULA Calibration Date: 10/19/99 Time: 11:19

Lab File ID: U1019005.D Init. Calib. Date(s): 08/26/99 08/26/99

Heated Purge: (Y/N) N Init. Calib. Times: 16:11 19:11

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	RRF	RRF10	MIN RRF	% D	MAX % D
Dichlorodifluoromethane	0.227	0.179		21.1	
Chloromethane	0.194	0.248	0.100	-28.1	
Vinyl chloride	0.223	0.251		-12.8	20
Bromomethane	0.247	0.213		13.6	
Chloroethane	0.136	0.174		-28.1	
Trichlorofluoromethane	0.501	0.466		7.0	
1,1-Dichloroethene	0.250	0.253		-1.1	20
Acetone	0.008	0.010		-15.4	
Carbon disulfide	0.896	0.695		22.4	
Methylene chloride	0.229	0.239		-4.2	
trans-1,2-Dichloroethene	0.306	0.305		0.2	
1,1-Dichloroethane	0.510	0.501	0.100	1.7	
2-Butanone	0.012	0.012		3.2	
Chloroform	0.559	0.492		12.1	20
1,1,1-Trichloroethane	0.439	0.382		12.8	
Carbon tetrachloride	0.436	0.357		18.2	
1,2-Dichloroethane-d4	0.165	0.152		8.1	
Benzene	0.685	0.723		-5.6	
1,2-Dichloroethane	0.157	0.142		9.5	
Trichloroethene	0.381	0.376		1.4	
1,2-Dichloropropane	0.239	0.259		-8.1	20
Dibromomethane	0.158	0.133		15.8	
Bromodichloromethane	0.446	0.407		8.7	
cis-1,3-Dichloropropene	0.246	0.248		-0.6	
4-Methyl-2-pentanone	0.034	0.030		11.8	
Toluene-d8	1.245	1.354		-8.7	
Toluene	0.712	0.796		-11.7	20
trans-1,3-Dichloropropene	0.234	0.248		-5.9	
1,1,2-Trichloroethane	0.176	0.188		-6.5	
Tetrachloroethene	0.658	0.594		9.7	
2-Hexanone	0.029	0.021		26.7	
Dibromochloromethane	0.420	0.373		11.2	
1,2-Dibromoethane	0.285	0.283		0.6	
Chlorobenzene	0.827	0.753	0.300	9.0	
1,1,1,2-Tetrachloroethane	0.382	0.358		6.3	

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VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1901

Instrument ID: URSULA Calibration Date: 10/19/99 Time: 11:19

Lab File ID: U1019005.D Init. Calib. Date(s): 08/26/99 08/26/99

Heated Purge: (Y/N) N Init. Calib. Times: 16:11 19:11

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	$\overline{RRF}$	RRF10	MIN RRF	% D	MAX % D
Ethylbenzene	1.386	1.528		-10.2	20
m,p-Xylene	0.486	0.489		-0.7	
o-Xylene	0.434	0.403		7.2	
Styrene	0.625	0.643		-2.9	
Bromoform	0.209	0.173	0.100	17.2	
4-Bromofluorobenzene	1.578	1.671		-5.9	
1,1,2,2-Tetrachloroethane	0.507	0.552	0.300	-9.0	
Dibromofluoromethane	0.600	0.507		15.5	
1,2,3-Trichloropropane	0.259	0.289		-11.3	
1,2-Dibromo-3-chloropropane	0.059	0.067		-13.3	
Average %D				11.6	

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1901

Instrument ID: URSULA Calibration Date: 10/19/99 Time: 11:55

Lab File ID: U1019006.D Init. Calib. Date(s): 09/24/99 09/24/99

Heated Purge: (Y/N) N Init. Calib. Times: 17:31 21:08

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	RRF	RRF10	MIN RRF	% D	MAX % D
Acrolein	0.005	0.004		23.4	
Allyl chloride	0.752	0.919		-22.3	
Acrylonitrile	0.007	0.006		17.1	
Vinyl acetate	0.129	0.134		-4.0	
Chloroprene	0.402	0.338		16.0	
Methacrylonitrile	0.014	0.015		-3.2	
Dibromofluoromethane	0.571	0.531		7.0	
1,2-Dichloroethane-d4	0.149	0.152		-2.1	
Methyl methacrylate	0.041	0.041		0.0	
Toluene-d8	1.219	1.310		-7.5	
Ethyl methacrylate	0.111	0.130		-17.9	
trans-1,4-Dichloro-2-butene	0.025	0.032		-26.3	
4-Bromofluorobenzene	1.603	1.768		-10.3	
Average %D				12.1	

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Laucks Testing Labs Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C1901

Lab File ID (Standard): U1019005.D Date Analyzed: 10/19/99

Instrument ID: URSULA Time Analyzed: 11:19

GC Column: DB-624 ID: 0.45 (mm) Heated Purge: (Y/N) N

	IS1 AREA #	RT #	IS2 AREA #	RT #	IS3 AREA #	RT #
12 HOUR STD	189774	11.24	101475	17.63	44427	23.02
UPPER LIMIT	379548	11.74	202950	18.13	88854	23.52
LOWER LIMIT	94887	10.74	50738	17.13	22214	22.52
SAMPLE NO.						
01 VBLKU1	182412	11.25	99200	17.62	38897	23.08
02 VBLKSPKU1	184461	11.29	103835	17.63	41279	23.06
03 030TB00101	178074	11.26	96643	17.63	36856	23.03
04 030TB00201	176987	11.26	98630	17.64	37242	23.04
05 030FB00101	179279	11.25	99581	17.61	38913	23.02
06 030RB00101	178464	11.25	96508	17.60	38199	23.02
07 030GW00701	181111	11.24	102083	17.60	40071	23.01
08 DUPGW00101	179696	11.24	101627	17.60	39961	23.01
09 030GW00101	180864	11.25	100084	17.60	39548	23.01
10 030GW00301	180519	11.24	100196	17.58	38714	23.01
11 030GW00401	181686	11.24	103514	17.58	41190	23.00
12 030GW00501	181053	11.23	101484	17.58	40949	23.00
13 030GW00601	183090	11.22	101642	17.58	40618	22.98
14 030IW00101	181404	11.22	101913	17.58	39733	22.99
15 030GW00201	184693	11.22	103622	17.57	41766	22.99
16 030GW00201MS	187735	11.21	101719	17.58	45455	22.99
17 030GW00201MSD	192894	11.22	106990	17.57	49049	22.99

IS1 = Fluorobenzene
IS2 = Chlorobenzene-d5
IS3 = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
* Values outside of contract required QC limits

Blank Spike Report

Lab Name : LAUCKS TESTING LABS

Description : SW 8260
Lab ID : S101999MVOWU1
Matrix : W
Units : UG/L

(Database Reference: S101999_MVOW01)

Analyte	Spike Added	Amount Found	% Rec	Recovery Limits	
1,1-Dichloroethene----------	10.00	10.700	107	60 - 140	71-130
Trichloroethene----------	10.00	9.5900	96	60 140	86-11
Benzene----------	10.00	10.120	101	60 140	85-12
Toluene----------	10.00	9.8800	99	60 140	86-12
Chlorobenzene----------	10.00	9.1900	92	60 140	84-11

* = Recovery exceeded control limit

Form BLKSPK-1

MS/MSD Report

Lab Name : LAUCKS TESTING LABS

Client ID : 030-GW-002-01

Lab ID : 9910380-03
Matrix : WATER
Units : UG/L

Description : Volatiles by GC/MS, Full List

(Database Reference: K101999_MVOW02)

Matrix Spike Data

Analyte	Spike Added	Sample Found	MS Found	MS Rec	Recovery Limits
Vinyl Chloride----------	10.0	0	13.300	133	60 140
1,1-Dichloroethene----------	10.0	0	9.1600	92	60 140
trans-1,2-Dichloroethene------	10.0	0	8.3400	83	60 140
cis-1,2-Dichloroethene--------	10.0	0	8.7900	88	60 140
Trichloroethene----------	10.0	0	8.9900	90	60 140
Chloroethane----------	10.0	0	12.800	128	60 140
Methylene Chloride----------	10.0	0	8.8300	88	60 140
1,1-Dichloroethane----------	10.0	0	9.8900	99	60 140
Chloroform----------	10.0	0	8.4100	84	60 140
1,1,1-Trichloroethane---------	10.0	0	7.9100	79	60 140
Carbon Tetrachloride----------	10.0	0	7.5600	76	60 140
Benzene----------	10.0	0	9.3700	94	60 140
1,2-Dichloroethane----------	10.0	0	8.8000	88	60 140
Toluene----------	10.0	0	10.100	101	60 140
Ethylbenzene----------	10.0	0	10.600	106	60 140
Tetrachloroethene----------	10.0	0	8.3900	84	60 140
Dichlorodifluoromethane-------	10.0	0	16.300	163 *	60 140
Chloromethane----------	10.0	0	15.400	154 *	60 140
Bromomethane----------	10.0	0	8.9300	89	60 140
Trichlorofluoromethane--------	10.0	0	8.9200	89	60 140
Bromochloromethane----------	10.0	0	7.7100	77	60 140
1,2-Dichloropropane----------	10.0	0	10.900	109	60 140
Bromodichloromethane----------	10.0	0	8.8400	88	60 140
cis-1,3-Dichloropropene-------	10.0	0	9.3000	93	60 140
trans-1,3-Dichloropropene-----	10.0	0	10.700	107	60 140
1,1,2-Trichloroethane---------	10.0	0	11.000	110	60 140
Dibromochloromethane----------	10.0	0	9.3000	93	60 140
Chlorobenzene----------	10.0	0	9.8000	98	60 140
1,1,1,2-Tetrachloroethane-----	10.0	0	9.5700	96	60 140
Styrene----------	10.0	0	10.100	101	60 140
Bromoform----------	10.0	0	8.9300	89	60 140
1,1,2,2-Tetrachloroethane-----	10.0	0	11.700	117	60 140
2,2-Dichloropropane----------	10.0	0	8.0800	81	60 140
1,1-Dichloropropene----------	10.0	0	8.7200	87	60 140
Dibromomethane----------	10.0	0	8.8600	89	60 140
1,3-Dichloropropane----------	10.0	0	11.000	110	60 140
1,2-Dibromoethane----------	10.0	0	9.8200	98	60 140
1,2,3-Trichloropropane--------	10.0	0	11.300	113	60 140
1,2-Dibromo-3-chloropropane---	10.0	0	12.000	120	60 140
Acetone----------	10.0	0	12.800	128	60 140

Matrix Spike Duplicate Data

Analyte	Spike Added	MSD Found	MSD Rec	RPD	Control Limits Recov		RPD
Vinyl Chloride----------	10.0	12.700	127	5	60	140	30
1,1-Dichloroethene----------	10.0	8.9900	90	2	60	140	30
trans-1,2-Dichloroethene------	10.0	8.2300	82	1	60	140	30
cis-1,2-Dichloroethene--------	10.0	8.9100	89	1	60	140	30
Trichloroethene----------	10.0	8.7700	88	2	60	140	30
Chloroethane----------	10.0	12.300	123	4	60	140	30
Methylene Chloride----------	10.0	9.2700	93	6	60	140	30
1,1-Dichloroethane----------	10.0	9.8100	98	1	60	140	30
Chloroform----------	10.0	8.4400	84	0	60	140	30
1,1,1-Trichloroethane---------	10.0	7.6800	77	3	60	140	30
Carbon Tetrachloride----------	10.0	7.3200	73	4	60	140	30
Benzene----------	10.0	9.2900	93	1	60	140	30
1,2-Dichloroethane----------	10.0	8.8600	89	1	60	140	30
Toluene----------	10.0	9.7300	97	4	60	140	30
Ethylbenzene----------	10.0	10.200	102	4	60	140	30
Tetrachloroethene----------	10.0	7.9200	79	6	60	140	30
Dichlorodifluoromethane-------	10.0	15.500	155 *	5	60	140	30
Chloromethane----------	10.0	15.000	150 *	3	60	140	30
Bromomethane----------	10.0	8.5600	86	3	60	140	30
Trichlorofluoromethane--------	10.0	8.6400	86	3	60	140	30
Bromochloromethane----------	10.0	8.2000	82	6	60	140	30
1,2-Dichloropropane----------	10.0	11.200	112	3	60	140	30
Bromodichloromethane----------	10.0	9.0200	90	2	60	140	30
cis-1,3-Dichloropropene-------	10.0	9.5800	96	3	60	140	30
trans-1,3-Dichloropropene-----	10.0	10.900	109	2	60	140	30
1,1,2-Trichloroethane---------	10.0	11.300	113	3	60	140	30
Dibromochloromethane----------	10.0	9.4900	95	2	60	140	30
Chlorobenzene----------	10.0	9.6900	97	1	60	140	30
1,1,1,2-Tetrachloroethane-----	10.0	9.7000	97	1	60	140	30
Styrene----------	10.0	10.200	102	1	60	140	30
Bromoform----------	10.0	9.3400	93	4	60	140	30
1,1,2,2-Tetrachloroethane-----	10.0	12.000	120	3	60	140	30
2,2-Dichloropropane----------	10.0	7.7500	78	4	60	140	30
1,1-Dichloropropene----------	10.0	8.4000	84	4	60	140	30
Dibromomethane----------	10.0	9.2600	93	4	60	140	30
1,3-Dichloropropane----------	10.0	11.400	114	4	60	140	30
1,2-Dibromoethane----------	10.0	10.200	102	4	60	140	30
1,2,3-Trichloropropane--------	10.0	11.900	119	5	60	140	30
1,2-Dibromo-3-chloropropane---	10.0	11.700	117	3	60	140	30
Acetone----------	10.0	12.600	126	2	60	140	30

Comments

Form MS/MSD-1

* = Recovery or RPD exceeded control limit

SURROGATE RECOVERY FORM

Lab Name: Laucks Testing Labs, Inc. Matrix: WATER

LAB SAMPLE ID.	CLIENT SAMPLE ID.	Surr 1	Surr 2	Surr 3	Surr 4	Surr 5	Surr 6
9910380-01	030-RB-001-01	96					
9910380-02	030-GW-007-01	90					
9910380-03	030-GW-002-01	97					
9910380-03MS	030-GW-002-01MS	93					
9910380-03MSD	030-GW-002-01MSD	95					
9910380-04	DUP-GW-001-01	64					
9910380-05	030-GW-001-01	82					
9910380-06	030-GW-003-01	93					
9910417-02	030-FB-001-01	99					
9910417-03	030-GW-004-01	101					
9910417-04	030-GW-005-01	96					
9910417-05	030-GW-006-01	98					
9910417-06	030-IW-001-01	94					
B101899HORWLC	METHOD BLANK	86					
S101899HORWLC	BLANK SPIKE	89					

	Surrogate Compound	LCL	UCL
1 =	1,2-Dinitrobenzene	60	140

* = values outside of recovery limit
D = surrogate diluted out
LCL = Lower Control Limi
UCL = Upper Control Limi

Surr-Rep

FormVer 1.0 11/23/96

Blank Spike Report

Lab Name : LAUCKS TESTING LABS

Description : Ordnance by 8330
Lab ID : S101899HORWLC
Matrix : W
Units : UG/L

(Database Reference: S101899_HSVW01)

Analyte	Spike Added	Amount Found	% Rec	Recovery Limits	
HMX	25.97	21.660	83	29	135
RDX	25.97	21.400	82	44	125
1,3,5-Trinitrobenzene	25.97	22.750	88	52	125
1,3-Dinitrobenzene	25.97	22.650	87	53	122
Tetryl	25.97	23.080	89	33	138
Nitrobenzene	25.97	21.950	85	40	134
2,4,6-Trinitrotoluene	25.97	22.720	87	51	134
4-Amino-2,6-Dinitrotoluene	25.97	22.690	87	60	125
2-Amino-4,6-Dinitrotoluene	25.97	22.260	86	61	125
2,6-Dinitrotoluene	25.97	22.490	87	49	132
2,4-Dinitrotoluene	25.97	23.160	89	55	129
2-Nitrotoluene	25.97	22.790	88	41	140
4-Nitrotoluene	25.97	23.140	89	39	142
3-Nitrotoluene	25.97	24.020	92	40	145

* = Recovery exceeded control limit

Form BLKSPK-1

MS/MSD Report

Lab Name : LAUCKS TESTING LABS

Client ID : 030-GW-002-01

Description : Ordnance by 8330

(Database Reference: K101899_HSVW01)

Lab ID : 9910380-03
Matrix : WATER
Units : UG/L

Matrix Spike Data

Analyte	Spike Added	Sample Found	MS Found	MS Rec	Recovery Limits	
HMX	26.000	0	24.300	94	10	96
RDX	26.000	0	23.700	91	47	125
1,3,5-Trinitrobenzene	26.000	0	24.500	94	44	142
1,3-Dinitrobenzene	26.000	0	24.700	95	32	122
Tetryl	26.000	0	24.800	95	27	109
Nitrobenzene	26.000	0	24.400	94	31	99
2,4,6-Trinitrotoluene	26.000	0	24.000	92	59	114
4-Amino-2,6-Dinitrotoluene	26.000	0	23.900	92	58	117
2-Amino-4,6-Dinitrotoluene	26.000	0	23.700	91	58	117
2,6-Dinitrotoluene	26.000	0	23.800	92	38	106
2,4-Dinitrotoluene	26.000	0	24.500	94	42	110
2-Nitrotoluene	26.000	0	24.400	94	30	99
4-Nitrotoluene	26.000	0	24.700	95	31	100
3-Nitrotoluene	26.000	0	24.900	96	28	105

Matrix Spike Duplicate Data

Analyte	Spike Added	MSD Found	MSD Rec	RPD	Control Limits Recov		RPD
HMX	26.000	23.200	89	5	10	96	30
RDX	26.000	23.000	88	3	47	125	30
1,3,5-Trinitrobenzene	26.000	23.900	92	2	44	142	30
1,3-Dinitrobenzene	26.000	23.900	92	3	32	122	30
Tetryl	26.000	24.700	95	0	27	109	30
Nitrobenzene	26.000	23.400	90	4	31	99	30
2,4,6-Trinitrotoluene	26.000	23.500	90	2	59	114	30
4-Amino-2,6-Dinitrotoluene	26.000	23.200	89	3	58	117	30
2-Amino-4,6-Dinitrotoluene	26.000	23.100	89	2	58	117	30
2,6-Dinitrotoluene	26.000	23.300	90	2	38	106	30
2,4-Dinitrotoluene	26.000	24.100	93	1	42	110	30
2-Nitrotoluene	26.000	23.800	92	2	30	99	30
4-Nitrotoluene	26.000	24.100	93	2	31	100	30
3-Nitrotoluene	26.000	24.500	94	2	28	105	30

Comments

Form MS/MSD-1

Laucks Testing Labs, Inc.
Initial Calibration Linearity Summary

Start Cal Date: 05-OCT-99 15:13:49
End Cal Date : 05-OCT-99 17:50:21
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC3.i/3100599A.b/3A05901.m
Sublist : all.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC3.i/3100599A.b/3A05903.d
Level 2: /chem/HPLC3.i/3100599A.b/3A05904.d
Level 3: /chem/HPLC3.i/3100599A.b/3A05905.d
Level 4: /chem/HPLC3.i/3100599A.b/3A05906.d
Level 5: /chem/HPLC3.i/3100599A.b/3A05907.d/3A05907.dat
Level 6: /chem/HPLC3.i/3100599A.b/3A05908.d/3A05908.dat

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave CF	%RSD
1 HMX	754.2200	687.2400	679.4040	670.4180	650.4108	643.9509	680.9406	5.8
2 RDX	829.5000	798.8500	841.8480	856.0130	839.7942	839.6703	834.2792	2.3
3 1,3,5-Trinitrobenzene	1868.300	1869.950	1862.882	1882.517	1858.038	1859.371	1866.843	0.5
5 1,3-Dinitrobenzene	2616.760	2470.330	2421.392	2475.819	2411.862	2331.474	2454.606	3.9
6 Tetryl	1277.780	1533.610	1547.078	1593.954	1601.861	1669.542	1527.304	8.7
7 Nitrobenzene	1688.240	1649.440	1610.422	1645.834	1603.386	1575.425	1628.791	2.5
8 2,4,6-Trinitrotoluene	2056.080	1955.390	1907.286	1934.275	1910.717	1943.095	1951.140	2.8
9 4-Amino-2,6-Dinitrotoluene	1410.300	1256.210	1223.734	1254.465	1205.221	1203.023	1258.825	6.2
10 2-Amino-4,6-Dinitrotoluene	1950.520	1857.600	1793.206	1810.648	1775.013	1782.682	1828.278	3.6
11 2,6-Dinitrotoluene	1392.400	1230.140	1197.186	1216.615	1196.440	1196.055	1238.139	6.2

Amount = Response divided by CF

CF - Calibration Factor (response divided by concentration).
RSD - Relative Standard Deviation.

Laucks Testing Labs, Inc.
Initial Calibration Linearity Summary

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave CF	%RSD
12 2,4-Dinitrotoluene	2444.340	2308.430	2291.574	2347.008	2308.866	2317.959	2336.363	2.4
13 2-Nitrotoluene	1077.360	1083.120	1044.532	1073.493	1049.347	1054.297	1063.691	1.5
14 4-Nitrotoluene	869.5000	926.1200	883.4300	911.9270	894.2746	899.6808	897.4887	2.2
15 3-Nitrotoluene	1060.080	1230.120	1148.060	1179.247	1157.127	1161.625	1156.043	4.8
4 1,2-Dinitrobenzene	1263.820	1216.200	1207.994	1220.586	1205.444	1202.679	1219.454	1.9

Amount = Response divided by CF

CF - Calibration Factor (response divided by concentration).
RSD - Relative Standard Deviation.

Laucks Testing Labs, Inc.
Initial Calibration Retention Time Summary

Start Cal Date: 05-OCT-99 15:13:49
End Cal Date : 05-OCT-99 17:50:21
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC3.i/3100599A.b/3A05901.m
Sublist : all.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC3.i/3100599A.b/3A05903.d
Level 2: /chem/HPLC3.i/3100599A.b/3A05904.d
Level 3: /chem/HPLC3.i/3100599A.b/3A05905.d
Level 4: /chem/HPLC3.i/3100599A.b/3A05906.d
Level 5: /chem/HPLC3.i/3100599A.b/3A05907.d/3A05907.dat
Level 6: /chem/HPLC3.i/3100599A.b/3A05908.d/3A05908.dat

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave RT
1 HMX	3.42	3.42	3.42	3.42	3.43	3.42	3.423
2 RDX	5.39	5.40	5.40	5.40	5.40	5.40	5.399
3 1,3,5-Trinitrobenzene	7.00	7.01	7.01	7.01	7.00	7.00	7.006
5 1,3-Dinitrobenzene	9.21	9.22	9.22	9.22	9.21	9.20	9.214
6 Tetryl	9.49	9.52	9.53	9.53	9.53	9.53	9.522
7 Nitrobenzene	10.73	10.74	10.74	10.74	10.73	10.72	10.734
8 2,4,6-Trinitrotoluene	11.17	11.18	11.18	11.18	11.18	11.18	11.179
9 4-Amino-2,6-Dinitrotoluene	12.11	12.13	12.13	12.13	12.14	12.14	12.131
10 2-Amino-4,6-Dinitrotoluene	12.84	12.85	12.85	12.85	12.86	12.86	12.851
11 2,6-Dinitrotoluene	13.79	13.80	13.81	13.81	13.81	13.80	13.805

Retention times are expressed as minutes.

Laucks Testing Labs, Inc.
Initial Calibration Retention Time Summary

Start Cal Date: 05-OCT-99 15:13:49
End Cal Date : 05-OCT-99 17:50:21
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC3.i/3100599A.b/3A05901.m
Sublist : all.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave RT
12 2,4-Dinitrotoluene	14.64	14.66	14.66	14.66	14.65	14.64	14.651
13 2-Nitrotoluene	17.19	17.23	17.22	17.22	17.22	17.22	17.218
14 4-Nitrotoluene	18.69	18.71	18.69	18.70	18.68	18.65	18.687
15 3-Nitrotoluene	19.96	19.98	19.98	19.98	19.98	19.96	19.974
4 1,2-Dinitrobenzene	8.10	8.11	8.11	8.11	8.11	8.11	8.109

Retention times are expressed as minutes.

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Laucks Testing Labs, Inc.
Initial Calibration Amounts Summary

Start Cal Date: 05-OCT-99 15:13:49
End Cal Date : 05-OCT-99 17:50:21
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC3.i/3100599A.b/3A05901.m
Sublist : all.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC3.i/3100599A.b/3A05903.d
Level 2: /chem/HPLC3.i/3100599A.b/3A05904.d
Level 3: /chem/HPLC3.i/3100599A.b/3A05905.d
Level 4: /chem/HPLC3.i/3100599A.b/3A05906.d
Level 5: /chem/HPLC3.i/3100599A.b/3A05907.d/3A05907.dat
Level 6: /chem/HPLC3.i/3100599A.b/3A05908.d/3A05908.dat

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
1 HMX	50.00	100.00	500.00	1000.00	5000.00	10000.00
2 RDX	50.00	100.00	500.00	1000.00	5000.00	10000.00
3 1,3,5-Trinitrobenzene	50.00	100.00	500.00	1000.00	5000.00	10000.00
5 1,3-Dinitrobenzene	50.00	100.00	500.00	1000.00	5000.00	10000.00
6 Tetryl	50.00	100.00	500.00	1000.00	5000.00	10000.00
7 Nitrobenzene	50.00	100.00	500.00	1000.00	5000.00	10000.00
8 2,4,6-Trinitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
9 4-Amino-2,6-Dinitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
10 2-Amino-4,6-Dinitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
11 2,6-Dinitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00

$50\ ug/L \times \frac{10\ ml}{770\ ml}$

$= 0.65\ ug/L$

Standard concentrations are expressed as ng/mL. (ug/L)

low STD: ~~[illegible]~~ 50 ug/L which is lower than all QAPP RL's for target cm

∴ All non-detected results should be based

10/06/[illegible] 09:27 ICAL Standard Concentrations Summary v2.0 Page 1

Laucks Testing Labs, Inc.
Initial Calibration Amounts Summary

Start Cal Date: 05-OCT-99 15:13:49
End Cal Date : 05-OCT-99 17:50:21
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC3.i/3100599A.b/3A05901.m
Sublist : all.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
12 2,4-Dinitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
13 2-Nitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
14 4-Nitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
15 3-Nitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
4 1,2-Dinitrobenzene	50.00	100.00	500.00	1000.00	5000.00	10000.00

Standard concentrations are expressed as ng/mL.

Laucks Testing Labs, Inc.
Initial Calibration Response Summary

Start Cal Date: 05-OCT-99 15:13:49
End Cal Date : 05-OCT-99 17:50:21
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC3.i/3100599A.b/3A05901.m
Sublist : all.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC3.i/3100599A.b/3A05903.d
Level 2: /chem/HPLC3.i/3100599A.b/3A05904.d
Level 3: /chem/HPLC3.i/3100599A.b/3A05905.d
Level 4: /chem/HPLC3.i/3100599A.b/3A05906.d
Level 5: /chem/HPLC3.i/3100599A.b/3A05907.d/3A05907.dat
Level 6: /chem/HPLC3.i/3100599A.b/3A05908.d/3A05908.dat

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
1 HMX	37711.000	68724.000	339702.00	670418.00	3252054.0	6439509.0
2 RDX	41475.000	79885.000	420924.00	856013.00	4198971.0	8396703.0
3 1,3,5-Trinitrobenzene	93415.000	186995.00	931441.00	1882517.0	9290190.0	18593713
5 1,3-Dinitrobenzene	130838.00	247033.00	1210696.0	2475819.0	12059311	23314740
6 Tetryl	63889.000	153361.00	773539.00	1533954.0	8009303.0	16695424
7 Nitrobenzene	84412.000	164944.00	805211.00	1645834.0	8016929.0	15754250
8 2,4,6-Trinitrotoluene	102804.00	195539.00	953643.00	1934275.0	9553586.0	19430949
9 4-Amino-2,6-Dinitrotoluene	70515.000	125621.00	611867.00	1254465.0	6026106.0	12030226
10 2-Amino-4,6-Dinitrotoluene	97526.000	185760.00	896603.00	1810648.0	8875066.0	17826824
11 2,6-Dinitrotoluene	69620.000	123014.00	598593.00	1216615.0	5982198.0	11960550

Response is in Area units

Laucks Testing Labs, Inc.
Initial Calibration Response Summary

Start Cal Date: 05-OCT-99 15:13:49
End Cal Date : 05-OCT-99 17:50:21
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC3.i/3100599A.b/3A05901.m
Sublist : all.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
12 2,4-Dinitrotoluene	122217.00	230843.00	1145787.0	2347008.0	11544331	23179592
13 2-Nitrotoluene	53868.000	108312.00	522266.00	1073493.0	5246735.0	10542966
14 4-Nitrotoluene	43475.000	92612.000	441715.00	911927.00	4471373.0	8996808.0
15 3-Nitrotoluene	53004.000	123012.00	574030.00	1179247.0	5785635.0	11616248
4 1,2-Dinitrobenzene	63191.000	121620.00	603997.00	1220586.0	6027219.0	12028790

Response is in Area units.

Laucks Testing Labs, Inc.
Initial Calibration Linearity Summary

Start Cal Date: 06-OCT-99 11:08:45
End Cal Date : 06-OCT-99 14:03:37
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC4.i/4100699A.b/4A06901.m
Sublist : all.sub
Column : CN
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC4.i/4100699A.b/4A06903.d
Level 2: /chem/HPLC4.i/4100699A.b/4A06904.d
Level 3: /chem/HPLC4.i/4100699A.b/4A06905.d
Level 4: /chem/HPLC4.i/4100699A.b/4A06906.d
Level 5: /chem/HPLC4.i/4100699A.b/4A06907.d
Level 6: /chem/HPLC4.i/4100699A.b/4A06908.d

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave CF	%RSD
1 Nitrobenzene	144.0800	145.3400	147.4220	149.8760	146.5880	147.6115	146.8196	1.4
2 135TNB/13DNB	210.1400	204.9350	201.2580	205.2100	200.7747	203.3606	204.2797	1.7
3 2NT/4NT/3NT	95.04000	96.65667	95.47133	97.02233	95.07647	94.46430	95.62185	1.0
4 26DNT	118.8200	113.1800	109.0420	111.9270	106.7962	109.3517	111.5195	3.8
5 24DNT	234.3400	219.1000	213.2120	217.0240	212.4996	213.0823	218.2096	3.8
6 246TNT	185.8000	172.3500	164.4020	166.8280	164.1920	164.5045	169.6794	5.0
8 4-Amino-2,6-Dinitrotoluene	132.9200	118.1600	113.5840	115.5130	111.1066	111.8122	117.1826	6.9
9 2-Amino-4,6-Dinitrotoluene	172.5000	161.2400	155.9780	157.0870	153.7422	154.3611	159.1514	4.4
10 RDX	88.28000	86.88000	77.88400	78.17300	75.73600	76.13960	80.51543	6.9
11 Tetryl	106.3400	124.5000	125.2640	115.5460	111.8916	107.3985	115.1567	7.1

Amount = Response divided by CF

CF - Calibration Factor (response divided by concentration).
RSD - Relative Standard Deviation.

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Laucks Testing Labs, Inc.
Initial Calibration Linearity Summary

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave CF	%RSD
12 HMX	65.02000	61.78000	57.82200	58.92600	56.83020	56.82370	59.53365	5.5
7 1,2-Dinitrobenzene	137.3400	115.1100	109.3380	108.2980	109.1484	107.2201	114.4091	10.1

Amount = Response divided by CF

CF - Calibration Factor (response divided by concentration).
RSD - Relative Standard Deviation.

Laucks Testing Labs, Inc.
Initial Calibration Retention Time Summary

Start Cal Date: 06-OCT-99 11:08:45
End Cal Date : 06-OCT-99 14:03:37
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC4.i/4100699A.b/4A06901.m
Sublist : all.sub
Column : CN
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC4.i/4100699A.b/4A06903.d
Level 2: /chem/HPLC4.i/4100699A.b/4A06904.d
Level 3: /chem/HPLC4.i/4100699A.b/4A06905.d
Level 4: /chem/HPLC4.i/4100699A.b/4A06906.d
Level 5: /chem/HPLC4.i/4100699A.b/4A06907.d
Level 6: /chem/HPLC4.i/4100699A.b/4A06908.d

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave RT
1 Nitrobenzene	6.97	6.97	6.97	6.97	6.97	6.97	6.971
2 135TNB/13DNB	8.09	8.07	8.07	8.08	8.07	8.08	8.077
3 2NT/4NT/3NT	8.52	8.50	8.51	8.52	8.50	8.52	8.513
4 26DNT	9.86	9.83	9.84	9.85	9.84	9.86	9.848
5 24DNT	10.24	10.20	10.21	10.21	10.21	10.22	10.214
6 246TNT	10.71	10.68	10.69	10.69	10.69	10.70	10.695
8 4-Amino-2,6-Dinitrotoluene	12.40	12.36	12.37	12.39	12.38	12.40	12.384
9 2-Amino-4,6-Dinitrotoluene	13.41	13.33	13.35	13.36	13.36	13.38	13.363
10 RDX	14.93	14.85	14.86	14.86	14.87	14.88	14.874
11 Tetryl	20.57	20.53	20.53	20.52	20.53	20.54	20.536

Retention times are expressed as minutes.

Laucks Testing Labs, Inc.
Initial Calibration Retention Time Summary

Start Cal Date: 06-OCT-99 11:08:45
End Cal Date : 06-OCT-99 14:03:37
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC4.i/4100699A.b/4A06901.m
Sublist : all.sub
Column : CN
Column Size : 0m L - 4.60mm ID

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave RT
12 HMX	26.60	26.47	26.52	26.48	26.50	26.48	26.509
7 1,2-Dinitrobenzene	11.18	11.12	11.14	11.14	11.14	11.16	11.145

Retention times are expressed as minutes.

Laucks Testing Labs, Inc.
Initial Calibration Amounts Summary

Start Cal Date: 06-OCT-99 11:08:45
End Cal Date : 06-OCT-99 14:03:37
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC4.i/4100699A.b/4A06901.m
Sublist : all.sub
Column : CN
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC4.i/4100699A.b/4A06903.d
Level 2: /chem/HPLC4.i/4100699A.b/4A06904.d
Level 3: /chem/HPLC4.i/4100699A.b/4A06905.d
Level 4: /chem/HPLC4.i/4100699A.b/4A06906.d
Level 5: /chem/HPLC4.i/4100699A.b/4A06907.d
Level 6: /chem/HPLC4.i/4100699A.b/4A06908.d

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
1 Nitrobenzene	50.00	100.00	500.00	1000.00	5000.00	10000.00
2 135TNB/13DNB	100.00	200.00	1000.00	2000.00	10000.00	20000.00
3 2NT/4NT/3NT	150.00	300.00	1500.00	3000.00	15000.00	30000.00
4 26DNT	50.00	100.00	500.00	1000.00	5000.00	10000.00
5 24DNT	50.00	100.00	500.00	1000.00	5000.00	10000.00
6 246TNT	50.00	100.00	500.00	1000.00	5000.00	10000.00
8 4-Amino-2,6-Dinitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
9 2-Amino-4,6-Dinitrotoluene	50.00	100.00	500.00	1000.00	5000.00	10000.00
10 RDX	50.00	100.00	500.00	1000.00	5000.00	10000.00
11 Tetryl	50.00	100.00	500.00	1000.00	5000.00	10000.00

Standard concentrations are expressed as ng/mL.

Laucks Testing Labs, Inc.
Initial Calibration Amounts Summary

Start Cal Date: 06-OCT-99 11:08:45
End Cal Date : 06-OCT-99 14:03:37
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC4.i/4100699A.b/4A06901.m
Sublist : all.sub
Column : CN
Column Size : 0m L - 4.60mm ID

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
12 HMX	50.00	100.00	500.00	1000.00	5000.00	10000.00
7 1,2-Dinitrobenzene	50.00	100.00	500.00	1000.00	5000.00	10000.00

Standard concentrations are expressed as ng/mL.

Laucks Testing Labs, Inc.
Initial Calibration Response Summary

Start Cal Date: 06-OCT-99 11:08:45
End Cal Date : 06-OCT-99 14:03:37
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC4.i/4100699A.b/4A06901.m
Sublist : all.sub
Column : CN
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: /chem/HPLC4.i/4100699A.b/4A06903.d
Level 2: /chem/HPLC4.i/4100699A.b/4A06904.d
Level 3: /chem/HPLC4.i/4100699A.b/4A06905.d
Level 4: /chem/HPLC4.i/4100699A.b/4A06906.d
Level 5: /chem/HPLC4.i/4100699A.b/4A06907.d
Level 6: /chem/HPLC4.i/4100699A.b/4A06908.d

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
1 Nitrobenzene	7204.0000	14534.000	73711.000	149876.00	732940.00	1476115.0
2 135TNB/13DNB	21014.000	40987.000	201258.00	410420.00	2007747.0	4067212.0
3 2NT/4NT/3NT	14256.000	28997.000	143207.00	291067.00	1426147.0	2833929.0
4 26DNT	5941.0000	11318.000	54521.000	111927.00	533981.00	1093517.0
5 24DNT	11717.000	21910.000	106606.00	217024.00	1062498.0	2130823.0
6 246TNT	9290.0000	17235.000	82201.000	166828.00	820960.00	1645045.0
8 4-Amino-2,6-Dinitrotoluene	6646.0000	11816.000	56792.000	115513.00	555533.00	1118122.0
9 2-Amino-4,6-Dinitrotoluene	8625.0000	16124.000	77989.000	157087.00	768711.00	1543611.0
10 RDX	4414.0000	8688.0000	38942.000	78173.000	378680.00	761396.00
11 Tetryl	5317.0000	12450.000	62632.000	115546.00	559458.00	1073985.0

Response is in Area units.

Laucks Testing Labs, Inc.
Initial Calibration Response Summary

Start Cal Date: 06-OCT-99 11:08:45
End Cal Date : 06-OCT-99 14:03:37
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : /chem/HPLC4.i/4100699A.b/4A06901.m
Sublist : all.sub
Column : CN
Column Size : 0m L - 4.60mm ID

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
12 HMX	3251.0000	6178.0000	28911.000	58926.000	284151.00	568237.00
7 1,2-Dinitrobenzene	6867.0000	11511.000	54669.000	108298.00	545742.00	1072201.0

Response is in Area units.

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7395-

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-12-9-063

TO:	**R. CLARK**	**DATE:**	**DECEMBER 17, 1999**
FROM:	**GRETCHEN A. PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –TOTAL AND DISSOLVED APPENDIX IX METALS, AMMONIA, CYANIDE, NITRATE/NITRITE, TOTAL KJELDAHL NITROGEN, PHOSPHORUS AND DISSOLVED PHOSPHORUS**
CTO 019 – NSWC CRANE
SDG – C1901

SAMPLES: 20/Aqueous/

030-FB-001-01	030-GW-001-01	030-GW-001-01-F
030-GW-002-01	030-GW-002-01-F	030-GW-003-01
030-GW-003-01-F	030-GW-004-01	030-GW-004-01-F
030-GW-005-01	030-GW-005-01-F	030-GW-006-01
030-GW-006-01-F	030-GW-007-01	030-GW-007-01-F
030-IW-001-01	030-RB-001-01	030-RB-001-01-F
DUP-GW-001-01	DUP-GW-001-01-F	

Overview

The sample set for CTO 019, NSWC Crane, SDG C1901, consists of seventeen (17) aqueous environmental samples, one (1) field blank (030-FB-001-01) and two (2) rinsate blanks (030-RB-001-01 and 030-RB-001-01-F). Two (2) field duplicate pairs (030-GW-007-01 / DUP-GW-001-01 and 030-GW-007-01-F / DUP-GW-001-01-F) were included within this SDG.

All samples, with exception to those designated –F, were analyzed for Appendix IX metals, ammonia, cyanide, nitrate/nitrite, total kjeldahl nitrogen (TKN) and total phosphorus. The samples designated –F were analyzed for dissolved Appendix IX metals, and dissolved phosphorus. The samples were collected by Tetra Tech NUS on October 11-13, 1999 and analyzed by Laucks Testing Labs, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria.

Metals analyses, with the exception of mercury, were conducted using SW 846 method 6020. Mercury analyses were conducted using SW 846 method 7470A. Cyanide analyses were conducted using SW 846 method 9012A. Ammonia analyses were conducted using EPA method 350.1. Nitrate/Nitrite analyses were conducted using EPA method 353.2. Total and dissolved phosphorus analyses were conducted using EPA method 365.2. TKN analyses were conducted using EPA method 351.2.

These data were evaluated based on the following parameters:

- Data Completeness
- Holding Times
- Calibration Verifications

- Laboratory Blank / Field Blank Analyses
- * Laboratory Duplicate Results
- * Field Duplicate Results
- * Matrix Spike Analyses
- * Post Digestion Spike Analyses
- * Laboratory Control Sample Results
- * Sample Quanitation
- * Detection Limits

* - All quality control criteria were met for this parameter.

Holding Times

The twenty-eight (28) day holding time for total and dissolved phosphate analyses was exceeded by one (1) day affecting samples 030-RB-001-01 and 030-RB-001-01-F. The nondetected results reported for total and dissolved phosphorus in the affected samples were qualified as estimated, "UJ".

The twenty-eight (28) day holding time for TKN was exceeded by one (1) to two (2) days affecting samples 030-GW-002-01, 030-GW-007-01, 030-RB-001-01 and DUP-GW-001-01. The nondetected results reported for TKN in samples 030-GW-002-01, 030-GW-007-01 and 030-RB-001-01 were qualified as estimated, "UJ". The positive result reported for TKN in sample DUP-GW-001-01 was qualified for blank contamination.

Laboratory Blank Analyses

The following contaminants were detected in the field quality control blanks at the following maximum concentrations:

Samples affected: All

Analyte	Maximum Concentration	Action Level
TKN[1]	5 mg/L	2.5 mg/L
Ammonia[2]	0.02 mg/L	0.10 mg/L

[1] Maximum concentration found in the field blank.
[2] Maximum concentration found in a rinsate blank.

An action level of 5X the maximum concentration has been used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluating for blank contamination. Positive results less than the action level for TKN were qualified as nondetected "U". Positive results greater than the action level for ammonia were qualified as estimated, "J". It should be noted that field quality control blanks are not qualified for blank contamination.

Notes

The Contract Required Detection Limit (CRDL) Percent Recoveries (%Rs) for several analytes affecting both the total and dissolved metals were outside the 80-120% quality control limit. No validation action was required per Region V guidance.

A Continuing Calibration Verification (CCV) Percent Recovery (%R) for tin was >110% quality control limit. However, no validation action was required as all results reported for tin were nondetects.

A comparison of field duplicate pairs (030-GW-007-01 / DUP-GW-001-01 and 030-GW-007-01-F / DUP-GW-001-01-F) is included in Appendix C.

The QUAPP requested selenium be reported to 1.0µg/L. The laboratory reported to 5.6µg/L.

Executive Summary

Laboratory Performance: The holding times for total and dissolved phosphate and TKN were exceeded affecting some samples.

Other Factors Affecting Data Quality: TKN and ammonia were present in the field quality control blanks.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994, "EPA Region V Standard Operating Procedures for Validation of CLP Inorganic Review", September 1993, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-FB-001-01			030-GW-001-01			030-GW-001-01-F			030-GW-002-01		
SAMPLE DATE:	10/13/99			10/13/99			10/13/99			10/12/99		
LABORATORY ID:	9910417-02			9910380-05			9910380-11			9910380-03		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01			0.01	U					0.01	U	
CYANIDE	0.005	U		0.005	U					0.005	U	
NITRATE/NITRITE, AS N	0.01	U		0.99						1		
TOTAL KJELDAHL NITROGEN	5			0.4	U	B				0.3	U	B
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

CTO - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-002-01-F			030-GW-003-01			030-GW-003-01-F			030-GW-004-01		
SAMPLE DATE:	10/12/99			10/13/99			10/13/99			10/13/99		
LABORATORY ID:	9910380-09			9910380-06			9910380-12			9910417-03		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN				0.01	U					0.14	J	B
CYANIDE				0.005	U					0.005	U	
NITRATE/NITRITE, AS N				0.42						0.03		
TOTAL KJELDAHL NITROGEN				0.4	U	B				1.1	U	B
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-004-01-F			030-GW-005-01			030-GW-005-01-F			030-GW-006-01		
SAMPLE DATE:	10/13/99			10/14/99			10/14/99			10/14/99		
LABORATORY ID:	9910417-07			9910417-04			9910417-08			9910417-05		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN				0.01	U					0.01	U	
CYANIDE				0.005	U					0.005	U	
NITRATE/NITRITE, AS N				7.2						5.2		
TOTAL KJELDAHL NITROGEN				0.3	U					0.3	U	
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

CTO - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-006-01-F			030-GW-007-01			030-GW-007-01-F			030-IW-001-01		
SAMPLE DATE:	10/14/99			10/12/99			10/12/99			10/14/99		
LABORATORY ID:	9910417-09			9910380-02			9910380-08			9910417-06		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN				0.01	U					0.01	U	
CYANIDE				0.005	U					0.005	U	
NITRATE/NITRITE, AS N				0.3						1.2		
TOTAL KJELDAHL NITROGEN				0.3	UJ	H				0.6	U	B
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-RB-001-01			030-RB-001-01-F			DUP-GW-001-01			DUP-GW-001-01-F		
SAMPLE DATE:	10/11/99			10/11/99			10/12/99			10/12/99		
LABORATORY ID:	9910380-01			9910380-07			9910380-04			9910380-10		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.02						0.01	U				
CYANIDE	0.005	U					0.005	U				
NITRATE/NITRITE, AS N	0.01	U					0.32					
TOTAL KJELDAHL NITROGEN	0.3	UJ	H				0.4	U	B			
TOTAL PHOSPHORUS AS P	0.1	UJ	H	0.1	UJ	H	0.1	U		0.1	U	

CTO[illegible] - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-FB-001-01			030-GW-001-01			030-GW-001-01-F			030-GW-002-01		
SAMPLE DATE:	10/13/99			10/13/99			10/13/99			10/12/99		
LABORATORY ID:	9910417-02			9910380-05			9910380-11			9910380-03		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.1	U		4.3			3.1			3.4		
BARIUM	1.1	U		7.2			7.7			7.6		
BERYLLIUM	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	
CHROMIUM	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	
COPPER	2.2	U		2.2	U		2.2	U		2.2	U	
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	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	
SELENIUM	5.6	U		5.6	U		5.6	U		8.4		
SILVER	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	
TIN	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	
ZINC	11.1	U		13.3			13.2			11.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-002-01-F			030-GW-003-01			030-GW-003-01-F			030-GW-004-01		
SAMPLE DATE:	10/12/99			10/13/99			10/13/99			10/13/99		
LABORATORY ID:	9910380-09			9910380-06			9910380-12			9910417-03		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	2.9			1.1	U		1.1	U		2.8		
BARIUM	7.0			22.7			19.2			23.8		
BERYLLIUM	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	
CHROMIUM	5.6	U		5.6	U		5.6	U		5.6	U	
COBALT	3.3	U		3.3	U		3.3	U		8.7		
COPPER	2.2	U		2.2	U		2.2	U		4.1		
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.20	U		0.20	U		0.20	U		0.20	U	
NICKEL	11.1	U		11.1	U		11.1	U		21.3		
SELENIUM	7.9			5.6	U		5.6	U		5.6	U	
SILVER	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	
TIN	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	
ZINC	11.1	U		11.1	U		11.1	U		40.8		

CTC[illegible] - NSWC CRANE
WAT[illegible] DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-004-01-F	030-GW-005-01	030-GW-005-01-F	030-GW-006-01
SAMPLE DATE:	10/13/99	10/14/99	10/14/99	10/14/99
LABORATORY ID:	9910417-07	9910417-04	9910417-08	9910417-05
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	11.7	U		1.1	U		1.1	U		1.1	U	
ARSENIC	3.1			2.2			1.7			2.2		
BARIUM	29.2			27.7			23.3			5.4		
BERYLLIUM	1.1	U		1.1	U		1.1	U		1.1	U	
CADMIUM	1.2			1.1	U		1.1	U		1.1	U	
CHROMIUM	5.6	U		5.6	U		5.6	U		5.6	U	
COBALT	9.4			3.3	U		3.3	U		3.3	U	
COPPER	5.3			2.2	U		2.2	U		2.4		
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.20	U		0.20	U		0.20	U		0.20	U	
NICKEL	24.3			11.1	U		11.1	U		11.1	U	
SELENIUM	5.6	U		5.6	U		5.6	U		12.6		
SILVER	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	
TIN	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	
ZINC	45.4			11.1	U		11.1	U		13.0		

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-GW-006-01-F			030-GW-007-01			030-GW-007-01-F			030-IW-001-01		
SAMPLE DATE:	10/14/99			10/12/99			10/12/99			10/14/99		
LABORATORY ID:	9910417-09			9910380-02			9910380-08			9910417-06		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.6			1.1			1.3			2.8		
BARIUM	6.0			14.1			13.0			13.8		
BERYLLIUM	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	
CHROMIUM	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	
COPPER	2.2	U		2.2	U		2.2	U		4.3		
LEAD	1.1	U		1.1	U		1.1	U		1.4		
MERCURY	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	
SELENIUM	15.4			5.6	U		5.6	U		5.6	U	
SILVER	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	
TIN	11.1	U		11.1	U		11.1	U		1.1	U	
VANADIUM	2.2	U		2.2	U		2.2	U		2.2	U	
ZINC	11.1	U		17.2			12.9			47.8		

CTC - NSWC CRANE
WA DATA
LAUCKS
SDG: C1901

SAMPLE NUMBER:	030-RB-001-01			030-RB-001-01-F			DUP-GW-001-01			DUP-GW-001-01-F		
SAMPLE DATE:	10/11/99			10/11/99			10/12/99			10/12/99		
LABORATORY ID:	9910380-01			9910380-07			9910380-04			9910380-10		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.1	U		1.1	U		1.6			1.3		
BARIUM	1.1	U		1.1	U		14.1			13.1		
BERYLLIUM	1.1	U		1.1	U		1.1	U		1.1	U	
CADMIUM	1.1	U		1.1	U		1.0	U		1.1	U	
CHROMIUM	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	
COPPER	2.2	U		2.2	U		2.2	U		2.2	U	
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	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	
SELENIUM	5.6	U		5.6	U		5.6	U		5.6	U	
SILVER	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	
TIN	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	
ZINC	11.1	U		11.1	U		15.6			12.9		

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-FB-001-01
SDG No. : C1901 Lab Sample ID: 9910417-02
Matrix : WATER Date Received: 10/15/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01		mg/L	11/05/99	11/05/99	0.01	EPA 350.1
Nitrate + Nitrite as N	0.01	U	mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	5.0		mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1901
Matrix : WATER

Sample ID : 030-GW-001-01
Lab Sample ID: 9910380-05
Date Received: 10/14/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350.1
Nitrate + Nitrite as N	0.99		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.4		mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-001-01F
SDG No. : C1901 Lab Sample ID: 9910380-1I
Matrix : WATER Date Received: 10/14/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-002-01
SDG No. : C1901 Lab Sample ID: 9910380-03
Matrix : WATER Date Received: 10/14/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350 1
Nitrate + Nitrite as N	1.0		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3		mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-002-01F
SDG No. : C1901 Lab Sample ID: 9910380-09
Matrix : WATER Date Received: 10/14/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-003-01
SDG No. : C1901 Lab Sample ID: 9910380-06
Matrix : WATER Date Received: 10/14/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350 1
Nitrate + Nitrite as N	0.42		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.4		mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-003-01F
SDG No. : C1901 Lab Sample ID: 9910380-12
Matrix : WATER Date Received: 10/14/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-004-01
SDG No. : C1901 Lab Sample ID: 9910417-03
Matrix : WATER Date Received: 10/15/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.14		mg/L	11/05/99	11/05/99	0.01	EPA 350 1
Nitrate + Nitrite as N	0.03		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	1.1		mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-004-01F
SDG No. : C1901 Lab Sample ID: 9910417-07
Matrix : WATER Date Received: 10/15/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1901
Matrix : WATER

Sample ID : 030-GW-005-01
Lab Sample ID: 9910417-04
Date Received: 10/15/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350 1
Nitrate + Nitrite as N	7.2		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3	U	mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-005-01F
SDG No. : C1901 Lab Sample ID: 9910417-08
Matrix : WATER Date Received: 10/15/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus-as-P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-006-01
SDG No. : C1901 Lab Sample ID: 9910417-05
Matrix : WATER Date Received: 10/15/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350 1
Nitrate + Nitrite as N	5.2		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3	U	mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-006-01F
SDG No. : C1901 Lab Sample ID: 9910417-09
Matrix : WATER Date Received: 10/15/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1901
Matrix : WATER

Sample ID : 030-GW-007-01
Lab Sample ID: 9910380-02
Date Received: 10/14/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350 1
Nitrate + Nitrite as N	0.30		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3	U	mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-GW-007-01F
SDG No. : C1901 Lab Sample ID: 9910380-08
Matrix : WATER Date Received: 10/14/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1901
Matrix : WATER

Sample ID : 030-IW-001-01
Lab Sample ID: 9910417-08
Date Received: 10/15/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350 1
Nitrate + Nitrite as N	1.2		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.6		mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 030-RB-001-01
SDG No. : C1901 Lab Sample ID: 9910380-01
Matrix : WATER Date Received: 10/14/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.02		mg/L	11/05/99	11/05/99	0.01	EPA 350.1
Nitrate + Nitrite as N	0.01	U	mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3	U	mg/L	11/05/99	11/10/99	0.3	EPA 351.2

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INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1901
Matrix : WATER

Sample ID : 030-RB-001-01F
Lab Sample ID: 9910380-07
Date Received: 10/14/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1901
Matrix : WATER

Sample ID : DUP-GW-001-01
Lab Sample ID: 9910380-04
Date Received: 10/14/99

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.005	U	mg/L	10/21/99	10/25/99	0.005	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	11/05/99	11/05/99	0.01	EPA 350.1
Nitrate + Nitrite as N	0.32		mg/L	11/08/99	11/08/99	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.4		mg/L	11/05/99	11/10/99	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : DUP-GW-001-01F
SDG No. : C1901 Lab Sample ID: 9910380-10
Matrix : WATER Date Received: 10/14/99

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	11/08/99	11/09/99	0.10	EPA 365.2

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: GFB001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Matrix (soil/water): WATER Lab Sample ID: 10417-02

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1	U		M
7440-39-3	Barium	1.1	U		M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-FB-001-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: EGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Matrix (soil/water): WATER Lab Sample ID: 10380-05

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	4.3			M
7440-39-3	Barium	7.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	13.3			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-001-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: EGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Matrix (soil/water): WATER Lab Sample ID: 10380-11

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	3.1			M
7440-39-3	Barium	7.7			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	13.2			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-001-01F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: CGW002

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Matrix (soil/water): WATER Lab Sample ID: 10380-03

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	3.4			M
7440-39-3	Barium	7.6			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	8.4			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-002-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: CGW002

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Matrix (soil/water): WATER Lab Sample ID: 10380-09

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.9			M
7440-39-3	Barium	7.			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	7.9			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-002-01F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: FGW003

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Matrix (soil/water): WATER Lab Sample ID: 10380-06

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1	U		M
7440-39-3	Barium	22.7			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-003-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: FGW003

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Matrix (soil/water): WATER Lab Sample ID: 10380-12

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1	U		M
7440-39-3	Barium	19.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-003-01F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: HGW004

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Matrix (soil/water): WATER Lab Sample ID: 10417-03

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.8			M
7440-39-3	Barium	23.8			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	8.7			M
7440-50-8	Copper	4.1			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	21.3			M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	40.8			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-004-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: GGW004

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Matrix (soil/water): WATER Lab Sample ID: 10417-07

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	3.1			M
7440-39-3	Barium	29.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.2			M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	9.4			M
7440-50-8	Copper	5.3			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	24.3			M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	45.4			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-004-01F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: IGW005

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Matrix (soil/water): WATER Lab Sample ID: 10417-04

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.2			M
7440-39-3	Barium	27.7			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-005-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: HGW005

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Matrix (soil/water): WATER Lab Sample ID: 10417-08

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.7			M
7440-39-3	Barium	23.3			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-005-01F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: JGW006

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Matrix (soil/water): WATER Lab Sample ID: 10417-05

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.2			M
7440-39-3	Barium	5.4			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.4			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	12.6			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	13.			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-006-01

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: IGW006

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Matrix (soil/water): WATER Lab Sample ID: 10417-09

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.6			M
7440-39-3	Barium	6.			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	15.4			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-006-01F

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: BGW007

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C19011

Matrix (soil/water): WATER Lab Sample ID: 10380-02

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1			M
7440-39-3	Barium	14.1			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	17.2			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-007-01

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U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: BGW007

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Matrix (soil/water): WATER Lab Sample ID: 10380-08

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.3			M
7440-39-3	Barium	13.			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	12.9			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-007-01F

FORM I - IN

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: KIW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Matrix (soil/water): WATER Lab Sample ID: 10417-06

Level (low/med): LOW Date Received: 10/15/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.8			M
7440-39-3	Barium	13.8			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	4.3			M
7439-89-6	Iron				
7439-92-1	Lead	1.4			M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	47.8			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-IW-001-01

FORM I - IN

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: ARB001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Matrix (soil/water): WATER Lab Sample ID: 10380-01

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1	U		M
7440-39-3	Barium	1.1	U		M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-RB-001-01

FORM I - IN

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: ARB001

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Matrix (soil/water): WATER Lab Sample ID: 10380-07

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1	U		M
7440-39-3	Barium	1.1	U		M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-RB-001-01F

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U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: DGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Matrix (soil/water): WATER Lab Sample ID: 10380-04

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.6			M
7440-39-3	Barium	14.1			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	15.6			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: DUP-GW-001-01

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: DGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Matrix (soil/water): WATER Lab Sample ID: 10380-10

Level (low/med): LOW Date Received: 10/14/99

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.3			M
7440-39-3	Barium	13.1			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	2.2	U		M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	12.9			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: DUP-GW-001-01F

FORM I - IN

APPENDIX C
SUPPORT DOCUMENTATION

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

To: TETRA TECH
Project No. : CTO 38 7651
Laboratory Nos.: 9910380, 9910417
SDG No. : C1901
Date of Report:

SAMPLE RECEIPT, IDENTIFICATION, AND GENERAL COMMENTS:

Sample Receipt and Identification:

The samples submitted under the laboratory number(s) indicated above were identified and analyzed as tabulated below. The samples were collected and received on the dates noted on the enclosed chain-of-custody copies, Attachment A.

Client Sample Identification	Laucks Sample Identification	Testing Analytical Request
030-RB-001-01	9910380-01	VOA/ORD/MET/INO
030-GW-007-01	9910380-02	VOA/ORD/MET/INO
030-GW-002-01	9910380-03	VOA/ORD/MET/INO
DUP-GW-001-01	9910380-04	VOA/ORD/MET/INO
030-GW-001-01	9910380-05	VOA/ORD/MET/INO
030-GW-003-01	9910380-06	VOA/ORD/MET/INO
030-RB-001-01F	9910380-07	DMET/DTP
030-GW-007-01F	9910380-08	DMET/DTP
030-GW-002-01F	9910380-09	DMET/DTP
DUP-GW-001-01F	9910380-10	DMET/DTP
030-GW-001-01F	9910380-11	DMET/DTP
030-GW-003-01F	9910380-12	DMET/DTP
030-TB-001-01	9910380-13	VOA
030-TB-002-01	9910417-01	VOA
030-FB-001-01	9910417-02	VOA/ORD/MET/INO
030-GW-004-01	9910417-03	VOA/ORD/MET/INO
030-GW-005-01	9910417-04	VOA/ORD/MET/INO
030-GW-006-01	9910417-05	VOA/ORD/MET/INO
030-IW-001-01	9910417-06	VOA/ORD/MET/INO
030-GW-004-01F	9910417-07	DMET/DTP
030-GW-005-01F	9910417-08	DMET/DTP
030-GW-006-01F	9910417-09	DMET/DTP

Analytical Request Key:

VOA =	Volatile Organics - Appendix IX List (8260B)
ORD =	Ordnance (8330)
MET =	Total Appendix IX Metals (6020/7470)

DMET =	Diss. App. IX Metals (6010/6020/7470)
INO =	Ammonia (350.1), Nitrate+Nitrite (353.2), Cyanide (9012A), Total Phosphorous (365.2), Total Kjeldahl Nitrogen (351.2)
DTP =	Dissolved Total Phosphorus (365.2)

Sample Receipt Comments:

The following samples had air bubbles in the VOA vials. There were no other anomalies associated with the receipt of these samples.

Sample ID	Comments	Sample ID	Comments
030-GW-007-01	2 of 3 2>1/4"	030-TB-002-01	3 of 3 1<1/4, 2>1/4"
DUP-GW-001-01	3 of 3 3>1/4"	030-GW-005-01	1 of 3 1<1/4"
030-GW-002-01	2 of 9 2<1/4"	030-TB-001-01	3 of 3 3>1/4

Sample Identification on Forms:

When completing forms created through the CLP software, every attempt is made to use both your sample IDs as well as the laboratory sample IDs. The forms have varied default sizes to their sample identification fields, and are not amenable to alteration or editing. When it is not possible to use your complete sample ID because of field length limitations, Laucks will usually do one of two things: 1) use as much of your ID as will fit, beginning from the RIGHT hand side of the sample ID number; or 2) select some sub-set of your sample identifier if it is clearly a discrete number. In addition, all forms will contain our sample IDs, which can be cross-referenced from the table above.

GENERAL REMARKS ON ORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON ORGANIC ANALYSIS."

Manual Integration:
One or more analytes may have been manually integrated on the data system quantitation reports. The manual integrations have been flagged, initialed and dated by the analyst. A list of the manual integration flags are detailed below.

M	Manual integration due to irregular peak shape.
MS	Manual integration due to split peak.
MR	Manual integration due to retention time shift.
MI	Manual integration of correct isomer or peak.
MT	Manual integration due to peak tailing.
MB	Manual integration due to irregular baseline.

All GC/MS Fractions:

The computerized printout for sample analysis may tabulate values for target analytes that are not reported on the relevant Form I. In that case, we have manually searched the mass spectral data and have eliminated the compound(s) as reportable based on this search.

Volatile Fraction:

The instrument that was used in the determination of volatile organic compounds in this SDG was fitted with the following column and trap:

Instrument	Column Name	ID, mm	Film thickness, µm	Trap
URSULA	DB-624	0.45	1.4	OI Vocarb 3000

SPECIFIC REMARKS ON ORGANIC ANALYSES:

Holding Time Compliance:

Following the Contract Laboratory Program (CLP) model, Laucks calculates holding time compliance for organic determinations based on the first injection and/or analysis of an extract or sample. Subsequent analyses (for instance, for the purpose of dilution) are not tabulated.

Volatile Organic Compounds:

The holding time is 14 days calculated from date of collection in both soil and water samples. All samples were analyzed within holding time.

Ordnance:

The holding time to extraction is 7 days in water and 14 days in soil calculated from date of collection. The holding time from extraction to analysis is 40 days. All samples were extracted and analyzed within holding time.

Volatile Fraction:

Initial Calibration Standards:
The levels of the initial calibration standards are 1, 5, 10, 25 and 50 µg/L for all analytes with the exception of the ketones, acrolein, trans-1,4-dichloro-2-butene and m,p-xylenes. The calibration levels for the ketones, acrolein and trans-1,4-dichloro-2-butene are 5, 10, 25, 50 and 100 µg/L. The calibration levels for the m,p-xylenes are 2, 10, 20, 50 and 100 µg/L.

Sample Reporting Limits:
The most current version of SW 846 requires that the low level standard define the reporting limit. The laboratory's low level standard is 1 µg/L. The client has given express permission to report below the laboratory's low level standard for this project for specific compounds.

Quality Control Analyses:
MS/MSD analyses performed on sample 030GW00201 yielded all spiking analyte recovery values within the control limits with the exception of dichlorodifluoromethane and chloromethane. The elevated recovery values for these analytes may be partially due to the discrepancy between standard sources. Since these analytes were not detected in any of the associated samples, no corrective action was taken.

Ordnance Fraction:

Analytical Comments:
Samples were analyzed for ordnance compounds in accordance with method SW 8330 utilizing a UV detector. A C18 (octadecyl) analytical column was used as the quantitation column. A CN (cyano phase) column was used for confirming any positive analyte responses detected on the C18 column.

CN Column:
The confirmation column demonstrates coelution for the following target analytes: 1,3,5-trinitrobenzene and 1,3-dinitrobenzene; 2-nitrotoluene, 3-nitrotoluene and 4-nitrotoluene. The responses of the eluting compounds are summed and reported as one peak. When the presence of these compounds are indicated on the C18 column, CN column concentration values can not be accurately determined due to the coeluting peaks and the sample results are flagged appropriately.

Data Qualifiers:
A "Z" flag on sample report forms indicates coelution has occurred between two or more target analytes on the confirmation CN column. For this reason, quantitative confirmation is not possible.

Appropriate quantitation and SDL levels for samples which were analyzed at one or more dilutions are noted by an "X" flag.

The "P" flag indicates that the percent difference between the concentration values on the two columns is greater than 25 percent.

GENERAL REMARKS ON INORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON INORGANIC ANALYSES."

ICP and ICP-MS Metals:

EPA SW846 method 3015 was used for the digestion of the samples. Method 6010B was used for the determination of selenium, and method 6020 was used for the determination of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, nickel, silver, thallium, vanadium, zinc and tin.

On the first timed and dated page of each ICP and ICP-MS run, the data to be reported or rejected will be tabulated for that run.

Mercury:

Laucks purchases a 1000 mg/L Hg stock solution from Inorganic Ventures. The 1.0 mg/L working standard is made by diluting 100 µL to 100 mL with 2% HNO_3. The calibration curve is made by placing 0, 20, 50, 100, 200, 500 and 1000 µL of the working standard in BOD bottles and diluting up to 100 mL. The standard curve is equivalent to 0, 0.2, 0.5, 1.0, 2.0, 5.0 and 10.0 µg/L.

SPECIFIC REMARKS ON INORGANIC ANALYSES:

Holding Time Compliance:

Laucks calculates holding time compliance for inorganic determinations using the date on which reportable data were acquired.

Metals:

The holding time for metals is six months from the date of collection, excepting mercury, which is 28 days. All analyses were performed within holding time.

Miscellaneous:

The holding times tabulated below derive from the relevant EPA methods and are applicable when the sample was appropriately preserved and/or cooled. All samples submitted followed the preservation guidelines unless explicitly noted otherwise.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

Analyte	Holding Time	Violations
Phosphate	28 days	None
CN	14 days	None
TKN	28 days	None
Ammonia	28 days	None
Nitrate+Nitrite	28 days	None

Total Metals:

Due to high level of chloride anion present in the samples Se was analysed on ICP-Trace instrument.

Dissolved Metals:

Due to high level of chloride anion present in the samples Se was analysed on ICP-Trace instrument.

Conventionals:

The preparation blank for Total Phosphorus was detected at 0.017 mg/L, which was below the Laucks internal control limit of 0.020 mg/L, therefore no corrective action was required.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

ABBREVIATIONS

Several abbreviations can appear in our reports. The most commonly employed abbreviations are as follows:

U The analyte of interest was not detected to the limit of detection indicated.

SDL Sample Detection Limit. The SDL can vary from sample to sample, depending on sample size, matrix interferences, moisture content and other sample-specific conditions.

PQL Practical Quantitation Limit. The limit is drawn from the test method and usually represents the SDL multiplied by a matrix-specific factor.

DB Dry Basis. The value reported has been back-calculated to normalize for the moisture content of the sample.

AR As-Received. The value has not been normalized for moisture.

ORGANIC ANALYSES:

B When used in relation to organics fractions, the "B" flag indicates the analyte of interest was detected in the method blank associated with the sample, as well as in the sample itself. The "B" flag is applied without regard to the relative concentrations detected in the blank and sample.

J The analyte of interest was detected below the routine reporting limit. This value should be regarded as an estimate.

T The flagged values represent the SUM of two co-eluting compounds. The SUM of these two values is shown as though it were a result for each of them. The two figures should not be added together.

E The flagged value was reported from an analysis which exceeded the linear range of the instrument. See additional comments for further discussion of the circumstances. Values so flagged should be considered estimates.

D The value reported derives from analysis of a diluted sample of sample extract.

P When a dual column GC technique is employed, this flag indicates that test results from the two columns differ by more than 25%. Generally, we report the lower value.

C The flagged analyte has been confirmed by GC/MS analysis. The value reported may be derived from either the initial of confirmatory (GC/MS) analysis. See specific report comments for details.

CRQL Client Requested Quantitation Limit, usually the limit of detection specified at your request. Might also be referred to as Contract Required Quantitation Limit.

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INORGANIC ANALYSES:

B The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL). If the analyte was analyzed for but not detected, a "U" shall be entered.

E The reported value is estimated because of the presence of interference. An explanatory note shall be included under Comments on the Cover Page (if the problem applies to all samples) or on the specific Form I-IN (if it is an isolated problem).

M Duplicate injection precision not met.

N Spiked sample recovery not within control limits.

S The reported value was determined by the Method of Standard Additions (MSA)

W Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50 % of spike absorbance.

* Duplicate analysis not within control limits.

+ Correlation coefficient for the MSA is less than 0.995.

Entering "S", "W" or "+" is mutually exclusive. No combination of these qualifiers can appear in the same field for an analyte.

CRDL Client Requested Detection Limit, usually the limit of detection specified at your request. Might also be referred to as Contract required Detection Limit.

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Seattle, WA 98108

RELEASE OF DATA

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

Respectfully submitted,

Hugh Prentice	Mike Nelson
Project Manager	Technical Director
2 Dec 1999	2 Dec 1999
(DATE)	(DATE)

HOW TO CONTACT US:

All Laucks Testing Laboratories staff members can be reached at the same telephone and facsimile numbers: (206) 767-5060 by phone, (206) 767-5063 by FAX.

	Primary Contact	Alternate
Technical	Mike Nelson	
Administrative/billing	Hugh Prentice	
Package	Tom Marino	Rebecca V. James

REQUESTS FOR DUPLICATE COPIES:

This packet has been checked for accuracy. All pages are present and in sequential order. Please see Attachment B for a detailed record.

In the event that duplicate data copies are needed, Laucks will accommodate your request at a fee of twenty five cents ($0.25) per copy, plus shipping. If the data are in storage, there will also be a fee for retrieval.

C19

HOLDING TIME
12/07/99

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
MG/L	030-FB-001-01	9910417-02	NORMAL	C1901	AMM	10/13/99	11/05/99	11/05/99	23	0	23
MG/L	030-GW-001-01	9910380-05	NORMAL	C1901	AMM	10/13/99	11/05/99	11/05/99	23	0	23
MG/L	030-GW-002-01	9910380-03	NORMAL	C1901	AMM	10/12/99	11/05/99	11/05/99	24	0	24
MG/L	030-GW-003-01	9910380-06	NORMAL	C1901	AMM	10/13/99	11/05/99	11/05/99	23	0	23
MG/L	030-GW-004-01	9910417-03	NORMAL	C1901	AMM	10/13/99	11/05/99	11/05/99	23	0	23
MG/L	030-GW-005-01	9910417-04	NORMAL	C1901	AMM	10/14/99	11/05/99	11/05/99	22	0	22
MG/L	030-GW-006-01	9910417-05	NORMAL	C1901	AMM	10/14/99	11/05/99	11/05/99	22	0	22
MG/L	030-GW-007-01	9910380-02	NORMAL	C1901	AMM	10/12/99	11/05/99	11/05/99	24	0	24
MG/L	030-IW-001-01	9910417-06	NORMAL	C1901	AMM	10/14/99	11/05/99	11/05/99	22	0	22
MG/L	030-RB-001-01	9910380-01	NORMAL	C1901	AMM	10/11/99	11/05/99	11/05/99	25	0	25
MG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	AMM	10/12/99	11/05/99	11/05/99	24	0	24
MG/L	030-FB-001-01	9910417-02	NORMAL	C1901	CN	10/13/99	10/21/99	10/25/99	8	4	12
MG/L	030-GW-001-01	9910380-05	NORMAL	C1901	CN	10/13/99	10/21/99	10/25/99	8	4	12
MG/L	030-GW-002-01	9910380-03	NORMAL	C1901	CN	10/12/99	10/21/99	10/25/99	9	4	13
MG/L	030-GW-003-01	9910380-06	NORMAL	C1901	CN	10/13/99	10/21/99	10/25/99	8	4	12
MG/L	030-GW-004-01	9910417-03	NORMAL	C1901	CN	10/13/99	10/21/99	10/25/99	8	4	12
MG/L	030-GW-005-01	9910417-04	NORMAL	C1901	CN	10/14/99	10/21/99	10/25/99	7	4	11
MG/L	030-GW-006-01	9910417-05	NORMAL	C1901	CN	10/14/99	10/21/99	10/25/99	7	4	11
MG/L	030-GW-007-01	9910380-02	NORMAL	C1901	CN	10/12/99	10/21/99	10/25/99	9	4	13
MG/L	030-IW-001-01	9910417-06	NORMAL	C1901	CN	10/14/99	10/21/99	10/25/99	7	4	11
MG/L	030-RB-001-01	9910380-01	NORMAL	C1901	CN	10/11/99	10/21/99	10/25/99	10	4	14
MG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	CN	10/12/99	10/21/99	10/25/99	9	4	13
MG/L	030-GW-001-01-F	9910380-11	NORMAL	C1901	DPHO	10/13/99	11/08/99	11/09/99	26	1	27
MG/L	030-GW-002-01-F	9910380-09	NORMAL	C1901	DPHO	10/12/99	11/08/99	11/09/99	27	1	28
MG/L	030-GW-003-01-F	9910380-12	NORMAL	C1901	DPHO	10/13/99	11/08/99	11/09/99	26	1	27

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
MG/L	030-GW-004-01-F	9910417-07	NORMAL	C1901	DPHO	10/13/99	11/08/99	11/09/99	26	1	27
MG/L	030-GW-005-01-F	9910417-08	NORMAL	C1901	DPHO	10/14/99	11/08/99	11/09/99	25	1	26
MG/L	030-GW-006-01-F	9910417-09	NORMAL	C1901	DPHO	10/14/99	11/08/99	11/09/99	25	1	26
MG/L	030-GW-007-01-F	9910380-08	NORMAL	C1901	DPHO	10/12/99	11/08/99	11/09/99	27	1	28
MG/L	030-RB-001-01-F	9910380-07	NORMAL	C1901	DPHO	10/11/99	11/08/99	11/09/99	28	1	29
MG/L	DUP-GW-001-01-F	9910380-10	NORMAL	C1901	DPHO	10/12/99	11/08/99	11/09/99	27	1	28
UG/L	030-FB-001-01	9910417-02	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-001-01	9910380-05	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-002-01	9910380-03	NORMAL	C1901	EXP	10/12/99	10/18/99	10/19/99	6	1	7
UG/L	030-GW-003-01	9910380-06	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-004-01	9910417-03	NORMAL	C1901	EXP	10/13/99	10/18/99	10/19/99	5	1	6
UG/L	030-GW-005-01	9910417-04	NORMAL	C1901	EXP	10/14/99	10/18/99	10/19/99	4	1	5
UG/L	030-GW-006-01	9910417-05	NORMAL	C1901	EXP	10/14/99	10/18/99	10/19/99	4	1	5
UG/L	030-GW-007-01	9910380-02	NORMAL	C1901	EXP	10/12/99	10/18/99	10/19/99	6	1	7
UG/L	030-IW-001-01	9910417-06	NORMAL	C1901	EXP	10/14/99	10/18/99	10/20/99	4	2	6
UG/L	030-RB-001-01	9910380-01	NORMAL	C1901	EXP	10/11/99	10/18/99	10/19/99	7	1	8
UG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	EXP	10/12/99	10/18/99	10/19/99	6	1	7
UG/L	030-FB-001-01	9910417-02	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-001-01	9910380-05	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-002-01	9910380-03	NORMAL	C1901	HG	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-GW-003-01	9910380-06	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-004-01	9910417-03	NORMAL	C1901	HG	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-005-01	9910417-04	NORMAL	C1901	HG	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-GW-006-01	9910417-05	NORMAL	C1901	HG	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-GW-007-01	9910380-02	NORMAL	C1901	HG	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-IW-001-01	9910417-06	NORMAL	C1901	HG	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-RB-001-01	9910380-01	NORMAL	C1901	HG	10/11/99	11/03/99	11/04/99	23	[illegible]	24

Uni	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_ TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	HG	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-GW-001-01-F	9910380-11	NORMAL	C1901	HGF	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-002-01-F	9910380-09	NORMAL	C1901	HGF	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-GW-003-01-F	9910380-12	NORMAL	C1901	HGF	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-004-01-F	9910417-07	NORMAL	C1901	HGF	10/13/99	11/03/99	11/04/99	21	1	22
UG/L	030-GW-005-01-F	9910417-08	NORMAL	C1901	HGF	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-GW-006-01-F	9910417-09	NORMAL	C1901	HGF	10/14/99	11/03/99	11/04/99	20	1	21
UG/L	030-GW-007-01-F	9910380-08	NORMAL	C1901	HGF	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-RB-001-01-F	9910380-07	NORMAL	C1901	HGF	10/11/99	11/03/99	11/04/99	23	1	24
UG/L	DUP-GW-001-01-F	9910380-10	NORMAL	C1901	HGF	10/12/99	11/03/99	11/04/99	22	1	23
UG/L	030-FB-001-01	9910417-02	NORMAL	C1901	M	10/13/99	11/02/99	11/03/99	20	1	21
UG/L	030-GW-001-01	9910380-05	NORMAL	C1901	M	10/13/99	11/02/99	11/03/99	20	1	21
UG/L	030-GW-002-01	9910380-03	NORMAL	C1901	M	10/12/99	11/02/99	11/03/99	21	1	22
UG/L	030-GW-003-01	9910380-06	NORMAL	C1901	M	10/13/99	11/02/99	11/03/99	20	1	21
UG/L	030-GW-004-01	9910417-03	NORMAL	C1901	M	10/13/99	11/02/99	11/03/99	20	1	21
UG/L	030-GW-005-01	9910417-04	NORMAL	C1901	M	10/14/99	11/02/99	11/03/99	19	1	20
UG/L	030-GW-006-01	9910417-05	NORMAL	C1901	M	10/14/99	11/02/99	11/03/99	19	1	20
UG/L	030-GW-007-01	9910380-02	NORMAL	C1901	M	10/12/99	11/02/99	11/03/99	21	1	22
UG/L	030-IW-001-01	9910417-06	NORMAL	C1901	M	10/14/99	11/02/99	11/03/99	19	1	20
UG/L	030-RB-001-01	9910380-01	NORMAL	C1901	M	10/11/99	11/02/99	11/03/99	22	1	23
UG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	M	10/12/99	11/02/99	11/03/99	21	1	22
UG/L	030-GW-001-01-F	9910380-11	NORMAL	C1901	MF	10/13/99	11/02/99	11/03/99	20	1	21
UG/L	030-GW-002-01-F	9910380-09	NORMAL	C1901	MF	10/12/99	11/02/99	11/03/99	21	1	22
UG/L	030-GW-003-01-F	9910380-12	NORMAL	C1901	MF	10/13/99	11/02/99	11/03/99	20	1	21
UG/L	030-GW-004-01-F	9910417-07	NORMAL	C1901	MF	10/13/99	11/02/99	11/03/99	20	1	21
UG/L	030-GW-005-01-F	9910417-08	NORMAL	C1901	MF	10/14/99	11/02/99	12/04/99	19	32	51
UG/L	030-GW-006-01-F	9910417-09	NORMAL	C1901	MF	10/14/99	11/02/99	12/04/99	19	32	51

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-007-01-F	9910380-08	NORMAL	C1901	MF	10/12/99	11/02/99	11/03/99	21	1	22
UG/L	030-RB-001-01-F	9910380-07	NORMAL	C1901	MF	10/11/99	11/02/99	11/03/99	22	1	23
UG/L	DUP-GW-001-01-F	9910380-10	NORMAL	C1901	MF	10/12/99	11/02/99	11/03/99	21	1	22
MG/L	030-FB-001-01	9910417-02	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-001-01	9910380-05	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-002-01	9910380-03	NORMAL	C1901	NTIA	10/12/99	11/08/99	11/08/99	27	0	27
MG/L	030-GW-003-01	9910380-06	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-004-01	9910417-03	NORMAL	C1901	NTIA	10/13/99	11/08/99	11/08/99	26	0	26
MG/L	030-GW-005-01	9910417-04	NORMAL	C1901	NTIA	10/14/99	11/08/99	11/08/99	25	0	25
MG/L	030-GW-006-01	9910417-05	NORMAL	C1901	NTIA	10/14/99	11/08/99	11/08/99	25	0	25
MG/L	030-GW-007-01	9910380-02	NORMAL	C1901	NTIA	10/12/99	11/08/99	11/08/99	27	0	27
MG/L	030-IW-001-01	9910417-06	NORMAL	C1901	NTIA	10/14/99	11/08/99	11/08/99	25	0	25
MG/L	030-RB-001-01	9910380-01	NORMAL	C1901	NTIA	10/11/99	11/08/99	11/08/99	28	0	28
MG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	NTIA	10/12/99	11/08/99	11/08/99	27	0	27
UG/L	030-FB-001-01	9910417-02	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-001-01	9910380-05	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-002-01	9910380-03	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	0	7
UG/L	030-GW-003-01	9910380-06	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-004-01	9910417-03	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	030-GW-005-01	9910417-04	NORMAL	C1901	OV	10/14/99	10/19/99	10/19/99	5	0	5
UG/L	030-GW-006-01	9910417-05	NORMAL	C1901	OV	10/14/99	10/19/99	10/19/99	5	0	5
UG/L	030-GW-007-01	9910380-02	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	0	7
UG/L	030-IW-001-01	9910417-06	NORMAL	C1901	OV	10/14/99	10/19/99	10/19/99	5	0	5
UG/L	030-RB-001-01	9910380-01	NORMAL	C1901	OV	10/11/99	10/19/99	10/19/99	8	0	8
UG/L	030-TB-001-01	9910380-13	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	0	7
UG/L	030-TB-002-01	9910417-01	NORMAL	C1901	OV	10/13/99	10/19/99	10/19/99	6	0	6
UG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	OV	10/12/99	10/19/99	10/19/99	7	[illegible]	7

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
MG/L	030-FB-001-01	9910417-02	NORMAL	C1901	TKN	10/13/99	11/05/99	11/10/99	23	5	28
MG/L	030-GW-001-01	9910380-05	NORMAL	C1901	TKN	10/13/99	11/05/99	11/10/99	23	5	28
MG/L	030-GW-002-01	9910380-03	NORMAL	C1901	TKN	10/12/99	11/05/99	11/10/99	24	5	29
MG/L	030-GW-003-01	9910380-06	NORMAL	C1901	TKN	10/13/99	11/05/99	11/10/99	23	5	28
MG/L	030-GW-004-01	9910417-03	NORMAL	C1901	TKN	10/13/99	11/05/99	11/10/99	23	5	28
MG/L	030-GW-005-01	9910417-04	NORMAL	C1901	TKN	10/14/99	11/05/99	11/10/99	22	5	27
MG/L	030-GW-006-01	9910417-05	NORMAL	C1901	TKN	10/14/99	11/05/99	11/10/99	22	5	27
MG/L	030-GW-007-01	9910380-02	NORMAL	C1901	TKN	10/12/99	11/05/99	11/10/99	24	5	29
MG/L	030-IW-001-01	9910417-06	NORMAL	C1901	TKN	10/14/99	11/05/99	11/10/99	22	5	27
MG/L	030-RB-001-01	9910380-01	NORMAL	C1901	TKN	10/11/99	11/05/99	11/10/99	25	5	30
MG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	TKN	10/12/99	11/05/99	11/10/99	24	5	29
MG/L	030-FB-001-01	9910417-02	NORMAL	C1901	TPHO	10/13/99	11/08/99	11/09/99	26	1	27
MG/L	030-GW-001-01	9910380-05	NORMAL	C1901	TPHO	10/13/99	11/08/99	11/09/99	26	1	27
MG/L	030-GW-002-01	9910380-03	NORMAL	C1901	TPHO	10/12/99	11/08/99	11/09/99	27	1	28
MG/L	030-GW-003-01	9910380-06	NORMAL	C1901	TPHO	10/13/99	11/08/99	11/09/99	26	1	27
MG/L	030-GW-004-01	9910417-03	NORMAL	C1901	TPHO	10/13/99	11/08/99	11/09/99	26	1	27
MG/L	030-GW-005-01	9910417-04	NORMAL	C1901	TPHO	10/14/99	11/08/99	11/09/99	25	1	26
MG/L	030-GW-006-01	9910417-05	NORMAL	C1901	TPHO	10/14/99	11/08/99	11/09/99	25	1	26
MG/L	030-GW-007-01	9910380-02	NORMAL	C1901	TPHO	10/12/99	11/08/99	11/09/99	27	1	28
MG/L	030-IW-001-01	9910417-06	NORMAL	C1901	TPHO	10/14/99	11/08/99	11/09/99	25	1	26
MG/L	030-RB-001-01	9910380-01	NORMAL	C1901	TPHO	10/11/99	11/08/99	11/09/99	28	1	29
MG/L	DUP-GW-001-01	9910380-04	NORMAL	C1901	TPHO	10/12/99	11/08/99	11/09/99	27	1	28

9910380 C1492 00320

CHAIN OF CUSTODY RECORD

PROJECT NO.: CTO 19 7393

SITE NAME: NSWC CRANE, IN

SAMPLERS (SIGNATURE): [illegible] / Scott Reid

	STATION NO.	DATE 1999	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	AMMONIA, NITRATE/NITRITE TKN, T. PHOS.	DIS. PHOS.	REMARKS
1,7	RB	10/11	1810		✓	030-RB-001-01	10	3	2	1	1	1	1	1	
3	TB	10/12	0715		✓	030-TB-001-01	3	3							
8	LF	↓	1440		✓	030-GW-007-01	10	3	2	1	1	1	1	1	
9	↓	↓	1326		✓	030-GW-002-01	30	9	6	3	3	3	3	3	RUN MS/MSD ALSO
10	↓	↓	0000		✓	DUP-GW-001-01	10	3	2	1	1	1	1	1	
11	↓	10/13	1005		✓	030-GW-001-01	10	3	2	1	1	1	1	1	
12	↓	↓	1025		✓	030-GW-003-01	10	3	2	1	1	1	1	1	

12

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
[illegible]	10.13.99 1625	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS:	
		[illegible]	10/14/99 0830	FED EX AB # 8117 3683 5451 TEMP BLANK AT SHIPPMENT = 4°C	

Order No. 70440 (0693)

CHAIN OF CUSTODY RECORD

9910417 C19Ø1

00321

PROJECT NO.: CT019 7393

SITE NAME: NSWC CRANE, IN

SAMPLERS (SIGNATURE): K. S. Simpson

STATION NO.	DATE 1999	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	AMMONIA, NITRATE/NITRITE TKN, T. PHOS.	DIS. PHOS.	REMARKS
TB	10/13	1340		✓	030-TB-002-01	3	3							TRIP BLANK
FB	↓	1600		✓	030-FB-001-01	8	3	2	1	KS #	1	1		SOURCE (DI) WATER
7 LF	↓	1712		✓	030-GW-004-01	10	3	2	1	1	1	1	1	
8 ↓	10/14	0950		✓	030-GW-005-01	10	3	2	1	1	1	1	1	
9 ↓	↓	1025		✓	030-GW-006-01	10	3	2	1	1	1	1	1	
IDW	↓	1310		✓	030-IW-001-01	8	3	2	1		1	1		DEVELOPMENT & PURGE WATER

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
K. S. Simpson	10/14/99 1630	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: FED EX AB # 8117 3683 5473	
		[illegible signature]	10/15/99 0830	TEMP. BLANK AT SHIPMENT = 4°C	

Order No. 70440 (0693)

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: LAUCKS TESTING LABS, INC.

Lab Code: LAUCKS SDG No: C1901

Client Identification	Lab Sample Work Order Number
030-RB-001-01	9910380-01
030-GW-007-01	9910380-02
030-GW-002-01	9910380-03
DUP-GW-001-01	9910380-04
030-GW-001-01	9910380-05
030-GW-003-01	9910380-06
030-RB-001-01F	9910380-07
030-GW-007-01F	9910380-08
030-GW-002-01F	9910380-09
DUP-GW-001-01F	9910380-10
030-GW-001-01F	9910380-11
030-GW-003-01F	9910380-12
030-FB-001-01	9910417-02
030-GW-004-01	9910417-03
030-GW-005-01	9910417-04
030-GW-006-01	9910417-05
030-IW-001-01	9910417-06
030-GW-004-01F	9910417-07
030-GW-005-01F	9910417-08
030-GW-006-01F	9910417-09

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Paul Swift Name: Paul Swift

Date: 11/22/99 Title: Inorganics Manager

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: LAUCKS TESTING LABS, INC. Contract:

Lab Code: LAUCKS Case No.: SAS No.: SDG No.: C1901T

EPA Sample No.	Client Identification	Full Lab Sample ID	Lab Sample ID for Forms/Raw Data
ARB001	030-RB-001-01	9910380-01	10380-01
BGW007	030-GW-007-01	9910380-02	10380-02
CGW002	030-GW-002-01	9910380-03	10380-03
CGW002D	030-GW-002-01D	9910380-03D	10380-03D
CGW002S	030-GW-002-01S	9910380-03S	10380-03S
DGW001	DUP-GW-001-01	9910380-04	10380-04
EGW001	030-GW-001-01	9910380-05	10380-05
FGW003	030-GW-003-01	9910380-06	10380-06
GFB001	030-FB-001-01	9910417-02	10417-02
HGW004	030-GW-004-01	9910417-03	10417-03
IGW005	030-GW-005-01	9910417-04	10417-04
JGW006	030-GW-006-01	9910417-05	10417-05
KIW001	030-IW-001-01	9910417-06	10417-06

Where D= Duplicate and S= Spike.

Were ICP interelement correction factors applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes, were raw data generated before application of background corrections? Yes/No NO

Comments: See SDG Narrative for specific comments on the metals analysis.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Galina Gringer Name: Galina Gringer

Date: November 30, 1999 Title: Senior Chemist

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Initial Calibration Source: EPA-LV/SPEX

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony				30.0	32.10	107.0			M
Arsenic				50.0	51.50	103.0			M
Barium									
Beryllium				25.0	24.70	98.8			M
Cadmium				25.0	25.20	100.8	23.30	93.2	M
Calcium									
Chromium				50.0	49.20	98.4			M
Cobalt				50.0	51.30	102.6			M
Copper				25.0	25.40	101.6			M
Iron									
Lead				25.0	24.90	99.6			M
Magnesium									
Manganese									
Mercury				5.0	4.80	96.0	4.82	96.4	AV
Nickel				200.0	208.60	104.3			M
Potassium									
Selenium				1000.0	1087.90	108.8	1085.90	108.6	P
Silver				50.0	53.50	107.0			M
Sodium									
Thallium				50.0	50.00	100.0			M
Vanadium				50.0	53.90	107.8			M
Zinc				100.0	103.70	103.7			M
Tin				100.0	112.90	112.9			M

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

CCV 5

FORM II (PART 1) - IN

U.S. EPA - CLP

2B

CRDL STANDARD FOR AA AND ICP

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

AA CRDL Standard Source: IV

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Found	%R	Final Found	%R
Aluminum								
Antimony				2.0	1.60	80.0	1.50	75.0
Arsenic				2.0	1.40	70.0	1.80	90.0
Barium				4.0	3.90	97.5	4.10	102.5
Beryllium				2.0	2.10	105.0	2.00	100.0
Cadmium				2.0	2.20	110.0	2.30	115.0
Calcium								
Chromium				10.0	8.90	89.0	9.20	92.0
Cobalt				6.0	6.10	101.7	6.20	103.3
Copper				4.0	3.70	92.5	3.70	92.5
Iron								
Lead				2.0	2.00	100.0	2.00	100.0
Magnesium								
Manganese								
Mercury	0.2	0.25	125.0					
Nickel				20.0	15.80	79.0	15.80	79.0
Potassium								
Selenium				10.0	8.60	86.0	10.00	100.0
Silver				6.0	8.20	136.7	7.60	126.7
Sodium								
Thallium				2.0	2.00	100.0	1.90	95.0
Vanadium				4.0	3.60	90.0	3.70	92.5
Zinc				40.0	39.60	99.0	37.70	94.2
Tin					2.80		2.70	

U.S. EPA - CLP

3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Arsenic	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Barium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Calcium											
Chromium	5.0	U	5.0	U	5.0	U	5.0	U	5.600	U	M
Cobalt	3.0	U	3.0	U	3.0	U	3.0	U	3.300	U	M
Copper	2.0	U	2.0	U	2.0	U	2.0	U	2.200	U	M
Iron											
Lead	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Magnesium											
Manganese											
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	AV
Nickel	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M
Potassium											
Selenium	5.0	U	5.0	U	5.0	U	5.0	U	5.600	U	P
Silver	3.0	U	3.0	U	3.0	U	3.0	U	3.300	U	M
Sodium											
Thallium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U	2.200	U	M
Zinc	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M
Tin	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M

FORM III - IN

U.S. EPA - CLP

3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony			1.0	U	1.0	U					M
Arsenic			1.0	U	1.0	U					M
Barium			1.0	U							M
Beryllium			1.0	U	1.0	U					M
Cadmium			1.0	U	1.0	U	1.0	U			M
Calcium											
Chromium			5.0	U	5.0	U					M
Cobalt			3.0	U	3.0	U					M
Copper			2.0	U	2.0	U					M
Iron											
Lead			1.0	U	1.0	U					M
Magnesium											
Manganese											
Mercury			0.2	U	0.2	U	0.2	U			AV
Nickel			10.0	U	10.0	U					M
Potassium											
Selenium			5.0	U	5.0	U	5.0	U			P
Silver			3.0	U	3.0	U					M
Sodium											
Thallium			1.0	U	1.0	U					M
Vanadium			2.0	U	2.0	U					M
Zinc			10.0	U	10.0	U					M
Tin			10.0	U	10.0	U					M

U.S. EPA - CLP

3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury			0.2	U							AV
Nickel											
Potassium											
Selenium			5.0	U							P
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Tin											

FORM III - IN

U.S. EPA - CLP

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Method: M

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
ARB001	11/02/99	45	50
BGW007	11/02/99	45	50
CGW002	11/02/99	45	50
CGW002D	11/02/99	45	50
CGW002S	11/02/99	45	50
DGW001	11/02/99	45	50
EGW001	11/02/99	45	50
FGW003	11/02/99	45	50
GFB001	11/02/99	45	50
HGW004	11/02/99	45	50
IGW005	11/02/99	45	50
JGW006	11/02/99	45	50
KIW001	11/02/99	45	50
LCSW1	11/02/99	45	50
PBW1	11/02/99	45	50

FORM XIII - IN

U.S. EPA - CLP

13

PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Method: P

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
ARB001	11/02/99	45	50
BGW007	11/02/99	45	50
CGW002	11/02/99	45	50
CGW002D	11/02/99	45	50
CGW002S	11/02/99	45	50
DGW001	11/02/99	45	50
EGW001	11/02/99	45	50
FGW003	11/02/99	45	50
GFB001	11/02/99	45	50
HGW004	11/02/99	45	50
IGW005	11/02/99	45	50
JGW006	11/02/99	45	50
KIW001	11/02/99	45	50
LCSW1	11/02/99	45	50
PBW1	11/02/99	45	50

FORM XIII - IN

U.S. EPA - CLP

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Method: AV

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
ARB001	11/03/99	100	100
BGW007	11/03/99	100	100
CGW002	11/03/99	100	100
CGW002D	11/03/99	100	100
CGW002S	11/03/99	100	100
DGW001	11/03/99	100	100
EGW001	11/03/99	100	100
FGW003	11/03/99	100	100
GFB001	11/03/99	100	100
HGW004	11/03/99	100	100
IGW005	11/03/99	100	100
JGW006	11/03/99	100	100
KIW001	11/03/99	100	100
LCSW1	11/03/99	100	100
PBW1	11/03/99	100	100
S0.2	11/03/99		
S0.5	11/03/99		
S10.0	11/03/99		
S1.0	11/03/99		
S2.0	11/03/99		
S5.0	11/03/99		
S0	11/03/99		

FORM XIII - IN

U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C19

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/03/99 End Date: 11/03/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	1138			X	X		X			X	X	X		X				X			X		X	X	X	X
S1	1.00	1144			X	X		X			X	X	X		X				X			X		X	X	X	X
S2	1.00	1149			X	X		X			X	X	X		X				X			X		X	X	X	X
S3	1.00	1154			X	X		X			X	X	X		X				X			X		X	X	X	X
ICV1	1.00	1159			X	X		X			X	X	X		X				X			X		X	X	X	X
ICB1	1.00	1204			X	X		X			X	X	X		X				X			X		X	X	X	X
CCV1	1.00	1210			X	X		X			X	X	X		X				X			X		X	X	X	X
CCB1	1.00	1215			X	X		X			X	X	X		X				X			X		X	X	X	X
CRI1	1.00	1220			X	X		X			X	X	X		X				X			X		X	X	X	X
ICSAI1	1.00	1225			X	X		X			X	X	X		X				X			X		X	X	X	X
ICSABI1	1.00	1230			X	X		X			X	X	X		X				X			X		X	X	X	X
CCV2	1.00	1236			X	X		X			X	X	X		X				X			X		X	X	X	X
CCB2	1.00	1241			X	X		X			X	X	X		X				X			X		X	X	X	X
PBW1	1.00	1246			X	X		X			X	X	X		X				X			X		X	X	X	X
LCSW1	1.00	1251			X	X		X			X	X	X		X				X			X		X	X	X	X
ARB001	1.00	1256			X	X		X			X	X	X		X				X			X		X	X	X	X
BGW007	1.00	1301			X	X		X			X	X	X		X				X			X		X	X	X	X
CGW002	1.00	1306			X	X		X			X	X	X		X				X			X		X	X	X	X
CGW002D	1.00	1312			X	X		X			X	X	X		X				X			X		X	X	X	X
CGW002S	1.00	1317			X	X		X			X	X	X		X				X			X		X	X	X	X
CGW002A	1.00	1322			X	X		X			X	X	X		X				X			X		X	X	X	X
CGW002L	5.00	1327			X	X		X			X	X	X		X				X			X		X	X	X	X
ZZZZZZ	1.00	1332																									
CCV3	1.00	1337			X	X		X			X	X	X		X				X			X		X	X	X	X
CCB3	1.00	1342			X	X		X			X	X	X		X				X			X		X	X	X	X
DGW001	1.00	1348			X	X		X			X	X	X		X				X			X		X	X	X	X
EGW001	1.00	1353			X	X		X			X	X	X		X				X			X		X	X	X	X
FGW003	1.00	1416			X	X		X			X	X	X		X				X			X		X	X	X	X
ZZZZZZ	1.00	1421																									
ZZZZZZ	1.00	1426																									
ZZZZZZ	1.00	1431																									
CCV4	1.00	1436			X	X		X			X	X	X		X				X			X		X	X	X	X

FORM XIV - IN

U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/03/99 End Date: 11/03/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CCB4	1.00	1441			X	X		X			X	X	X		X				X			X		X	X	X	X
GFB001	1.00	1447			X	X		X			X	X	X		X				X			X		X	X	X	X
HGW004	1.00	1452			X	X		X			X	X	X		X				X			X		X	X	X	X
IGW005	1.00	1457			X	X		X			X	X	X		X				X			X		X	X	X	X
JGW006	1.00	1502			X	X		X			X	X	X		X				X			X		X	X	X	X
KIW001	1.00	1507			X	X		X			X	X	X		X				X			X		X	X	X	X
CRIF1	1.00	1512			X	X		X			X	X	X		X				X			X		X	X	X	X
ICSAF1	1.00	1517			X	X		X			X	X	X		X				X			X		X	X	X	X
ICSABF1	1.00	1523			X	X		X			X	X	X		X				X			X		X	X	X	X
CCV5	1.00	1528			X	X		X			X	X	X		X				X			X		X	X	X	X
CCB5	1.00	1533			X	X		X			X	X	X		X				X			X		X	X	X	X

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/17/99 End Date: 11/17/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	1238					X																				
S1	1.00	1241					X																				
S2	1.00	1244					X																				
S3	1.00	1247					X																				
ICV1	1.00	1250					X																				
ICB1	1.00	1252					X																				
CCV1	1.00	1255					X																				
CCB1	1.00	1258					X																				
CRII1	1.00	1301					X																				
ICSAI1	1.00	1304					X																				
ICSABI1	1.00	1306					X																				
CCV2	1.00	1309					X																				
CCB2	1.00	1312					X																				
LCSW1	1.00	1315					X																				
PBW1	1.00	1318					X																				
ARB001	1.00	1320					X																				
BGW007	1.00	1323					X																				
DGW001	1.00	1326					X																				
CGW002	1.00	1329					X																				
CGW002D	1.00	1332					X																				
CGW002S	1.00	1334					X																				
CGW002A	1.00	1337					X																				
CGW002L	5.00	1340					X																				
CCV3	1.00	1343					X																				
CCB3	1.00	1346					X																				
EGW001	1.00	1348					X																				
FGW003	1.00	1351					X																				
GFB001	1.00	1354					X																				
HGW004	1.00	1357					X																				
IGW005	1.00	1400					X																				
JGW006	1.00	1403					X																				
KIW001	1.00	1405					X																				

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/17/99 End Date: 11/17/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CRIF1	1.00	1408					X																				
ICSAF1	1.00	1411					X																				
ICSABF1	1.00	1414					X																				
CCV4	1.00	1417					X																				
CCB4	1.00	1420					X																				

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/29/99 End Date: 11/29/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0824							X																		
S1	1.00	0827							X																		
S2	1.00	0830							X																		
S3	1.00	0833							X																		
ICV1	1.00	0836							X																		
ICB1	1.00	0839							X																		
CCV1	1.00	0842							X																		
CCB1	1.00	0845							X																		
CRII1	1.00	0848							X																		
ICSAI1	1.00	0851							X																		
ICSABI1	1.00	0855							X																		
CCV2	1.00	0858							X																		
CCB2	1.00	0901							X																		
ZZZZZZ	1.00	0904																									
ZZZZZZ	1.00	0907																									
ZZZZZZ	1.00	0910																									
ZZZZZZ	1.00	0913																									
ZZZZZZ	1.00	0916																									
ZZZZZZ	1.00	0919																									
ZZZZZZ	1.00	0922																									
ZZZZZZ	1.00	0926																									
ZZZZZZ	1.00	0929																									
CCV3	1.00	0932							X																		
CCB3	1.00	0935							X																		
ZZZZZZ	1.00	0938																									
ZZZZZZ	1.00	0941																									
ZZZZZZ	1.00	0944																									
ZZZZZZ	1.00	0947																									
ZZZZZZ	1.00	0951																									
ZZZZZZ	1.00	0954																									
ZZZZZZ	1.00	0957																									
ZZZZZZ	1.00	1000																									

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/29/99 End Date: 11/29/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
ZZZZZZ	1.00	1003																									
CCV4	1.00	1006							X																		
CCB4	1.00	1009							X																		
PBW1	1.00	1012							X																		
LCSW1	1.00	1015							X																		
ARB001.	1.00	1019							X																		
BGW007	1.00	1022							X																		
CGW002	1.00	1025							X																		
CGW002D	1.00	1028							X																		
CGW002S	1.00	1031							X																		
CGW002A	1.00	1034							X																		
CGW002L	5.00	1037							X																		
DGW001	1.00	1040							X																		
CCV5	1.00	1043							X																		
CCB5	1.00	1047							X																		
EGW001	1.00	1050							X																		
FGW003	1.00	1053							X																		
GFB001	1.00	1056							X																		
HGW004	1.00	1059							X																		
IGW005	1.00	1102							X																		
JGW006	1.00	1105							X																		
KIW001	1.00	1108							X																		
CRIF1	1.00	1111							X																		
ICSAF1	1.00	1115							X																		
ICSABF1	1.00	1118							X																		
CCV6	1.00	1121							X																		
CCB6	1.00	1124							X																		

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Instrument ID Number: TRACEICM Method: P

Start Date: 11/05/99 End Date: 11/05/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0943																			X						
S	1.00	0947																			X						
S1	1.00	0951																									
S2	1.00	0955																									
S3	1.00	0958																									
ICV1	1.00	1001																			X						
ICB1	1.00	1008																			X						
CCV1	1.00	1012																			X						
CCB1	1.00	1019																			X						
CRII1	1.00	1023																			X						
ICSAI2	1.00	1031																			X						
ICSABI2	1.00	1035																			X						
CCV2	1.00	1040																			X						
CCB2	1.00	1046																			X						
ZZZZZZ	1.00	1050																									
ZZZZZZ	1.00	1055																									
ZZZZZZ	1.00	1059																									
CCV3	1.00	1106																			X						
CCB3	1.00	1112																			X						
ZZZZZZ	1.00	1116																									
ZZZZZZ	1.00	1120																									
ZZZZZZ	1.00	1125																									
ZZZZZZ	1.00	1129																									
ZZZZZZ	1.00	1133																									
ZZZZZZ	1.00	1138																									
ZZZZZZ	1.00	1142																									
ZZZZZZ	1.00	1146																									
ZZZZZZ	1.00	1151																									
ZZZZZZ	1.00	1155																									
CCV4	1.00	1202																			X						
CCB4	1.00	1207																			X						
ZZZZZZ	1.00	1212																									

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Instrument ID Number: TRACEICM Method: P

Start Date: 11/05/99 End Date: 11/05/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
ZZZZZZ	1.00	1216																									
ZZZZZZ	1.00	1220																									
ZZZZZZ	1.00	1225																									
PBW1	1.00	1230																			X						
LCSW1	1.00	1235																			X						
ARB001	1.00	1239																			X						
BGW007	1.00	1243																			X						
CGW002	1.00	1248																			X						
CGW002D	1.00	1252																			X						
CCV5	1.00	1259																			X						
CCB5	1.00	1304																			X						
CGW002S	1.00	1308																			X						
CGW002L	5.00	1313																			X						
DGW001	1.00	1317																			X						
EGW001	1.00	1321																			X						
FGW003	1.00	1326																			X						
GFB001	1.00	1330																			X						
HGW004	1.00	1335																			X						
IGW005	1.00	1339																			X						
JGW006	1.00	1343																			X						
KIW001	1.00	1348																			X						
CCV6	1.00	1357																			X						
CCB6	1.00	1402																			X						
CRIF1	1.00	1407																			X						
ICSAF2	1.00	1411																			X						
ICSABF2	1.00	1415																			X						
CGV7	1.00	1425																			X						
CCB7	1.00	1431																			X						

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C19

Instrument ID Number: FIMS400 Method: AV

Start Date: 11/04/99 End Date: 11/04/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0936																X									
S0.2	1.00	0939																X									
S0.5	1.00	0943																X									
S1.0	1.00	0946																X									
S2.0	1.00	0949																X									
S5.0	1.00	0952																X									
S10.0	1.00	0955																X									
ICV1	1.00	0958																X									
ICB1	1.00	1002																X									
CCV1	1.00	1005																X									
CCB1	1.00	1008																X									
ZZZZZZ	1.00	1011																									
CRA1	1.00	1014																X									
ZZZZZZ	1.00	1017																									
ZZZZZZ	1.00	1020																									
ZZZZZZ	1.00	1023																									
ZZZZZZ	1.00	1026																									
ZZZZZZ	1.00	1029																									
ZZZZZZ	1.00	1033																									
ZZZZZZ	1.00	1036																									
CCV2	1.00	1039																X									
CCB2	1.00	1042																X									
ZZZZZZ	1.00	1045																									
ZZZZZZ	1.00	1048																									
ZZZZZZ	1.00	1051																									
ZZZZZZ	1.00	1054																									
ZZZZZZ	1.00	1057																									
ZZZZZZ	1.00	1100																									
ZZZZZZ	1.00	1103																									
ZZZZZZ	1.00	1106																									
ZZZZZZ	1.00	1109																									
CCV3	1.00	1112																X									

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901T

Instrument ID Number: FIMS400 Method: AV

Start Date: 11/04/99 End Date: 11/04/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CCB3	1.00	1115																X									
ZZZZZZ	1.00	1119																									
ZZZZZZ	1.00	1122																									
ZZZZZZ	1.00	1125																									
ZZZZZZ	1.00	1128																									
ZZZZZZ	1.00	1131																									
ZZZZZZ	1.00	1134																									
ZZZZZZ	1.00	1137																									
ZZZZZZ	1.00	1140																									
LCSW1	1.00	1143																X									
CCV4	1.00	1146																X									
CCB4	1.00	1149																X									
PBW1	1.00	1152																X									
ZZZZZZ	1.00	1155																									
ZZZZZZ	1.00	1158																									
ZZZZZZ	1.00	1201																									
ZZZZZZ	1.00	1205																									
ZZZZZZ	1.00	1208																									
ZZZZZZ	1.00	1211																									
ZZZZZZ	1.00	1214																									
ZZZZZZ	1.00	1217																									
CCV5	1.00	1220																X									
CCB5	1.00	1223																X									
ZZZZZZ	1.00	1226																									
ZZZZZZ	1.00	1229																									
ZZZZZZ	1.00	1232																									
ARB001	1.00	1235																X									
BGW007	1.00	1238																X									
CGW002	1.00	1241																X									
CGW002D	1.00	1244																X									
CGW002S	1.00	1247																X									
DGW001	1.00	1251																X									

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Instrument ID Number: FIMS400 Method: AV

Start Date: 11/04/99 End Date: 11/04/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CCV6	1.00	1254																X									
CCB6	1.00	1257																X									
EGW001	1.00	1300																X									
FGW003	1.00	1303																X									
GFB001	1.00	1306																X									
HGW004	1.00	1309																X									
IGW005	1.00	1312																X									
JGW006	1.00	1315																X									
KIW001	1.00	1318																X									
CCV7	1.00	1321																X									
CCB7	1.00	1324																X									

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: LAUCKS TESTING LABS, INC. Contract:

Lab Code: LAUCKS Case No.: SAS No.: SDG No.: C1901D

EPA Sample No.	Client Identification	Full Lab Sample ID	Lab Sample ID for Forms/Raw Data
ARB001	030-RB-001-01F	9910380-07	10380-07
BGW007	030-GW-007-01F	9910380-08	10380-08
CGW002	030-GW-002-01F	9910380-09	10380-09
CGW002D	030-GW-002-01FD	9910380-09D	10380-09D
CGW002S	030-GW-002-01FS	9910380-09S	10380-09S
DGW001	DUP-GW-001-01F	9910380-10	10380-10
EGW001	030-GW-001-01F	9910380-11	10380-11
FGW003	030-GW-003-01F	9910380-12	10380-12
GGW004	030-GW-004-01F	9910417-07	10417-07
HGW005	030-GW-005-01F	9910417-08	10417-08
IGW006	030-GW-006-01F	9910417-09	10417-09

Where D= Duplicate and S= Spike.

Were ICP interelement correction factors applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes, were raw data generated before application of background corrections? Yes/No NO

Comments: See SDG Narrative for specific comments on the metals analysis.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Galina Gringer Name: Galina Gringer

Date: December 1, 1999 Title: Senior Chemist

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2B

CRDL STANDARD FOR AA AND ICP

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

AA CRDL Standard Source: IV

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Found	%R	Final Found	%R
Aluminum								
Antimony				2.0	1.60	80.0	1.60	80.0
Arsenic				2.0	1.40	70.0	2.00	100.0
Barium				4.0	3.90	97.5	3.90	97.5
Beryllium				2.0	2.10	105.0	2.80	140.0
Cadmium				2.0	2.20	110.0	2.00	100.0
Calcium								
Chromium				10.0	8.90	89.0	9.40	94.0
Cobalt				6.0	6.10	101.7	6.20	103.3
Copper				4.0	3.70	92.5	3.80	95.0
Iron								
Lead				2.0	1.90	95.0	1.90	95.0
Magnesium								
Manganese								
Mercury	0.2	0.25	125.0					
Nickel				20.0	15.80	79.0	16.40	82.0
Potassium								
Selenium				10.0	8.60	86.0	10.00	100.0
Silver				6.0	9.10	151.7	8.80	146.7
Sodium								
Thallium				2.0	1.90	95.0	1.90	95.0
Vanadium				4.0	3.60	90.0	3.60	90.0
Zinc				40.0	39.60	99.0	38.40	96.0
Tin					2.70		2.80	

2B

CRDL STANDARD FOR AA AND ICP

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

AA CRDL Standard Source: IV

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Found	%R	Final Found	%R
Aluminum								
Antimony				2.0	1.90	95.0	1.70	85.0
Arsenic				2.0	1.40	70.0	1.60	80.0
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead				2.0	2.20	110.0	2.10	105.0
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver				6.0	9.70	161.7	9.10	151.7
Sodium								
Thallium				2.0	2.10	105.0	2.10	105.0
Vanadium								
Zinc								
Tin				20.0	2.20	11.0	1.90	9.5

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BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Arsenic	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Barium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Calcium											
Chromium	5.0	U	5.0	U	5.0	U	5.0	U	5.600	U	M
Cobalt	3.0	U	3.0	U	3.0	U	3.0	U	3.300	U	M
Copper	2.0	U	2.0	U	2.0	U	2.0	U	2.200	U	M
Iron											
Lead	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Magnesium											
Manganese											
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	AV
Nickel	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M
Potassium											
Selenium	5.0	U	5.0	U	5.0	U	5.0	U	5.600	U	P
Silver	3.0	U	3.0	U	3.0	U	3.0	U	3.300	U	M
Sodium											
Thallium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U	2.200	U	M
Zinc	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M
Tin	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M

FORM III - IN

U.S. EPA - CLP

3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony			1.0	U							M
Arsenic			1.0	U	1.0	U	1.0	U			M
Barium			1.0	U	1.0	U	1.0	U			M
Beryllium			1.0	U	1.0	U	1.0	U			M
Cadmium			1.0	U							M
Calcium											
Chromium			5.0	U	5.0	U	5.0	U			M
Cobalt			3.0	U	3.0	U	3.0	U			M
Copper			2.0	U	2.0	U	2.0	U			M
Iron											
Lead			1.0	U							M
Magnesium											
Manganese											
Mercury			0.2	U							AV
Nickel			10.0	U	10.0	U	10.0	U			M
Potassium											
Selenium			5.0	U	5.0	U	5.0	U			P
Silver			3.0	U							M
Sodium											
Thallium			1.0	U							M
Vanadium			2.0	U	2.0	U	2.0	U			M
Zinc			10.0	U	10.0	U	10.0	U			M
Tin			10.0	U							M

FORM III - IN

U.S. EPA - CLP

3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic			1.0	U							M
Barium											
Beryllium			1.0	U							M
Cadmium											
Calcium											
Chromium			5.0	U							M
Cobalt			3.0	U							M
Copper			2.0	U							M
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel			10.0	U							M
Potassium											
Selenium			5.0	U							P
Silver											
Sodium											
Thallium											
Vanadium			2.0	U							M
Zinc			10.0	U							M
Tin											

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony	1.0	U	1.0	U	1.0	U					M
Arsenic	1.0	U	1.0	U	1.0	U					M
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead	1.0	U	1.0	U	1.0	U					M
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver	3.0	U	3.0	U	3.0	U					M
Sodium											
Thallium	1.0	U	1.0	U	1.0	U					M
Vanadium											
Zinc											
Tin	10.0	U	10.0	U	10.0	U					M

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U.S. EPA - CLP

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Method: M

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
ARB001	11/02/99	45	50
BGW007	11/02/99	45	50
CGW002	11/02/99	45	50
CGW002D	11/02/99	45	50
CGW002S	11/02/99	45	50
DGW001	11/02/99	45	50
EGW001	11/02/99	45	50
FGW003	11/02/99	45	50
GGW004	11/02/99	45	50
HGW005	11/02/99	45	50
IGW006	11/02/99	45	50
LCSW1	11/02/99	45	50
PBW1	11/02/99	45	50

FORM XIII - IN

U.S. EPA - CLP

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Method: P

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
ARB001	11/02/99	45	50
BGW007	11/02/99	45	50
CGW002	11/02/99	45	50
CGW002D	11/02/99	45	50
CGW002S	11/02/99	45	50
DGW001	11/02/99	45	50
EGW001	11/02/99	45	50
FGW003	11/02/99	45	50
GGW004	11/02/99	45	50
HGW005	11/02/99	45	50
IGW006	11/02/99	45	50
LCSW1	11/02/99	45	50
PBW1	11/02/99	45	50

FORM XIII - IN

U.S. EPA - CLP

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C190

Method: AV

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
ARB001	11/03/99	100	100
BGW007	11/03/99	100	100
CGW002	11/03/99	100	100
CGW002D	11/03/99	100	100
CGW002S	11/03/99	100	100
DGW001	11/03/99	100	100
EGW001	11/03/99	100	100
FGW003	11/03/99	100	100
GGW004	11/03/99	100	100
HGW005	11/03/99	100	100
IGW006	11/03/99	100	100
LCSW1	11/03/99	100	100
PBW1	11/03/99	100	100
S0.2	11/03/99		
S0.5	11/03/99		
S10.0	11/03/99		
S1.0	11/03/99		
S2.0	11/03/99		
S5.0	11/03/99		
S0	11/03/99		

FORM XIII - IN

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/03/99 End Date: 11/03/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0817			X										X							X		X			X
S1	1.00	0822			X										X							X		X			X
S2	1.00	0827			X										X							X		X			X
S3	1.00	0832			X										X							X		X			X
ZZZZZZ	1.00	0837																									
ZZZZZZ	1.00	0842																									
ICV1	1.00	0848			X										X							X		X			X
ICB1	1.00	0853			X										X							X		X			X
CCV1	1.00	0858			X										X							X		X			X
CCB1	1.00	0904			X										X							X		X			X
CRII1	1.00	0909			X										X							X		X			X
ICSAI1	1.00	0914			X										X							X		X			X
ICSABI1	1.00	0919			X										X							X		X			X
CCV2	1.00	0924			X										X							X		X			X
CCB2	1.00	0929			X										X							X		X			X
PBW1	1.00	0935			X										X							X		X			X
LCSW1	1.00	0940			X										X							X		X			X
ARB001	1.00	0945			X										X							X		X			X
BGW007	1.00	0950			X										X							X		X			X
CGW002	1.00	0955			X										X							X		X			X
CGW002D	1.00	1000			X										X							X		X			X
CGW002S	1.00	1005			X										X							X		X			X
CGW002A	1.00	1010			X										X							X		X			X
CGW002L	5.00	1016			X										X							X		X			X
CCV3	1.00	1021			X										X							X		X			X
CCB3	1.00	1026			X										X							X		X			X
DGW001	1.00	1031			X										X							X		X			X
EGW001	1.00	1036			X										X							X		X			X
FGW003	1.00	1041			X										X							X		X			X
GGW004	1.00	1047																									X
HGW005	1.00	1052																									
IGW006	1.00	1057																									

MH 12/06

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/03/99 End Date: 11/03/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CRIF1	1.00	1103			X										X							X		X			X
ICSAF1	1.00	1108			X										X							X		X			X
ICSABF1	1.00	1114			X										X							X		X			X
CCV4	1.00	1119			X										X							X		X			X
CCB4	1.00	1124			X										X							X		X			X

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/03/99 End Date: 11/03/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	1138				X		X			X	X	X						X						X	X	
S1	1.00	1144				X		X			X	X	X						X						X	X	
S2	1.00	1149				X		X			X	X	X						X						X	X	
S3	1.00	1154				X		X			X	X	X						X						X	X	
ICV1	1.00	1159				X		X			X	X	X						X						X	X	
ICB1	1.00	1204				X		X			X	X	X						X						X	X	
CCV1	1.00	1210				X		X			X	X	X						X						X	X	
CCB1	1.00	1215				X		X			X	X	X						X						X	X	
CRII1	1.00	1220				X		X			X	X	X						X						X	X	
ICSAI1	1.00	1225				X		X			X	X	X						X						X	X	
ICSABI1	1.00	1230				X		X			X	X	X						X						X	X	
CCV2	1.00	1236				X		X			X	X	X						X						X	X	
CCB2	1.00	1241				X		X			X	X	X						X						X	X	
ZZZZZZ	1.00	1246																									
ZZZZZZ	1.00	1251																									
ZZZZZZ	1.00	1256																									
ZZZZZZ	1.00	1301																									
ZZZZZZ	1.00	1306																									
ZZZZZZ	1.00	1312																									
ZZZZZZ	1.00	1317																									
ZZZZZZ	1.00	1322																									
ZZZZZZ	1.00	1327																									
ZZZZZZ	1.00	1332																									
CCV3	1.00	1337				X		X			X	X	X						X						X	X	
CCB3	1.00	1342				X		X			X	X	X						X						X	X	
ZZZZZZ	1.00	1348																									
ZZZZZZ	1.00	1353																									
ZZZZZZ	1.00	1416																									
ZZZZZZ	1.00	1421																									
ZZZZZZ	1.00	1426																									
ZZZZZZ	1.00	1431																									
CCV4	1.00	1436				X		X			X	X	X						X						X	X	

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/03/99 End Date: 11/03/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CCB4	1.00	1441				X		X			X	X	X						X						X	X	
ZZZZZZ	1.00	1447																									
ZZZZZZ	1.00	1452																									
ZZZZZZ	1.00	1457																									
ZZZZZZ	1.00	1502																									
ZZZZZZ	1.00	1507																									
CRIF1	1.00	1512				X		X			X	X	X						X						X	X	
ICSAF1	1.00	1517				X		X			X	X	X						X						X	X	
ICSABF1	1.00	1523				X		X			X	X	X						X						X	X	
CCV5	1.00	1528				X		X			X	X	X						X						X	X	
CCB5	1.00	1533				X		X			X	X	X						X						X	X	
PBW1	1.00	1542				X		X			X	X	X						X						X	X	
LCSW1	1.00	1547				X		X			X	X	X						X						X	X	
ARB001	1.00	1551				X		X			X	X	X						X						X	X	
BGW007	1.00	1555				X		X			X	X	X						X						X	X	
CGW002	1.00	1558				X		X			X	X	X						X						X	X	
CGW002D	1.00	1602				X		X			X	X	X						X						X	X	
CGW002S	1.00	1606				X		X			X	X	X						X						X	X	
CGW002A	1.00	1610				X		X			X	X	X						X						X	X	
CGW002L	5.00	1614				X		X			X	X	X						X						X	X	
CCV6	1.00	1617				X		X			X	X	X						X						X	X	
CCB6	1.00	1621				X		X			X	X	X						X						X	X	
DGW001	1.00	1625				X		X			X	X	X						X						X	X	
EGW001	1.00	1629				X		X			X	X	X						X						X	X	
FGW003	1.00	1633				X		X			X	X	X						X						X	X	
GGW004	1.00	1637						X			X	X	X						X						X	X	
HGW005	1.00	1640						X			X	X	X						X						X	X	
IGW006	1.00	1644						X			X	X	X						X						X	X	
CRIF1	1.00	1648				X		X			X	X	X						X						X	X	
ICSAF1	1.00	1652				X		X			X	X	X						X						X	X	
ICSABF1	1.00	1656				X		X			X	X	X						X						X	X	
CCV7	1.00	1700				X		X			X	X	X						X						X	X	

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/03/99 End Date: 11/03/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CCB7	1.00	1703				X		X			X	X	X						X						X	X	

FORM XIV - IN

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/17/99 End Date: 11/17/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	1238					X																				
S1	1.00	1241					X																				
S2	1.00	1244					X																				
S3	1.00	1247					X																				
ICV1	1.00	1250					X																				
ICB1	1.00	1252					X																				
CCV1	1.00	1255					X																				
CCB1	1.00	1258					X																				
CRII1	1.00	1301					X																				
ICSAI1	1.00	1304					X																				
ICSABI1	1.00	1306					X																				
CCV2	1.00	1309					X																				
CCB2	1.00	1312					X																				
ZZZZZZ	1.00	1315																									
ZZZZZZ	1.00	1318																									
ZZZZZZ	1.00	1320																									
ZZZZZZ	1.00	1323																									
ZZZZZZ	1.00	1326																									
ZZZZZZ	1.00	1329																									
ZZZZZZ	1.00	1332																									
ZZZZZZ	1.00	1334																									
ZZZZZZ	1.00	1337																									
ZZZZZZ	1.00	1340																									
CCV3	1.00	1343					X																				
CCB3	1.00	1346					X																				
ZZZZZZ	1.00	1348																									
ZZZZZZ	1.00	1351																									
ZZZZZZ	1.00	1354																									
ZZZZZZ	1.00	1357																									
ZZZZZZ	1.00	1400																									
ZZZZZZ	1.00	1403																									
ZZZZZZ	1.00	1405																									

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/17/99 End Date: 11/17/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
ZZZZZZ	1.00	1408																									
ZZZZZZ	1.00	1411																									
ZZZZZZ	1.00	1414																									
CCV4	1.00	1417					X																				
CCB4	1.00	1420					X																				
PBW1	1.00	1422					X																				
LCSW1	1.00	1425					X																				
ARB001	1.00	1428					X																				
BGW007	1.00	1431					X																				
CGW002	1.00	1434					X																				
CGW002D	1.00	1436					X																				
CGW002S	1.00	1439					X																				
CGW002A	1.00	1442					X																				
CGW002L	5.00	1445					X																				
CCV5	1.00	1448					X																				
CCB5	1.00	1450					X																				
DGW001	1.00	1453					X																				
EGW001	1.00	1456					X																				
FGW003	1.00	1459					X																				
GGW004	1.00	1502					X																				
HGW005	1.00	1505					X																				
IGW006	1.00	1507					X																				
CRIF1	1.00	1510					X																				
ICSAF1	1.00	1513					X																				
ICSABF1	1.00	1516					X																				
CCV6	1.00	1519					X																				
CCB6	1.00	1522					X																				

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/29/99 End Date: 11/29/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0824							X																		
S1	1.00	0827							X																		
S2	1.00	0830							X																		
S3	1.00	0833							X																		
ICV1	1.00	0836							X																		
ICB1	1.00	0839							X																		
CCV1	1.00	0842							X																		
CCB1	1.00	0845							X																		
CRII1	1.00	0848							X																		
ICSAI1	1.00	0851							X																		
ICSABI1	1.00	0855							X																		
CCV2	1.00	0858							X																		
CCB2	1.00	0901							X																		
PBW1	1.00	0904							X																		
LCSW1	1.00	0907							X																		
ARB001	1.00	0910							X																		
BGW007	1.00	0913							X																		
CGW002	1.00	0916							X																		
CGW002D	1.00	0919							X																		
CGW002S	1.00	0922							X																		
CGW002A	1.00	0926							X																		
CGW002L	5.00	0929							X																		
CCV3	1.00	0932							X																		
CCB3	1.00	0935							X																		
DGW001	1.00	0938							X																		
EGW001	1.00	0941							X																		
FGW003	1.00	0944							X																		
GGW004	1.00	0947							X																		
HGW005	1.00	0951							X																		
IGW006	1.00	0954							X																		
CRIF1	1.00	0957							X																		
ICSAF1	1.00	1000							X																		

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: TRACEICM Method: P

Start Date: 11/05/99 End Date: 11/05/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0943																			X						
S	1.00	0947																			X						
S1	1.00	0951																									
S2	1.00	0955																									
S3	1.00	0958																									
ICV1	1.00	1001																			X						
ICB1	1.00	1008																			X						
CCV1	1.00	1012																			X						
CCB1	1.00	1019																			X						
CRII1	1.00	1023																			X						
ICSAI2	1.00	1031																			X						
ICSABI2	1.00	1035																			X						
CCV2	1.00	1040																			X						
CCB2	1.00	1046																			X						
ZZZZZZ	1.00	1050																									
ZZZZZZ	1.00	1055																									
ZZZZZZ	1.00	1059																									
CCV3	1.00	1106																			X						
CCB3	1.00	1112																			X						
PBW1	1.00	1116																			X						
LCSW1	1.00	1120																			X						
ARB001	1.00	1125																			X						
BGW007	1.00	1129																			X						
CGW002	1.00	1133																			X						
CGW002D	1.00	1138																			X						
CGW002S	1.00	1142																			X						
CGW002L	5.00	1146																			X						
DGW001	1.00	1151																			X						
EGW001	1.00	1155																			X						
CCV4	1.00	1202																			X						
CCB4	1.00	1207																			X						
FGW003	1.00	1212																			X						

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: TRACEICM Method: P

Start Date: 11/05/99 End Date: 11/05/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
GGW004	1.00	1216																			X						
HGW005	1.00	1220																			X						
IGW006	1.00	1225																			X						
ZZZZZZ	1.00	1230																									
ZZZZZZ	1.00	1235																									
ZZZZZZ	1.00	1239																									
ZZZZZZ	1.00	1243																									
ZZZZZZ	1.00	1248																									
ZZZZZZ	1.00	1252																									
CCV5	1.00	1259																			X						
CCB5	1.00	1304																			X						
ZZZZZZ	1.00	1308																									
ZZZZZZ	1.00	1313																									
ZZZZZZ	1.00	1317																									
ZZZZZZ	1.00	1321																									
ZZZZZZ	1.00	1326																									
ZZZZZZ	1.00	1330																									
ZZZZZZ	1.00	1335																									
ZZZZZZ	1.00	1339																									
ZZZZZZ	1.00	1343																									
ZZZZZZ	1.00	1348																									
CCV6	1.00	1357																			X						
CCB6	1.00	1402																			X						
CRIF1	1.00	1407																			X						
ICSAF2	1.00	1411																			X						
ICSABF2	1.00	1415																			X						
CCV7	1.00	1425																			X						
CCB7	1.00	1431																			X						

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: FIMS400 Method: AV

Start Date: 11/04/99 End Date: 11/04/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0936																X									
S0.2	1.00	0939																X									
S0.5	1.00	0943																X									
S1.0	1.00	0946																X									
S2.0	1.00	0949																X									
S5.0	1.00	0952																X									
S10.0	1.00	0955																X									
ICV1	1.00	0958																X									
ICB1	1.00	1002																X									
CCV1	1.00	1005																X									
CCB1	1.00	1008																X									
LCSW1	1.00	1011																X									
CRA1	1.00	1014																X									
PBW1	1.00	1017																X									
ZZZZZZ	1.00	1020																									
ZZZZZZ	1.00	1023																									
ZZZZZZ	1.00	1026																									
ZZZZZZ	1.00	1029																									
ZZZZZZ	1.00	1033																									
ZZZZZZ	1.00	1036																									
CCV2	1.00	1039																X									
CCB2	1.00	1042																X									
ZZZZZZ	1.00	1045																									
ZZZZZZ	1.00	1048																									
ZZZZZZ	1.00	1051																									
ZZZZZZ	1.00	1054																									
ZZZZZZ	1.00	1057																									
ZZZZZZ	1.00	1100																									
ARB001	1.00	1103																X									
BGW007	1.00	1106																X									
CGW002	1.00	1109																X									
CCV3	1.00	1112																X									

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: FIMS400 Method: AV

Start Date: 11/04/99 End Date: 11/04/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CCB3	1.00	1115																X									
CGW002D	1.00	1119																X									
CGW002S	1.00	1122																X									
DGW001	1.00	1125																X									
EGW001	1.00	1128																X									
FGW003	1.00	1131																X									
GGW004	1.00	1134																X									
HGW005	1.00	1137																X									
IGW006	1.00	1140																X									
ZZZZZZ	1.00	1143																									
CCV4	1.00	1146																X									
CCB4	1.00	1149																X									

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901D

Instrument ID Number: ELAN5000 Method: M

Start Date: 11/29/99 End Date: 11/29/99

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
ICSABF1	1.00	1003							X																		
CCV4	1.00	1006							X																		
CCB4	1.00	1009							X																		

ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1901P

Instrument ID Number: ELAN5000 Method: M

Start Date: 12/04/99 End Date: 12/04/99

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0948			X	X									X							X		X			X
S1	1.00	0953			X	X									X							X		X			X
S2	1.00	0958			X	X									X							X		X			X
S3	1.00	1003			X	X									X							X		X			X
ICV2	1.00	1009			X	X									X							X		X			X
ICB2	1.00	1014			X	X									X							X		X			X
CCV21	1.00	1019			X	X									X							X		X			X
CCB21	1.00	1024			X	X									X							X		X			X
CRII2	1.00	1030			X	X									X							X		X			X
ICSAI3	1.00	1035			X	X									X							X		X			X
ICSABI3	1.00	1040			X	X									X							X		X			X
GGW004	1.00	1046			X	X									X							X		X			
HGW005	1.00	1051			X	X									X							X		X			X
IGW006	1.00	1056			X	X									X							X		X			
CRIF2	1.00	1101			X	X									X							X		X			
ICSAF3	1.00	1106			X	X									X							X		X			X
ICSABF3	1.00	1111			X	X									X							X		X			X
CCV22	1.00	1116			X	X									X							X		X			X
CCB22	1.00	1122			X	X									X							X		X			X

998A

QUANTITATIVE ANALYSIS: SUMMARY REPORT

Data Set: 1103B
Data Set Description:
Parameter File: crane

Sample ID: 10380-04 DUP-GW-001-01
Sample Description:
Sample Type: Sample
Sequence Number: 026
Blank: Subtracted (001)
Dilution Factor: 1
Number of Repeats: 3
Time: 13:48:01 Nov 3 1999
Signal Profile Processing: Average
Spectral Peak Processing: Average
Deadtime Correction: 35

Calibration File: MING
Calibration: External Standard

	Sample Intensity	Std. Dev.	Blank Intensity	Std. Dev.
Be 9	36	1.6440	31	5.3182
Cl 35	316564	1.390E+04	7081	416.1813
Cl 37	1243262	3.866E+04	1088098	1.530E+04
Sc 45	160048	4888.1992	157724	4268.7930
Ti 46	9377	1854.2916	805	330.9347
Ti 47	431	32.9696	75	5.9426
Ti 48	516427	3.494E+04	-513	45.0320
Ti 49	2233	163.5234	40	12.6531
Ti 50	6982	398.5241	49	26.3913
Cr 50	6822	381.0836	79	21.0393
Cr 52	3053	166.0042	1645	38.3927
Cr 53	338	47.8452	154	36.5920
Cr 54	-5905	752.6860	-3864	695.1951
V 50	6668	374.5662	-5	22.2156
V 51	1121	14.6363	439	155.8774
Ni 58	3721	402.1235	-340	23.9851
Ni 60	2568	132.8429	43	9.3880
Ni 61	722	41.6898	266	17.0382
Ni 62	339	74.7763	43	3.2236
Ni 64	10790	496.3277	33	34.1293
Co 59	554	19.5944	168	11.1477
Cu 63	1560	92.7294	415	26.2455
Cu 65	1745	76.5353	237	8.4538
Zn 64	14400	605.6042	237	27.2199
Zn 66	2114	67.8130	117	4.8966
Zn 67	287	18.3333	29	4.2577
Zn 68	1065	38.0277	121	7.6213
Zn 70	-269	31.6109	-25	23.1676
As 75	312	24.7534	65	28.6526

QUANTITATIVE ANALYSIS: SUMMARY REPORT

	Sample Intensity	Std. Dev.	Blank Intensity	Std. Dev.
Se 74	-578	46.1286	-81	21.6680
Se 76	8830	517.2408	8259	465.0064
Se 77	38	3.1652	19	5.8447
Se 78	1784	107.1148	1582	101.0611
Se 80	1276288	2.749E+04	1185000	6.239E+04
Se 82	86	11.3511	5	9.8540
Ag 107	39	7.0481	23	2.3343
Ag 109	37	3.0421	21	2.5587
Cd 106	-66	14.8788	3	5.9074
Cd 108	-78	15.8139	-1	8.6749
Cd 110	38	12.9185	31	5.1552
Cd 111	96	16.5591	37	12.0362
Cd 112	182	5.5844	71	17.9714
Cd 113	3739	208.0275	3705	342.1272
Cd 114	197	5.1863	91	11.2464
Cd 116	55	29.3555	23	11.3077
In 115	84129	318.6866	82657	2238.2107
Sn 118	102	24.9081	31	6.3411
Sn 120	118	22.7802	31	16.6950
Sb 121	33	2.4277	17	3.8573
Sb 123	29	4.6579	16	4.5786
Ba 130	-35	35.4842	-66	21.3896
Ba 132	9	27.9368	18	47.6328
Ba 134	616	58.6521	50	15.2753
Ba 135	1677	42.9807	119	16.7167
Ba 136	1952	85.5554	126	19.0948
Ba 137	2886	152.1311	202	23.7685
Ba 138	18284	691.8798	1127	71.8074
Tl 203	43	5.8714	22	1.6268
Tl 205	97	12.3472	24	2.7243
Pb 204	21	7.6696	10	4.5904
Pb 206	92	3.7145	47	10.1050
Pb 207	86	10.1595	30	5.8601
Pb 208	165	21.8544	56	1.9680
Bi 209	59889	2121.0342	62619	358.3761

	Net Ratio/ Intensity	Std. Dev.	Conc.	Std. Dev.		% RSD
Be 9	2.594E-05	3.525E-05	4.178E-05	5.676E-05	mg/L	135.86
Cl 35	1.9330	0.0869				
Cl 37	0.8693	0.2603				
Sc 45	160048	4888.1992			ions/sec	
Ti 46	0.0535	0.0118				
Ti 47	2.222E-03	2.094E-04				
Ti 48	3.2299	0.2183				
Ti 49	0.0137	1.025E-03				
Ti 50	0.0433	2.496E-03				
Cr 50	0.0421	2.385E-03	0.0986	5.580E-03	mg/L	5.66
Cr 52	8.646E-03	1.065E-03	1.019E-03	1.256E-04	mg/L	1[illegible].32

QUANTITATIVE ANALYSIS: SUMMARY REPORT

	Net Ratio/ Intensity	Std. Dev.	Conc.	Std. Dev.	% RSD
Cr 53	1.131E-03	3.784E-04	1.142E-03	3.824E-04 mg/L	33.46
Cr 54	-0.0124	6.446E-03	-0.0370	0.0192 mg/L	52.00
V 50	0.0417	2.345E-03	3.2567	0.1831 mg/L	5.62
V 51	4.216E-03	9.925E-04	4.654E-04	1.096E-04 mg/L	23.54
Ni 58	0.0254	2.517E-03	4.927E-03	4.882E-04 mg/L	9.90
Ni 60	0.0158	8.321E-04	7.541E-03	3.979E-04 mg/L	5.27
Ni 61	2.820E-03	2.820E-04	0.0304	3.039E-03 mg/L	10.00
Ni 62	1.845E-03	4.677E-04	6.069E-03	1.539E-03 mg/L	25.35
Ni 64	0.0672	3.109E-03	1.2315	0.0570 mg/L	4.62
Co 59	2.396E-03	1.414E-04	2.586E-04	1.526E-05 mg/L	5.89
Cu 63	7.116E-03	6.028E-04	1.591E-03	1.347E-04 mg/L	8.47
Cu 65	9.400E-03	4.812E-04	4.353E-03	2.228E-04 mg/L	5.11
Zn 64	0.0885	3.788E-03	0.0587	2.514E-03 mg/L	4.28
Zn 66	0.0125	4.248E-04	0.0140	4.758E-04 mg/L	3.40
Zn 67	1.604E-03	1.177E-04	0.0108	7.952E-04 mg/L	7.33
Zn 68	5.887E-03	2.425E-04	9.324E-03	3.840E-04 mg/L	4.11
Zn 70	-1.518E-03	2.461E-04	-0.0727	0.0118 mg/L	16.21
As 75	1.542E-03	2.386E-04	1.385E-03	2.143E-04 mg/L	15.47
Se 74	-3.096E-03	3.193E-04	-0.5646	0.0582 mg/L	10.31
Se 76	2.803E-03	4.375E-03	0.0512	0.0799 mg/L	156.06
Se 77	1.201E-04	4.200E-05	1.935E-03	6.764E-04 mg/L	34.96
Se 78	1.118E-03	9.265E-04	5.871E-03	4.865E-03 mg/L	82.85
Se 80	0.4613	0.4313	0.7284	0.6810 mg/L	93.49
Se 82	5.079E-04	9.452E-05	6.425E-03	1.196E-03 mg/L	18.60
Ag 107	1.793E-04	8.841E-05	2.159E-05	1.064E-05 mg/L	49.29
Ag 109	1.792E-04	4.760E-05	2.317E-05	6.157E-06 mg/L	26.56
Cd 106	-8.217E-04	1.908E-04	-5.536E-03	1.285E-03 mg/L	23.21
Cd 108	-9.119E-04	2.153E-04	-7.872E-03	1.858E-03 mg/L	23.60
Cd 110	7.517E-05	1.657E-04	4.704E-05	1.037E-04 mg/L	220.47
Cd 111	6.954E-04	2.448E-04	4.317E-04	1.520E-04 mg/L	35.20
Cd 112	1.307E-03	2.273E-04	4.301E-04	7.480E-05 mg/L	17.39
Cd 113	-3.709E-04	4.821E-03	-2.446E-04	3.179E-03 mg/L	1299.78
Cd 114	1.239E-03	1.494E-04	3.411E-04	4.112E-05 mg/L	12.05
Cd 116	3.716E-04	3.748E-04	5.167E-04	5.211E-04 mg/L	100.85
In 115	84129	318.6866		ions/sec	
Sn 118	8.338E-04	3.058E-04	1.794E-04	6.580E-05 mg/l	36.68
Sn 120	1.028E-03	3.378E-04	1.619E-04	5.322E-05 mg/l	32.8
Sb 121	1.873E-04	5.487E-05	3.311E-05	9.698E-06 mg/L	29.2
Sb 123	1.472E-04	7.832E-05	3.576E-05	1.903E-05 mg/L	53.2
Ba 130	3.824E-04	4.948E-04	0.0190	0.0246 mg/L	129.4
Ba 132	-1.034E-04	6.651E-04	-5.312E-03	0.0342 mg/L	643.0
Ba 134	6.713E-03	7.212E-04	0.0148	1.595E-03 mg/L	10.7
Ba 135	0.0185	5.495E-04	0.0140	4.169E-04 mg/L	2.9
Ba 136	0.0217	1.043E-03	0.0141	6.773E-04 mg/L	4.8
Ba 137	0.0319	1.831E-03	0.0143	8.212E-04 mg/L	5.7
Ba 138	0.2037	8.270E-03	0.0145	5.882E-04 mg/L	4.0
Tl 203	3.778E-04	1.014E-04	4.951E-05	1.329E-05 mg/L	26.8
Tl 205	1.246E-03	2.107E-04	6.654E-05	1.125E-05 mg/L	16.9
Pb 204	1.765E-04	1.476E-04	5.264E-04	4.400E-04 mg/L	83.5

$$\frac{1.385E\text{-}03\ mg}{L} \times \frac{1000\ ug}{mg} \times \frac{50}{45} = 1.6\ \frac{ug}{L}$$

Printed 13:50 PST Nov 3 1999

FIELD DUPLICATE PRECISION

COMPOUND	030-GW-007-01	DUP-GW-001-01	RPD
Antimony	1.1U	1.1U	
Arsenic	1.1	1.6	37.04
Barium	14.1	14.1	0.00
Beryllium	1.1U	1.1U	
Cadmium	1.1U	1.0U	
Chromium	5.6U	5.6U	
Cobalt	3.3U	3.3U	
Copper	2.2U	2.2U	
Lead	1.1U	1.1U	
Mercury	0.20U	0.20U	
Nickel	11.1U	11.1U	
Selenium	5.6U	5.6U	
Silver	3.3U	3.3U	
Thallium	1.1U	1.1U	
Tin	11.1U	11.1U	
Vanadium	2.2U	2.2U	
Zinc	17.2	15.6	9.76
Ammonia	0.01U	0.01U	
Cyanide	0.005U	0.005U	
Nitrate/Nitrite	0.3	0.32	6.45
TKN	0.3U	0.4	
Phosphorus	0.1U	0.1U	

COMPOUND	030-GW-007-01-F	DUP-GW-001-01-F	RPD
Antimony	1.1U	1.1U	
Arsenic	1.3	1.3	0.00
Barium	13	13.1	0.77
Beryllium	1.1U	1.1U	
Cadmium	1.1U	1.0U	
Chromium	5.6U	5.6U	
Cobalt	3.3U	3.3U	
Copper	2.2U	2.2U	
Lead	1.1U	1.1U	
Mercury	0.20U	0.20U	
Nickel	11.1U	11.1U	
Selenium	5.6U	5.6U	
Silver	3.3U	3.3U	
Thallium	1.1U	1.1U	
Tin	11.1U	11.1U	
Vanadium	2.2U	2.2U	
Zinc	12.9	12.9	0.00
Phosphorus	0.1U	0.1U	

ROUND 2
JANUARY 2000

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-12-8-161

TO: ROGER CLARK

DATE: FEBRAURY 28, 2000

FROM: JUSTIN ORBICH

COPIES: DW [redacted]

SUBJECT: ORGANIC DATA VALIDATION – VOA/EXP
CTO 019 – NSWC CRANE, INDIANA
SDG C1902

SAMPLES: 10/Aqueous

030-GW-001-02	030-GW-002-02
030-GW-003-02	030-GW-004-02
030-GW-005-02	030-GW-006-02
030-GW-007-02	030-TB-001-02
030-TB-002-02	DUP-GW-001-02

Overview

The sample set for CTO 019, Naval Surface Warfare Center (NSWC) Crane, SDG CP1902, consists of ten (10) aqueous environmental samples, which includes two (2) trip blank designated (designated TB). All samples were analyzed for Target Compound List (TCL) plus selected Appendix IX volatile and explosive organic compounds. The trip blank was analyzed for TCL plus selected appendix IX volatile compounds only. One (1) field duplicate pair (030-GW-006-02/DUP-GW-001-02) was included in this SDG.

The samples were collected by Tetra Tech NUS on January 11th, 12th, and 13th, 2000 and analyzed by Laucks Testing Labs. The samples were analyzed under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and according to SW 846 method 8260B and 8330. This data was evaluated based on the following parameters:

- Data completeness
- * Holding Times
- * GC/MS tuning and system performance
- * Laboratory method and field quality control blank results
- Initial and continuing calibration
- * Surrogate spike recoveries
- Matrix Spike/Matrix Spike Duplicate results
- Laboratory control samples
- * Internal standard performance
- * Field duplicate precision
- * Compound identification
- * Compound quantitation
- * Detection Limits

The symbol (*) indicates that quality control criteria were met for this parameter. Problems affecting data usability are discussed below and the attached Table 1 summarizes the validation qualifications.

VOLATILE FRACTION

The initial and continuing calibration Relative Response Factors (RRFs) were below the quality control limits for acetone, 2-butanone, 4-methyl-2-pentanone, 2-hexanone, acrolein, acrylonitrile, methacrylonitrile, methyl methacrylate, and trans-1,4-dichloro-2-butene. The nondetected results were qualified rejected (UR), in all samples.

The continuing calibration Percent Differences (%Ds) exceeded the 25% quality control limits for dichlorodifluoromethane, vinyl acetate, and chloroprene on 1/17/00 at 1126. The nondetected results were qualified as estimated (UJ), in samples 030-GW-001-02, 030-GW-002-02, 030-GW-004-02, 030-GW-005-02, and 030-TB-001-02.

The continuing calibration Percent Differences (%Ds) exceeded the 25% quality control limits for vinyl acetate and chloroprene on 1/18/00 at 1058. The nondetected results were qualified as estimated (UJ), in samples 030-GW-003-02, 030-GW-006-02, 030-GW-007-02, 030-TB-002-02, and DUP-GW-001-02.

The Matrix Spike/Matrix Spike Duplicate (MS/MSD) Percent Recovery (%R) for acetone and dichlorodifluoromethane in sample 030-GW-003-02 was below the quality control limits. The nondetected result for dichlorodifluoromethane was qualified as estimated (UJ). No action was warranted on acetone since the result was qualified for a prior calibration noncompliance.

The following compounds were detected in the volatile method blanks at the maximum concentrations indicated below:

Compound	Concentration	Aqueous Action Level
Methylene chloride	0.4 µg/L	4.0 µg/L

Sample aliquot and dilution factors were taken into consideration during the application of all action levels. No action was warranted since only nondetected results were reported.

It should be noted that the laboratory reported the result for methylene chloride in sample 030-TB-001-02 incorrectly. As per the QAPP specifications, the parameters detected at concentrations below the reporting limits should be qualified as nondetected. The reviewer amended the result for methylene chloride as nondetected.

EXPLOSIVE FRACTION

The MS/MSD %R for 2,4,6-trinitrotoluene and HMX in sample 030-GW-003-02 was below the quality control limits. The nondetected results were qualified as estimated (UJ).

The limits reported by the laboratory exceed the limits specified in the Quality Assurance Project Plan (QAPP) due to the salting out procedure. The fluctuations in sample final volume (due to salting out procedure) cause reporting limits to vary. This accounts for the discrepancy between actual reporting limits and those defined in the QAPP.

The 0.61 reporting specified in the QAPP, for RDX, was not used to determine a final sample reporting limit. The laboratory used an incorrect limit of 0.65 and adjusted each sample based upon the final volume. The data reviewer corrected all Form Is and electronic files to reflect the 0.61 limit, which was, adjusted for sample final volume. It is further noted that the adjusted reporting limits for RDX exceed the Risk Base Target Level in each sample.

MEMO TO: ROGER CLARK
DATE: FEBRUARY 28, 2000 – PAGE 3

EXCUTIVE SUMMARY

Laboratory Performance: The initial and continuing calibration RRFs were below the quality control limits for several compounds. The continuing calibration %Ds exceeded the quality control limits for several compounds. It should be noted that the laboratory did not spike several requested compounds in the MS/MSD sample. The laboratory used the incorrect reporting limit in the calculation for RDX.

Other Factors Affecting Data Quality: A MS/MSD %R was below the quality control limit for several compounds in both fractions. In the explosive fraction, all the samples were analyzed at a 2X dilution.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review" (February 1994), EPA Region V Standard Operating Procedures for Validation of CLP Organic Data", (August 1993), and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC February 1996).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS

Justin Orbich
Chemist/Data Validator

Tetra Tech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

U	-	Value is a nondetected result as reported by the laboratory and should not be considered present.
UJ	-	Nondetected result is considered to be estimated as a result of technical noncompliances.
UR	-	Compound was rejected due to severe technical noncompliances or as a result of calibration RRF noncompliances.

APPENDIX A

Qualified Analytical Results

CTO01[illegible] NSWC CRANE
WATER[illegible]TA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-001-02			030-GW-002-02			030-GW-003-02			030-GW-004-02		
SAMPLE DATE:	01/12/00			01/12/00			01/13/00			01/11/00		
LABORATORY ID:	0001252-05			0001252-04			0001334-03			0001252-01		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHENE	1	U		1	U		1	U		1	U	
1,2,3-TRICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROPROPANE	0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
2-HEXANONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
4-METHYL-2-PENTANONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ACETONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ACROLEIN	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACRYLONITRILE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ALLYL CHLORIDE	10	U		10	U		10	U		10	U	
BENZENE	1	U		1	U		1	U		1	U	
BROMODICHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMOFORM	1	U		1	U		1	U		1	U	
BROMOMETHANE	1	U		1	U		1	U		1	U	
CARBON DISULFIDE	1	U		1	U		1	U		1	U	
CARBON TETRACHLORIDE	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROBENZENE	1	U		1	U		1	U		1	U	
CHLOROETHANE	1	U		1	U		1	U		1	U	
CHLOROFORM	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROMETHANE	1	U		1	U		1	U		1	U	
CHLOROPRENE	10	UJ	C	10	UJ	C	10	UJ	C	10	UJ	C
CIS-1,3-DICHLOROPROPENE	1	U		1	U		1	U		1	U	
DIBROMOCHLOROMETHANE	1	U		1	U		1	U		1	U	
DIBROMOMETHANE	1	U		1	U		1	U		1	U	
DICHLORODIFLUOROMETHANE	1	UJ	C	1	UJ	C	1	UJ	D	1	UJ	C
ETHYL METHACRYLATE	10	U		10	U		10	U		10	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-001-02			030-GW-002-02			030-GW-003-02			030-GW-004-02		
SAMPLE DATE:	01/12/00			01/12/00			01/13/00			01/11/00		
LABORATORY ID:	0001252-05			0001252-04			0001334-03			0001252-01		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
ETHYLBENZENE	1	U		1	U		1	U		1	U	
IODOMETHANE	10	U		10	U		10	U		10	U	
METHACRYLONITRILE	1	UR	C	1	UR	C	1	UR	C	1	UR	C
METHYL METHACRYLATE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
METHYLENE CHLORIDE	1	U		1	U		1	U		1	U	
STYRENE	1	U		1	U		1	U		1	U	
TETRACHLOROETHENE	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U		1	U	
TRANS-1,3-DICHLOROPROPENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRANS-1,4-DICHLORO-2-BUTENE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
TRICHLOROETHENE	1	U		1	U		1	U		1	U	
TRICHLOROFLUOROMETHANE	1	U		1	U		1	U		1	U	
VINYL ACETATE	10	UJ	C	10	UJ	C	10	UJ	C	10	UJ	C
VINYL CHLORIDE	1	U		1	U		1	U		1	U	
XYLENES, TOTAL	1	U		1	U		1	U		1	U	

SAMPLE NUMBER:	030-GW-005-02			030-GW-006-02			030-GW-007-02			030-TB-001-02		
SAMPLE DATE:	01/11/00			01/13/00			01/12/00			01/11/00		
LABORATORY ID:	0001252-02			0001334-05			0001334-02			0001252-06		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,1-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2,2-TETRACHLOROETHANE	1	U		1	U		1	U		1	U	
1,1,2-TRICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,1-DICHLOROETHENE	1	U		1	U		1	U		1	U	
1,2,3-TRICHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U		1	U		1	U	
1,2-DIBROMOETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROETHANE	1	U		1	U		1	U		1	U	
1,2-DICHLOROPROPANE	0.5	U		0.5	U		0.5	U		0.5	U	
2-BUTANONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
2-HEXANONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
4-METHYL-2-PENTANONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ACETONE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ACROLEIN	10	UR	C	10	UR	C	10	UR	C	10	UR	C
ACRYLONITRILE	5	UR	C	5	UR	C	5	UR	C	5	UR	C
ALLYL CHLORIDE	10	U		10	U		10	U		10	U	
BENZENE	1	U		1	U		1	U		1	U	
BROMODICHLOROMETHANE	1	U		1	U		1	U		1	U	
BROMOFORM	1	U		1	U		1	U		1	U	
BROMOMETHANE	1	U		1	U		1	U		1	U	
CARBON DISULFIDE	1	U		1	U		1	U		1	U	
CARBON TETRACHLORIDE	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROBENZENE	1	U		1	U		1	U		1	U	
CHLOROETHANE	1	U		1	U		1	U		1	U	
CHLOROFORM	0.3	U		0.3	U		0.3	U		0.3	U	
CHLOROMETHANE	1	U		1	U		1	U		1	U	
CHLOROPRENE	10	UJ	C	10	UJ	C	10	UJ	C	10	UJ	C
CIS-1,3-DICHLOROPROPENE	1	U		1	U		1	U		1	U	
DIBROMOCHLOROMETHANE	1	U		1	U		1	U		1	U	
DIBROMOMETHANE	1	U		1	U		1	U		1	U	
DICHLORODIFLUOROMETHANE	1	UJ	C	1	U		1	U		1	UJ	C
ETHYL METHACRYLATE	10	U		10	U		10	U		10	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-005-02	030-GW-006-02	030-GW-007-02	030-TB-001-02
SAMPLE DATE:	01/11/00	01/13/00	01/12/00	01/11/00
LABORATORY ID:	0001252-02	0001334-05	0001334-02	0001252-06
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
ETHYLBENZENE	1	U		1	U		1	U		1	U	
IODOMETHANE	10	U		10	U		10	U		10	U	
METHACRYLONITRILE	1	UR	C	1	UR	C	1	UR	C	1	UR	C
METHYL METHACRYLATE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
METHYLENE CHLORIDE	1	U		1	U		1	U		1.0	U	
STYRENE	1	U		1	U		1	U		1	U	
TETRACHLOROETHENE	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
TRANS-1,2-DICHLOROETHENE	1	U		1	U		1	U		1	U	
TRANS-1,3-DICHLOROPROPENE	0.5	U		0.5	U		0.5	U		0.5	U	
TRANS-1,4-DICHLORO-2-BUTENE	10	UR	C	10	UR	C	10	UR	C	10	UR	C
TRICHLOROETHENE	1	U		1	U		1	U		1	U	
TRICHLOROFLUOROMETHANE	1	U		1	U		1	U		1	U	
VINYL ACETATE	10	UJ	C	10	UJ	C	10	UJ	C	10	UJ	C
VINYL CHLORIDE	1	U		1	U		1	U		1	U	
XYLENES, TOTAL	1	U		1	U		1	U		1	U	

CTO01 NSWC CRANE
WATER TA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-TB-002-02			DUP-GW-001-02								
SAMPLE DATE:	01/12/00			01/13/00			/ /			/ /		
LABORATORY ID:	0001334-01			0001334-04								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:				030-6W-006-02								
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
1,1,1,2-TETRACHLOROETHANE	1	U		1	U							
1,1,1-TRICHLOROETHANE	1	U		1	U							
1,1,2,2-TETRACHLOROETHANE	1	U		1	U							
1,1,2-TRICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHANE	1	U		1	U							
1,1-DICHLOROETHENE	1	U		1	U							
1,2,3-TRICHLOROPROPANE	1	U		1	U							
1,2-DIBROMO-3-CHLOROPROPANE	1	U		1	U							
1,2-DIBROMOETHANE	1	U		1	U							
1,2-DICHLOROETHANE	1	U		1	U							
1,2-DICHLOROPROPANE	0.5	U		0.5	U							
2-BUTANONE	5	UR	C	5	UR	C						
2-HEXANONE	5	UR	C	5	UR	C						
4-METHYL-2-PENTANONE	5	UR	C	5	UR	C						
ACETONE	5	UR	C	5	UR	C						
ACROLEIN	10	UR	C	10	UR	C						
ACRYLONITRILE	5	UR	C	5	UR	C						
ALLYL CHLORIDE	10	U		10	U							
BENZENE	1	U		1	U							
BROMODICHLOROMETHANE	1	U		1	U							
BROMOFORM	1	U		1	U							
BROMOMETHANE	1	U		1	U							
CARBON DISULFIDE	1	U		1	U							
CARBON TETRACHLORIDE	0.3	U		0.3	U							
CHLOROBENZENE	1	U		1	U							
CHLOROETHANE	1	U		1	U							
CHLOROFORM	0.3	U		0.3	U							
CHLOROMETHANE	1	U		1	U							
CHLOROPRENE	10	UJ	C	10	UJ	C						
CIS-1,3-DICHLOROPROPENE	1	U		1	U							
DIBROMOCHLOROMETHANE	1	U		1	U							
DIBROMOMETHANE	1	U		1	U							
DICHLORODIFLUOROMETHANE	1	U		1	U							
ETHYL METHACRYLATE	10	U		10	U							

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-TB-002-02			DUP-GW-001-02								
SAMPLE DATE:	01/12/00			01/13/00			/ /			/ /		
LABORATORY ID:	0001334-01			0001334-04								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:				030-6W-006-02								
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
VOLATILES												
ETHYLBENZENE	1	U		1	U							
IODOMETHANE	10	U		10	U							
METHACRYLONITRILE	1	UR	C	1	UR	C						
METHYL METHACRYLATE	10	UR	C	10	UR	C						
METHYLENE CHLORIDE	1	U		1	U							
STYRENE	1	U		1	U							
TETRACHLOROETHENE	1	U		1	U							
TOLUENE	1	U		1	U							
TRANS-1,2-DICHLOROETHENE	1	U		1	U							
TRANS-1,3-DICHLOROPROPENE	0.5	U		0.5	U							
TRANS-1,4-DICHLORO-2-BUTENE	10	UR	C	10	UR	C						
TRICHLOROETHENE	1	U		1	U							
TRICHLOROFLUOROMETHANE	1	U		1	U							
VINYL ACETATE	10	UJ	C	10	UJ	C						
VINYL CHLORIDE	1	U		1	U							
XYLENES, TOTAL	1	U		1	U							

CTO01 NSWC CRANE
WATER TA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-001-02			030-GW-002-02			030-GW-003-02			030-GW-004-02		
SAMPLE DATE:	01/12/00			01/12/00			01/13/00			01/11/00		
LABORATORY ID:	0001252-05			0001252-04			0001334-03			0001252-01		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
EXPLOSIVES												
1,3,5-TRINITROBENZENE	1.4	U		1.6	U		1.9	U		1.4	U	
1,3-DINITROBENZENE	1.4	U		1.6	U		1.9	U		1.4	U	
2,4,6-TRINITROTOLUENE	1.4	U		1.6	U		1.9	UJ	D	1.4	U	
2,4-DINITROTOLUENE	1.4	U		1.6	U		1.9	U		1.4	U	
2,6-DINITROTOLUENE	1.4	U		1.6	U		1.9	U		1.4	U	
2-AMINO-4,6-DINITROTOLUENE	1.4	U		1.6	U		1.9	U		1.4	U	
2-NITROTOLUENE	1.4	U		1.6	U		1.9	U		1.4	U	
3-NITROTOLUENE	1.4	U		1.6	U		1.9	U		1.4	U	
4-AMINO-2,6-DINITROTOLUENE	1.4	U		1.6	U		1.9	U		1.4	U	
4-NITROTOLUENE	1.4	U		1.6	U		1.9	U		1.4	U	
HMX	1.4	U		1.6	U		1.9	UJ	D	1.4	U	
NITROBENZENE	1.4	U		1.6	U		1.9	U		1.4	U	
RDX	1.3	U		1.5	U		1.8	U		1.3	U	
TETRYL	1.4	U		1.6	U		1.9	U		1.4	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-005-02			030-GW-006-02			030-GW-007-02			DUP-GW-001-02		
SAMPLE DATE:	01/11/00			01/13/00			01/12/00			01/13/00		
LABORATORY ID:	0001252-02			0001334-05			0001334-02			0001334-04		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:										030-6W-006-02		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
EXPLOSIVES												
1,3,5-TRINITROBENZENE	1	U		1.3	U		1.4	U		1	U	
1,3-DINITROBENZENE	1	U		1.3	U		1.4	U		1	U	
2,4,6-TRINITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
2,4-DINITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
2,6-DINITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
2-AMINO-4,6-DINITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
2-NITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
3-NITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
4-AMINO-2,6-DINITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
4-NITROTOLUENE	1	U		1.3	U		1.4	U		1	U	
HMX	1	U		1.3	U		1.4	U		1	U	
NITROBENZENE	1	U		1.3	U		1.4	U		1	U	
RDX	0.9	U		1.2	U		1.3	U		0.9	U	
TETRYL	1	U		1.3	U		1.4	U		1	U	

APPENDIX B

Results as Reported by the Laboratory

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00102

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117011.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00102

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117011.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00102

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117011.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00202

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117010.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00202

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117010.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00202

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117010.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (ug/L or ug/Kg)	UG/L	Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00302

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-03

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118013.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00302

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-03

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118013.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00302

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-03

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118013.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00402

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117008.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00402

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117008.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
95-47-6	Xylene (total)	1.0	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00402

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117008.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00502

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117009.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00502

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117009.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00502

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117009.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00602

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118012.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00602

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118012.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00602

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-05

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118012.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00702

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118010.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00702

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118010.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030GW00702

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-02

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118010.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030TB00102

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-06

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117012.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	0.4	JB
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030TB00102

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-06

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117012.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030TB00102

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-06

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117012.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030TB00202

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118009.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030TB00202

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118009.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND (ug/L or ug/Kg)	UG/L	Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

030TB00202

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-01

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118009.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

DUP-GW-001-02 ~~030GW00102~~

90 02/17/00

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118011.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

DUP-GW-001-02
~~030GW00102~~

90
02/17/00

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118011.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

FORM I VOA

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

DUP-GW-001-02 ~~030GW00102~~

DG 02/17/00

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-04

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118011.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-001-02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 11000 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001252-05

Lab File ID: 3128009.D

Date Collected: 01/12/00

Date Received: 01/13/00

Date Prepared: 01/18/00

Date Analyzed: 01/28/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.4	U	1.4
121-82-4	RDX	1.3 ~~1.4~~	U	1.4
99-35-4	1,3,5-Trinitrobenzene	1.4	U	1.4
99-65-0	1,3-Dinitrobenzene	1.4	U	1.4
479-45-8	Tetryl	1.4	U	1.4
98-95-3	Nitrobenzene	1.4	U	1.4
118-96-7	2,4,6-Trinitrotoluene	1.4	U	1.4
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.4	U	1.4
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.4	U	1.4
606-20-2	2,6-Dinitrotoluene	1.4	U	1.4
121-14-2	2,4-Dinitrotoluene	1.4	U	1.4
88-72-2	2-Nitrotoluene	1.4	U	1.4
99-99-0	4-Nitrotoluene	1.4	U	1.4
99-08-1	3-Nitrotoluene	1.4	U	1.4

JO 02/29/00

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

030-GW-001-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001252-05

Instrument ID (1): HPLC3.i | Instrument ID (2):

Column (1): C18 ID 4.60 (mm) | Column (2): ID: (mm)

File (1): 3128009.d | File (2):

Date Analyzed (1) 01/28/00 | Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

X = Concentration Reported

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-002-02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 12000 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001252-04

Lab File ID: 3128008.D

Date Collected: 01/12/00

Date Received: 01/13/00

Date Prepared: 01/18/00

Date Analyzed: 01/28/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.6	U	1.6
121-82-4	RDX	1.5 ~~1.6~~	U	1.6
99-35-4	1,3,5-Trinitrobenzene	1.6	U	1.6
99-65-0	1,3-Dinitrobenzene	1.6	U	1.6
479-45-8	Tetryl	1.6	U	1.6
98-95-3	Nitrobenzene	1.6	U	1.6
118-96-7	2,4,6-Trinitrotoluene	1.6	U	1.6
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.6	U	1.6
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.6	U	1.6
606-20-2	2,6-Dinitrotoluene	1.6	U	1.6
121-14-2	2,4-Dinitrotoluene	1.6	U	1.6
88-72-2	2-Nitrotoluene	1.6	U	1.6
99-99-0	4-Nitrotoluene	1.6	U	1.6
99-08-1	3-Nitrotoluene	1.6	U	1.6

JW 02/29/00

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

030-GW-002-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001252-04

Instrument ID (1): HPLC3.i

Instrument ID (2):

Column (1): C18 ID 4.60 (mm)

Column (2): ID: (mm)

File (1): 3128008.d

File (2):

Date Analyzed (1) 01/28/00

Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

X = Concentration Reported

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-003-02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 14500 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001334-03

Lab File ID: 3128013.D

Date Collected: 01/13/00

Date Received: 01/15/00

Date Prepared: 01/18/00

Date Analyzed: 01/28/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.9	U	1.9
121-82-4	RDX	1.8 ~~1.9~~	U	1.9
99-35-4	1,3,5-Trinitrobenzene	1.9	U	1.9
99-65-0	1,3-Dinitrobenzene	1.9	U	1.9
479-45-8	Tetryl	1.9	U	1.9
98-95-3	Nitrobenzene	1.9	U	1.9
118-96-7	2,4,6-Trinitrotoluene	1.9	U	1.9
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.9	U	1.9
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.9	U	1.9
606-20-2	2,6-Dinitrotoluene	1.9	U	1.9
121-14-2	2,4-Dinitrotoluene	1.9	U	1.9
88-72-2	2-Nitrotoluene	1.9	U	1.9
99-99-0	4-Nitrotoluene	1.9	U	1.9
99-08-1	3-Nitrotoluene	1.9	U	1.9

PO 02/29/00

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

030-GW-003-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001334-03

Instrument ID (1): HPLC3.i

Column (1): C18 ID 4.60 (mm)

File (1): 3128013.d

Date Analyzed (1) 01/28/00

Instrument ID (2):

Column (2): ID: (mm)

File (2):

Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

_X = Concentration Reported

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-004-02

Lab Name: LAUCKS TESTING LABS

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001252-01

Sample wt/vol: 770 (g/ml) ml

Lab File ID: 3128006.D

% Moisture: N/A

Date Collected: 01/11/00

Extraction: SALTING OUT

Date Received: 01/13/00

Concentrated Extract Volume: 10500 (uL)

Date Prepared: 01/18/00

Dilution Factor: 2.0

Date Analyzed: 01/28/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.4	U	1.4
121-82-4	RDX	1.3 ~~1.4~~	U	1.4
99-35-4	1,3,5-Trinitrobenzene	1.4	U	1.4
99-65-0	1,3-Dinitrobenzene	1.4	U	1.4
479-45-8	Tetryl	1.4	U	1.4
98-95-3	Nitrobenzene	1.4	U	1.4
118-96-7	2,4,6-Trinitrotoluene	1.4	U	1.4
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.4	U	1.4
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.4	U	1.4
606-20-2	2,6-Dinitrotoluene	1.4	U	1.4
121-14-2	2,4-Dinitrotoluene	1.4	U	1.4
88-72-2	2-Nitrotoluene	1.4	U	1.4
99-99-0	4-Nitrotoluene	1.4	U	1.4
99-08-1	3-Nitrotoluene	1.4	U	1.4

DL/29/00

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

030-GW-004-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001252-01

Instrument ID (1): HPLC3.i

Instrument ID (2):

Column (1): C18 ID 4.60 (mm)

Column (2): ID: (mm)

File (1): 3128006.d

File (2):

Date Analyzed (1) 01/28/00

Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

X = Concentration Reported

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-005-02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 7800 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001252-02

Lab File ID: 3128007.D

Date Collected: 01/11/00

Date Received: 01/13/00

Date Prepared: 01/18/00

Date Analyzed: 01/28/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.0	U	1.0
121-82-4	RDX	0.9 ~~1.0~~	U	1.0
99-35-4	1,3,5-Trinitrobenzene	1.0	U	1.0
99-65-0	1,3-Dinitrobenzene	1.0	U	1.0
479-45-8	Tetryl	1.0	U	1.0
98-95-3	Nitrobenzene	1.0	U	1.0
118-96-7	2,4,6-Trinitrotoluene	1.0	U	1.0
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.0	U	1.0
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.0	U	1.0
606-20-2	2,6-Dinitrotoluene	1.0	U	1.0
121-14-2	2,4-Dinitrotoluene	1.0	U	1.0
88-72-2	2-Nitrotoluene	1.0	U	1.0
99-99-0	4-Nitrotoluene	1.0	U	1.0
99-08-1	3-Nitrotoluene	1.0	U	1.0

JO 02/29/04

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

030-GW-005-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001252-02

Instrument ID (1): HPLC3.i

Column (1): C18 ID 4.60 (mm)

File (1): 3128007.d

Date Analyzed (1) 01/28/00

Instrument ID (2):

Column (2): ID: (mm)

File (2):

Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

X = Concentration Reported

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-006-02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 9900 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001334-05

Lab File ID: 3128017.D

Date Collected: 01/13/00

Date Received: 01/15/00

Date Prepared: 01/18/00

Date Analyzed: 01/29/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.3	U	1.3
121-82-4	RDX	1.2 ~~1.3~~	U	1.3
99-35-4	1,3,5-Trinitrobenzene	1.3	U	1.3
99-65-0	1,3-Dinitrobenzene	1.3	U	1.3
479-45-8	Tetryl	1.3	U	1.3
98-95-3	Nitrobenzene	1.3	U	1.3
118-96-7	2,4,6-Trinitrotoluene	1.3	U	1.3
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.3	U	1.3
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.3	U	1.3
606-20-2	2,6-Dinitrotoluene	1.3	U	1.3
121-14-2	2,4-Dinitrotoluene	1.3	U	1.3
88-72-2	2-Nitrotoluene	1.3	U	1.3
99-99-0	4-Nitrotoluene	1.3	U	1.3
99-08-1	3-Nitrotoluene	1.3	U	1.3

JO 02/29/00

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

030-GW-006-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001334-05

Instrument ID (1): HPLC3.i

Instrument ID (2):

Column (1): C18 ID 4.60 (mm)

Column (2): ID: (mm)

File (1): 3128017.d

File (2):

Date Analyzed (1) 01/29/00

Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

X = Concentration Reported

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-007-02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 10400 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001334-02

Lab File ID: 3128012.D

Date Collected: 01/12/00

Date Received: 01/15/00

Date Prepared: 01/18/00

Date Analyzed: 01/28/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.4	U	1.4
121-82-4	RDX	1.3 ~~1.4~~	U	1.4
99-35-4	1,3,5-Trinitrobenzene	1.4	U	1.4
99-65-0	1,3-Dinitrobenzene	1.4	U	1.4
479-45-8	Tetryl	1.4	U	1.4
98-95-3	Nitrobenzene	1.4	U	1.4
118-96-7	2,4,6-Trinitrotoluene	1.4	U	1.4
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.4	U	1.4
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.4	U	1.4
606-20-2	2,6-Dinitrotoluene	1.4	U	1.4
121-14-2	2,4-Dinitrotoluene	1.4	U	1.4
88-72-2	2-Nitrotoluene	1.4	U	1.4
99-99-0	4-Nitrotoluene	1.4	U	1.4
99-08-1	3-Nitrotoluene	1.4	U	1.4

JG 02/29/00

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

030-GW-007-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001334-02

Instrument ID (1): HPLC3.i

Instrument ID (2):

Column (1): C18 ID 4.60 (mm)

Column (2): ID: (mm)

File (1): 3128012.d

File (2):

Date Analyzed (1) 01/28/00

Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

X = Concentration Reported

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

DUP-GW-001-02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 7700 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001334-04

Lab File ID: 3128016.D

Date Collected: 01/13/00

Date Received: 01/15/00

Date Prepared: 01/18/00

Date Analyzed: 01/29/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	1.0	U	1.0
121-82-4	RDX	0.9 ~~1.0~~	U	1.0
99-35-4	1,3,5-Trinitrobenzene	1.0	U	1.0
99-65-0	1,3-Dinitrobenzene	1.0	U	1.0
479-45-8	Tetryl	1.0	U	1.0
98-95-3	Nitrobenzene	1.0	U	1.0
118-96-7	2,4,6-Trinitrotoluene	1.0	U	1.0
1946-51-0	4-Amino-2,6-Dinitrotoluene	1.0	U	1.0
35572-78-2	2-Amino-4,6-Dinitrotoluene	1.0	U	1.0
606-20-2	2,6-Dinitrotoluene	1.0	U	1.0
121-14-2	2,4-Dinitrotoluene	1.0	U	1.0
88-72-2	2-Nitrotoluene	1.0	U	1.0
99-99-0	4-Nitrotoluene	1.0	U	1.0
99-08-1	3-Nitrotoluene	1.0	U	1.0

JO 02/29/00

CONFIRMATION SUMMARY WORKSHEET
FOR SINGLE COMPONENT ANALYTES

Client Sample ID

DUP-GW-001-02

Lab Name: Laucks Testing Labs, Inc.

Lab Sample ID: 0001334-04

Instrument ID (1): HPLC3.i

Instrument ID (2):

Column (1): C18 ID 4.60 (mm)

Column (2): ID: (mm)

File (1): 3128016.d

File (2):

Date Analyzed (1) 01/29/00

Date Analyzed (2):

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION Final Units:ug/L	%D

X = Concentration Reported

APPENDIX C

Support Documentation

#00[illegible]52

C1902

00323

12

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7393/CTO 19

SITE NAME: NSWC CRANE, INDIANA

SAMPLERS (SIGNATURE): [signature]

STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	METALS (T)	METALS (DIS)	CYANIDE	DIS. PHOS.	NH3, TKN, NITRATE/NITRITE, PHOS (T)	REMARKS
TB	1/11/00	1030		✓	030-TB-001-02	3	3							TRIP BLANK 6
1,7 LF	↓	1455		✓	030-GW-004-02	10	3	2	1	1	1	1	1	1+7
2,8 LF	↓	1530		✓	030-GW-005-02	10	3	2	1	1	1	1	1	2+8
3 TB	1/12/00	0720		✓	030-TB-002-02	3	3	2 (SW)						TRIP BLANK 3
4,9 LF	↓	1035		✓	030-GW-002-02	10	3	2	1	1	1	1	1	4+9
5,10 LF	↓	1100		✓	030-GW-001-02	10	3	2	1	1	1	1	1	5+10

LAUCKS

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
[signature]	1/12/00 1600	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Temp. blank @ shipment = 4°C.	
		[signature]	1/13/00 8:40	FED EX AIR BILL #: 8168 8343 7177	

0001334 C1902

00326

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7393/CTO 19

SITE NAME: LANDFARM - NSWC CRANE, IN.

SAMPLERS (SIGNATURE): Scott W. Neil

	STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	DIS. PHOS.	NH3, TKN, NITRATE, NITRITE, PHOS (T)	REMARKS
5	TB	1/12/00	0720		✓	030-TB-002-02	3	3							TRIP BLANK
6	LF	↓	1657		✓	030-GW-007-02	10	3	2	1	1	1	1	1	
7	LF	1/13/00	1055		✓	030-GW-003-02	30	9	6	3	3	3	3	3	Run MS/MSD
8	LF	1/13/00	0000		✓	DUP-GW-001-02	10	3	2	1	1	1	1	1	
9	LF	1/13/00	1205		✓	030-GW-006-02	10	3	2	1	1	1	1	1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
Scott W. Neil	1/14/00 1300	FED EX		1/15/00 1200	Hugh Prentice Lunch
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: TEMP BLANK @ SHIPPING = 4	

C1902

HOLDING TIME

02/16/00

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	CN	01/12/00	01/20/00	01/21/00	36,532	-36,523	9
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	CN	01/12/00	01/20/00	01/21/00	36,532	-36,523	9
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	CN	01/13/00	01/20/00	01/21/00	36,531	-36,523	8
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	CN	01/11/00	01/20/00	01/21/00	36,533	-36,523	10
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	CN	01/11/00	01/20/00	01/21/00	36,533	-36,523	10
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	CN	01/13/00	01/20/00	01/21/00	36,531	-36,523	8
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	CN	01/12/00	01/20/00	01/21/00	36,532	-36,523	9
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	CN	01/13/00	01/20/00	01/21/00	36,531	-36,523	8
MG/L	030-GW-001-02-F	0001252-10	NORMAL	C1902	DPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-002-02-F	0001252-09	NORMAL	C1902	DPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-003-02-F	0001334-07	NORMAL	C1902	DPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7
MG/L	030-GW-004-02-F	0001252-07	NORMAL	C1902	DPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-005-02-F	0001252-08	NORMAL	C1902	DPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-006-02-F	0001334-09	NORMAL	C1902	DPHO	01/13/00	01/26/00	01/27/00	36,537	-36,523	14
MG/L	030-GW-007-02-F	0001334-06	NORMAL	C1902	DPHO	01/12/00	01/19/00	01/20/00	36,531	-36,523	8
MG/L	DUP-GW-001-02-F	0001334-08	NORMAL	C1902	DPHO	01/13/00	01/26/00	01/27/00	36,537	-36,523	14
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	EXP	01/12/00	01/18/00	01/28/00	36,530	-36,514	16
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	EXP	01/12/00	01/18/00	01/28/00	36,530	-36,514	16
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	EXP	01/13/00	01/18/00	01/28/00	36,529	-36,514	15
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	EXP	01/11/00	01/18/00	01/28/00	36,531	-36,514	17
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	EXP	01/11/00	01/18/00	01/28/00	36,531	-36,514	17
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	EXP	01/13/00	01/18/00	01/29/00	36,529	-36,513	16
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	EXP	01/12/00	01/18/00	01/28/00	36,530	-36,514	16
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	EXP	01/13/00	01/18/00	01/29/00	36,529	-36,513	16

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	HG	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	HG	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	HG	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	HG	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	HG	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	HG	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	HG	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	HG	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-001-02-F	0001252-10	NORMAL	C1902	HGF	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-002-02-F	0001252-09	NORMAL	C1902	HGF	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-003-02-F	0001334-07	NORMAL	C1902	HGF	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-004-02-F	0001252-07	NORMAL	C1902	HGF	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-005-02-F	0001252-08	NORMAL	C1902	HGF	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-006-02-F	0001334-09	NORMAL	C1902	HGF	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-007-02-F	0001334-06	NORMAL	C1902	HGF	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	DUP-GW-001-02-F	0001334-08	NORMAL	C1902	HGF	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	M	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	M	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	M	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	M	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	M	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	M	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	M	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	M	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-001-02-F	0001252-10	NORMAL	C1902	MF	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	030-GW-002-02-F	0001252-09	NORMAL	C1902	MF	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	[illegible]-GW-003-02-F	0001334-07	NORMAL	C1902	[illegible]F	01/13/00	01/18/00	02/01/00	36,529	-36,51[illegible]	19

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-004-02-F	0001252-07	NORMAL	C1902	MF	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-005-02-F	0001252-08	NORMAL	C1902	MF	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-006-02-F	0001334-09	NORMAL	C1902	MF	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-007-02-F	0001334-06	NORMAL	C1902	MF	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	DUP-GW-001-02-F	0001334-08	NORMAL	C1902	MF	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	NH3	01/12/00	01/28/00	01/28/00	36,540	-36,524	16
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	NH3	01/12/00	01/28/00	01/28/00	36,540	-36,524	16
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	NH3	01/13/00	01/28/00	01/28/00	36,539	-36,524	15
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	NH3	01/11/00	01/28/00	01/28/00	36,541	-36,524	17
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	NH3	01/11/00	01/28/00	01/28/00	36,541	-36,524	17
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	NH3	01/13/00	01/28/00	01/28/00	36,539	-36,524	15
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	NH3	01/12/00	01/28/00	01/28/00	36,540	-36,524	16
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	NH3	01/13/00	01/28/00	01/28/00	36,539	-36,524	15
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	NTIA	01/12/00	01/20/00	01/20/00	36,532	-36,524	8
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	NTIA	01/12/00	01/20/00	01/20/00	36,532	-36,524	8
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	NTIA	01/13/00	01/20/00	01/20/00	36,531	-36,524	7
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	NTIA	01/11/00	01/20/00	01/20/00	36,533	-36,524	9
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	NTIA	01/11/00	01/20/00	01/20/00	36,533	-36,524	9
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	NTIA	01/13/00	01/20/00	01/20/00	36,531	-36,524	7
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	NTIA	01/12/00	01/20/00	01/20/00	36,532	-36,524	8
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	NTIA	01/13/00	01/20/00	01/20/00	36,531	-36,524	7
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	OV	01/12/00	01/17/00	01/17/00	36,529	-36,524	5
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	OV	01/12/00	01/17/00	01/17/00	36,529	-36,524	5
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	OV	01/13/00	01/18/00	01/18/00	36,529	-36,524	5
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	OV	01/11/00	01/17/00	01/17/00	36,530	-36,524	6
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	OV	01/11/00	01/17/00	01/17/00	36,530	-36,524	6
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	OV	01/13/00	01/18/00	01/18/00	36,529	-36,524	5

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	OV	01/12/00	01/18/00	01/18/00	36,530	-36,524	6
UG/L	030-TB-001-02	0001252-06	NORMAL	C1902	OV	01/11/00	01/17/00	01/17/00	36,530	-36,524	6
UG/L	030-TB-002-02	0001334-01	NORMAL	C1902	OV	01/12/00	01/18/00	01/18/00	36,530	-36,524	6
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	OV	01/13/00	01/18/00	01/18/00	36,529	-36,524	5
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	TKN	01/12/00	01/18/00	01/19/00	36,530	-36,523	7
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	TKN	01/12/00	01/18/00	01/19/00	36,530	-36,523	7
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	TKN	01/13/00	01/18/00	01/19/00	36,529	-36,523	6
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	TKN	01/11/00	01/18/00	01/19/00	36,531	-36,523	8
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	TKN	01/11/00	01/18/00	01/19/00	36,531	-36,523	8
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	TKN	01/13/00	01/18/00	01/19/00	36,529	-36,523	6
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	TKN	01/12/00	01/18/00	01/19/00	36,530	-36,523	7
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	TKN	01/13/00	01/18/00	01/19/00	36,529	-36,523	6
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	TPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	TPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	TPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	TPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	TPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	TPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	TPHO	01/12/00	01/19/00	01/20/00	36,531	-36,523	8
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	TPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7

Volatile Fraction:

The instrument that was used in the determination of volatile organic compounds in this SDG was fitted with the following column and trap:

Instrument	Column Name	ID, mm	Film thickness, µm	Trap
URSULA	DB-624	0.45	1.4	OI Vocarb 3000

SPECIFIC REMARKS ON ORGANIC ANALYSES:

Holding Time Compliance:

Following the Contract Laboratory Program (CLP) model, Laucks calculates holding time compliance for organic determinations based on the first injection and/or analysis of an extract or sample. Subsequent analyses (for instance, for the purpose of dilution) are not tabulated.

Volatile Organic Compounds:

The holding time is 14 days calculated from date of collection in both soil and water samples. All samples were analyzed within holding time.

Ordnance:

The holding time to extraction is 7 days in water and 14 days in soil calculated from date of collection. The holding time from extraction to analysis is 40 days. All samples were extracted and analyzed within holding time.

Volatile Fraction:

Initial Calibration Standards:
The levels of the initial calibration standards are 1, 5, 10, 25, and 50 µg/L for all analytes with the exception of the ketones, acrolein, trans-1,4-dichloro-2-butene and m,p-xylenes. The calibration levels for the ketones, acrolein and trans-1,4-dichloro-2-butene are 5, 10, 25, 50, and 100 µg/L. The calibration levels for the m,p-xylenes are 2, 10, 20, 50, and 100 µg/L.

Sample Reporting Limits:
The most current version of SW 846 requires that the low level standard define the reporting limit. The laboratory's low level standard is 1 µg/L. The client has given express permission to report below the laboratory's low level standard for this project for specific compounds.

Quality Control Analyses:
MS/MSD analyses performed on sample 030-GW-003-02 yielded all spiking analyte recovery values within the control limits with the exception of dichlorodifluoromethane,

acetone and 2,2-dichloropropane. The elevated recovery values for dichlorodifluoromethane and acetone may be partially due to the discrepancy between standard sources. The low recovery for 2,2-dichloropropane may be due to matrix interference. Since these analytes were not detected in any of the associated samples, no corrective action was taken.

Sample Identifications:
Client sample identifications have been shortened for the purpose of reporting in CLP-type format. On all forms for the volatile fraction, the following method of abbreviation was used. By deleting the hyphens, sample 030-GW-003-02 was shortened to 030GW00302. All client sample identifications have been truncated in this manner.

Ordnance Fraction:

Analytical Comments:
Samples were analyzed for ordnance compounds in accordance with method SW 8330 utilizing a UV detector. A C18 (octadecyl) analytical column was used as the quantitation column. A CN (cyano phase) column was used for confirming any positive analyte responses detected on the C18 column.

Quality Control Samples:
Analyses of the extracts for samples 030-GW-003-02MS, 030-GW-003-02MSD and the blank spike yielded recovery values for tetryl which fell below the lower control limit. Method 8330 indicates that tetryl decomposes rapidly in methanol/water solutions, as well as with heat. Care was taken during both the extraction process and analysis not to expose the samples to temperatures above room temperature. Since tetryl was not detected in any of the samples associated with this QC set, and since all surrogate recoveries were in control, no further action was taken.

MS/MSD analyses performed on sample 030-GW-003-02 yielded recovery values for 2,4,6-trinitrotoluene which exceeded the upper control limit. Since 2,4,6-trinitrotoluene was not detected in any of the associated samples, and since 2,4,6-trinitrotoluene recovery was in control in the blank spike, no further action was taken.

GENERAL REMARKS ON INORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON INORGANIC ANALYSES."

ICP and ICP-MS Metals:

EPA SW846 method 3015 was used for the digestion of the samples. Method 6010B was used for the determination of selenium due to apparent false positives in 6020B caused by the sample matrix (Chloride concentrations were high), and method 6020 was used for the determination of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, nickel, silver, thallium, vanadium, zinc and tin.

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Laucks Testing Labs SAS No.: SDG No.: C1902

Lab File ID: U1025003.D BFB Injection Date: 10/25/99

Instrument ID: Ursula BFB Injection Time: 11:33

GC Column: DB-624 ID: 0.45 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	22.7
75	30.0 - 66.0% of mass 95	47.1
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 120.0% of mass 95	62.7
175	4.0 - 9.0% of mass 174	4.6 (7.3)1
176	93.0 - 101.0% of mass 174	60.6 (96.7)1
177	5.0 - 9.0% of mass 176	4.4 (7.2)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD010	10 UG/L VOA LAB STD	U1025004.D	10/25/99	12:05
02	VSTD005	5 UG/L VOA LAB STD	U1025005.D	10/25/99	12:41
03	VSTD001	1 UG/L VOA LAB STD	U1025007.D	10/25/99	13:54
04	VSTD025	25 UG/L VOA LAB STD	U1025008.D	10/25/99	14:30
05	VSTD050	50 UG/L VOA LAB STD	U1025009.D	10/25/99	15:06
06	VSTD100	100 UG/L VOA LAB ST	U1025011.D	10/25/99	16:19

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Laucks Testing Labs Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C1902

Instrument ID: Ursula Calibration Date(s): 10/25/99 10/25/99

Heated Purge (Y/N): N Calibration Times: 12:05 16:19

GC Column: DB-624 ID: 0.45 (mm)

LAB FILE ID: RRF1 = U1025007.D RRF5 = U1025005.D RRF100 = U1025011.D
RRF10 = U1025004.D RRF25 = U1025008.D RRF50 = U1025009.D

COMPOUND	RRF1	RRF5	RRF10	RRF25	RRF50	RRF100	$\overline{RRF}$	% RSD
Dichlorodifluoromethane	0.229	0.209	0.221	0.225	0.210		0.219	4.0
Chloromethane	0.269	0.247	0.253	0.262	0.247		0.256	3.8
Vinyl chloride	0.265	0.244	0.256	0.265	0.249		0.256	3.7
Bromomethane	0.224	0.218	0.238	0.238	0.221		0.228	4.3
Chloroethane	0.178	0.163	0.173	0.171	0.160		0.169	4.5
Trichlorofluoromethane	0.491	0.455	0.477	0.487	0.465		0.475	3.2
1,1-Dichloroethene	0.267	0.275	0.290	0.292	0.275		0.280	3.9
Acetone		0.007	0.008	0.007	0.008	0.008	0.008	5.4
Carbon disulfide	0.884	0.905	0.902	0.960	0.896		0.909	3.2
Methylene chloride		0.296	0.253	0.219	0.216	0.200	0.237	16.2
trans-1,2-Dichloroethene	0.289	0.293	0.311	0.307	0.293		0.299	3.2
1,1-Dichloroethane	0.550	0.536	0.552	0.567	0.545		0.550	2.1
2-Butanone		0.005	0.008	0.012	0.014	0.015	0.011	40.6
Chloroform	0.498	0.481	0.497	0.498	0.493		0.493	1.5
1,1,1-Trichloroethane	0.380	0.388	0.410	0.414	0.400		0.398	3.6
Carbon tetrachloride	0.372	0.375	0.394	0.400	0.383		0.385	3.2
1,2-Dichloroethane-d4	0.143	0.147	0.143	0.135	0.138	0.134	0.140	3.7
Benzene	0.682	0.674	0.709	0.708	0.677		0.690	2.5
1,2-Dichloroethane	0.137	0.132	0.134	0.136	0.139		0.135	1.9
Trichloroethene	0.365	0.367	0.381	0.384	0.364		0.372	2.6
1,2-Dichloropropane	0.253	0.248	0.258	0.261	0.257		0.255	2.0
Dibromomethane	0.139	0.136	0.139	0.139	0.144		0.139	2.3
Bromodichloromethane	0.377	0.375	0.391	0.384	0.386		0.383	1.7
cis-1,3-Dichloropropene	0.195	0.212	0.232	0.232	0.240		0.222	8.3
4-Methyl-2-pentanone		0.020	0.025	0.032	0.039	0.041	0.031	28.5
Toluene-d8	1.339	1.330	1.334	1.359	1.294	1.339	1.332	1.6
Toluene	0.756	0.725	0.782	0.786	0.722		0.754	4.0
trans-1,3-Dichloropropene	0.250	0.221	0.245	0.254	0.261		0.246	6.2
1,1,2-Trichloroethane	0.185	0.178	0.181	0.185	0.183		0.182	1.6
Tetrachloroethene	0.598	0.621	0.659	0.662	0.598		0.628	5.0
2-Hexanone		0.025	0.029	0.024	0.033	0.038	0.030	19.4
Dibromochloromethane	0.382	0.362	0.386	0.389	0.393		0.382	3.2
1,2-Dibromoethane	0.251	0.256	0.277	0.281	0.284		0.270	5.7
Chlorobenzene	0.814	0.794	0.832	0.836	0.799		0.815	2.3
1,1,1,2-Tetrachloroethane	0.351	0.357	0.373	0.373	0.363		0.363	2.6
Ethylbenzene	1.428	1.455	1.529	1.576	1.462		1.490	4.1
m,p-Xylene	0.442	0.496	0.523	0.529	0.485		0.495	7.0

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date(s): 10/25/99 10/25/99

Heated Purge (Y/N): N Calibration Times: 12:05 16:19

GC Column: DB-624 ID: 0.45 (mm)

LAB FILE ID: RRF1 = U1025007.D RRF5 = U1025005.D RRF100 = U1025011.D

RRF10 = U1025004.D RRF25 = U1025008.D RRF50 = U1025009.D

COMPOUND	RRF1	RRF5	RRF10	RRF25	RRF50	RRF100	$\overline{RRF}$	% RSD
o-Xylene	0.419	0.435	0.455	0.458	0.433		0.440	3.7
Styrene	0.541	0.604	0.641	0.652	0.639		0.615	7.4
Bromoform	0.177	0.174	0.183	0.183	0.192		0.182	3.8
4-Bromofluorobenzene	1.721	1.663	1.627	1.676	1.641	1.654	1.664	2.0
1,1,2,2-Tetrachloroethane	0.549	0.518	0.525	0.525	0.524		0.528	2.3
Dibromofluoromethane	0.526	0.519	0.507	0.490	0.501	0.480	0.504	3.4
1,2,3-Trichloropropane	0.250	0.260	0.273	0.286	0.287		0.271	5.9
1,2-Dibromo-3-chloropropane	0.071	0.058	0.059	0.062	0.065		0.063	8.4
Average % RSD								5.8

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date(s): 09/24/99 09/24/99

Heated Purge (Y/N): N Calibration Times: 17:31 21:08

GC Column: DB-624 ID: 0.45 (mm)

LAB FILE ID: RRF1 = U0924017.D RRF5 = U0924016.D RRF100 = U0924021.D
RRF10 = U0924015.D RRF25 = U0924019.D RRF50 = U0924020.D

COMPOUND	RRF1	RRF5	RRF10	RRF25	RRF50	RRF100	$\overline{RRF}$	% RSD
Acrolein		0.005	0.005	0.005	0.005	0.005	0.005	1.6
Allyl chloride	0.620	0.700	0.760	0.823	0.855		0.752	12.6
Acrylonitrile	0.006	0.008	0.006	0.008	0.009		0.007	21.5
Vinyl acetate	0.118	0.110	0.125	0.138	0.152		0.129	12.8
Iodomethane	0.587	0.610	0.652	0.649	0.627		0.625	4.3
Chloroprene	0.425	0.383	0.398	0.402	0.403		0.402	3.8
Methacrylonitrile	0.014	0.008	0.013	0.016	0.021		0.014	35.0
Dibromofluoromethane	0.573	0.566	0.566	0.568	0.575	0.580	0.571	1.0
1,2-Dichloroethane-d4	0.147	0.147	0.146	0.149	0.151	0.152	0.149	1.7
Methyl methacrylate	0.039	0.031	0.040	0.044	0.052		0.041	18.5
Toluene-d8	1.217	1.224	1.226	1.229	1.204	1.216	1.219	0.8
Ethyl methacrylate	0.069	0.102	0.113	0.130	0.139		0.111	24.7
trans-1,4-Dichloro-2-butene		0.021	0.022	0.024	0.029	0.031	0.025	17.2
4-Bromofluorobenzene	1.626	1.599	1.573	1.602	1.623	1.593	1.603	1.2
Average % RSD								11.2

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Laucks Testing Labs SAS No.: SDG No.: C1902

Lab File ID: U0117002.D BFB Injection Date: 01/17/00

Instrument ID: Ursula BFB Injection Time: 10:00

GC Column: DB-624 ID: 0.45 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	22.5
75	30.0 - 66.0% of mass 95	44.9
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.4 (0.7)1
174	50.0 - 120.0% of mass 95	63.8
175	4.0 - 9.0% of mass 174	4.3 (6.7)1
176	93.0 - 101.0% of mass 174	63.3 (99.2)1
177	5.0 - 9.0% of mass 176	4.2 (6.6)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD010	10 UG/L VOA LAB STD	U0117004.D	01/17/00	11:26
02	VBLKU1	B011700MVOWU1	U0117006.D	01/17/00	12:59
03	VBLKSPKU1	S011700MVOWU1	U0117007.D	01/17/00	13:48
04	030GW00402	0001252-01	U0117008.D	01/17/00	14:24
05	030GW00502	0001252-02	U0117009.D	01/17/00	15:00
06	030GW00202	0001252-04	U0117010.D	01/17/00	15:36
07	030GW00102	0001252-05	U0117011.D	01/17/00	16:12
08	030TB00102	0001252-06	U0117012.D	01/17/00	16:48

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date: 01/17/00 Time: 11:26

Lab File ID: U0117004.D Init. Calib. Date(s): 10/25/99 10/25/99

Heated Purge: (Y/N) N Init. Calib. Times: 12:05 16:19

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	$\overline{RRF}$	RRF10	MIN RRF	% D	MAX % D
Dichlorodifluoromethane	0.219	0.136		37.8	
Chloromethane	0.256	0.205	0.100	19.7	
Vinyl chloride	0.256	0.237		7.3	20
Bromomethane	0.228	0.253		-11.1	
Chloroethane	0.169	0.164		2.8	
Trichlorofluoromethane	0.475	0.444		6.5	
1,1-Dichloroethene	0.280	0.284		-1.6	20
Acetone	0.008	0.010		-28.9	
Carbon disulfide	0.909	0.968		-6.5	
Methylene chloride	0.237	0.235		1.0	
trans-1,2-Dichloroethene	0.299	0.310		-3.7	
1,1-Dichloroethane	0.550	0.577	0.100	-4.8	
2-Butanone	0.011	0.014		-26.6	
Chloroform	0.493	0.519		-5.3	20
1,1,1-Trichloroethane	0.398	0.386		3.2	
Carbon tetrachloride	0.385	0.369		4.0	
1,2-Dichloroethane-d4	0.140	0.155		-10.9	
Benzene	0.690	0.740		-7.2	
1,2-Dichloroethane	0.135	0.142		-5.1	
Trichloroethene	0.372	0.374		-0.6	
1,2-Dichloropropane	0.255	0.290		-13.4	20
Dibromomethane	0.139	0.158		-13.5	
Bromodichloromethane	0.383	0.412		-7.7	
cis-1,3-Dichloropropene	0.222	0.255		-14.9	
4-Methyl-2-pentanone	0.031	0.042		-34.6	
Toluene-d8	1.332	1.282		3.8	
Toluene	0.754	0.767		-1.7	20
trans-1,3-Dichloropropene	0.246	0.270		-9.7	
1,1,2-Trichloroethane	0.182	0.203		-11.3	
Tetrachloroethene	0.628	0.586		6.7	
2-Hexanone	0.030	0.038		-27.2	
Dibromochloromethane	0.382	0.407		-6.4	
1,2-Dibromoethane	0.270	0.306		-13.4	
Chlorobenzene	0.815	0.857	0.300	-5.1	
1,1,1,2-Tetrachloroethane	0.363	0.385		-5.8	

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date: 01/17/00 Time: 11:26

Lab File ID: U0117004.D Init. Calib. Date(s): 10/25/99 10/25/99

Heated Purge: (Y/N) N Init. Calib. Times: 12:05 16:19

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	RRF	RRF10	MIN RRF	% D	MAX % D
Ethylbenzene	1.490	1.497		-0.5	20
m,p-Xylene	0.495	0.520		-5.0	
o-Xylene	0.440	0.462		-4.9	
Styrene	0.615	0.690		-12.2	
Bromoform	0.182	0.195	0.100	-7.1	
4-Bromofluorobenzene	1.664	1.649		0.9	
1,1,2,2-Tetrachloroethane	0.528	0.634	0.300	-20.0	
Dibromofluoromethane	0.504	0.556		-10.2	
1,2,3-Trichloropropane	0.271	0.308		-13.5	
1,2-Dibromo-3-chloropropane	0.063	0.079		-25.8	
Average %D				10.4	

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date: 01/17/00 Time: 12:23

Lab File ID: U0117005.D Init. Calib. Date(s): 09/24/99 09/24/99

Heated Purge: (Y/N) N Init. Calib. Times: 17:31 21:08

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	RRF	RRF10	MIN RRF	% D	MAX % D
Acrolein	0.005	0.004		19.5	
Allyl chloride	0.752	0.920		-22.4	
Acrylonitrile	0.007	0.008		-1.6	
Vinyl acetate	0.129	0.172		-33.6	
Iodomethane	0.625	0.367		41.2	
Chloroprene	0.402	0.300		25.5	
Methacrylonitrile	0.014	0.016		-12.4	
Dibromofluoromethane	0.571	0.563		1.5	
1,2-Dichloroethane-d4	0.149	0.146		1.6	
Methyl methacrylate	0.041	0.047		-13.6	
Toluene-d8	1.219	1.237		-1.4	
Ethyl methacrylate	0.111	0.136		-22.9	
trans-1,4-Dichloro-2-butene	0.025	0.033		31.4	
4-Bromofluorobenzene	1.603	1.745		-8.9	
Average %D				17.	

FORM VII VOA

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: Laucks Testing Labs SAS No.: _____ SDG No.: C1902

Lab File ID: U0118004.D BFB Injection Date: 01/18/00

Instrument ID: Ursula BFB Injection Time: 10:29

GC Column: DB-624 ID: 0.45 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	26.0
75	30.0 - 66.0% of mass 95	50.5
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.4
173	Less than 2.0% of mass 174	0.3 (0.6)1
174	50.0 - 120.0% of mass 95	59.4
175	4.0 - 9.0% of mass 174	4.7 (7.9)1
176	93.0 - 101.0% of mass 174	57.5 (96.9)1
177	5.0 - 9.0% of mass 176	3.6 (6.3)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD010	10 UG/L VOA LAB STD	U0118005.D	01/18/00	10:58
02	VBLKU2	B011800MVOWU1	U0118007.D	01/18/00	12:23
03	VBLKSPKU2	S011800MVOWU1	U0118008.D	01/18/00	12:59
04	030TB00202	0001334-01	U0118009.D	01/18/00	13:35
05	030GW00702	0001334-02	U0118010.D	01/18/00	14:12
06	030GW00102	0001334-04	U0118011.D	01/18/00	14:48
07	030GW00602	0001334-05	U0118012.D	01/18/00	15:24
08	030GW00302	0001334-03	U0118013.D	01/18/00	16:00
09	030GW00302MS	0001334-03MS	U0118014.D	01/18/00	16:36
10	030GW00302MSD	0001334-03MSD	U0118015.D	01/18/00	17:12

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date: 01/18/00 Time: 10:58

Lab File ID: U0118005.D Init. Calib. Date(s): 10/25/99 10/25/99

Heated Purge: (Y/N) N Init. Calib. Times: 12:05 16:19

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	RRF	RRF10	MIN RRF	% D	MAX % D
Dichlorodifluoromethane	0.219	0.227		-4.0	
Chloromethane	0.256	0.269	0.100	-5.1	
Vinyl chloride	0.256	0.282		-10.4	20
Bromomethane	0.228	0.283		-24.2	
Chloroethane	0.169	0.181		-6.9	
Trichlorofluoromethane	0.475	0.456		4.1	
1,1-Dichloroethene	0.280	0.252		9.9	20
Acetone	0.008	0.009		-15.8	
Carbon disulfide	0.909	0.955		-5.1	
Methylene chloride	0.237	0.227		4.2	
trans-1,2-Dichloroethene	0.299	0.277		7.2	
1,1-Dichloroethane	0.550	0.525	0.100	4.7	
2-Butanone	0.011	0.014		-30.4	
Chloroform	0.493	0.470		4.8	20
1,1,1-Trichloroethane	0.398	0.343		14.0	
Carbon tetrachloride	0.385	0.322		16.4	
1,2-Dichloroethane-d4	0.140	0.155		-10.4	
Benzene	0.690	0.680		1.4	
1,2-Dichloroethane	0.135	0.134		1.3	
Trichloroethene	0.372	0.336		9.8	
1,2-Dichloropropane	0.255	0.269		-5.5	20
Dibromomethane	0.139	0.143		-2.4	
Bromodichloromethane	0.383	0.373		2.6	
cis-1,3-Dichloropropene	0.222	0.234		-5.2	
4-Methyl-2-pentanone	0.031	0.043		-36.5	
Toluene-d8	1.332	1.294		2.9	
Toluene	0.754	0.711		5.8	20
trans-1,3-Dichloropropene	0.246	0.249		-1.1	
1,1,2-Trichloroethane	0.182	0.187		-2.6	
Tetrachloroethene	0.628	0.517		17.6	
2-Hexanone	0.030	0.038		-26.5	
Dibromochloromethane	0.382	0.362		5.3	
1,2-Dibromoethane	0.270	0.274		-1.4	
Chlorobenzene	0.815	0.780	0.300	4.3	
1,1,1,2-Tetrachloroethane	0.363	0.342		6.0	

7A
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date: 01/18/00 Time: 10:58

Lab File ID: U0118005.D Init. Calib. Date(s): 10/25/99 10/25/99

Heated Purge: (Y/N) N Init. Calib. Times: 12:05 16:19

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	RRF	RRF10	MIN RRF	% D	MAX % D
Ethylbenzene	1.490	1.381		7.3	20
m,p-Xylene	0.495	0.471		4.8	
o-Xylene	0.440	0.422		4.1	
Styrene	0.615	0.625		-1.5	
Bromoform	0.182	0.174	0.100	4.1	
4-Bromofluorobenzene	1.664	1.665		-0.1	
1,1,2,2-Tetrachloroethane	0.528	0.597	0.300	-13.1	
Dibromofluoromethane	0.504	0.536		-6.4	
1,2,3-Trichloropropane	0.271	0.296		-9.1	
1,2-Dibromo-3-chloropropane	0.063	0.070		-10.5	
Average %D				8.4	

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date: 01/18/00 Time: 11:47

Lab File ID: U0118006.D Init. Calib. Date(s): 09/24/99 09/24/99

Heated Purge: (Y/N) N Init. Calib. Times: 17:31 21:08

GC Column: DB-624 ID: 0.45 (mm)

COMPOUND	RRF	RRF10	MIN RRF	% D	MAX %D
Acrolein	0.005	0.004		19.5	
Allyl chloride	0.752	0.893		-18.8	
Acrylonitrile	0.007	0.008		-4.3	
Vinyl acetate	0.129	0.165		-28.3	
Iodomethane	0.625	0.345		44.8	
Chloroprene	0.402	0.292		27.5	
Methacrylonitrile	0.014	0.016		-15.2	
Dibromofluoromethane	0.571	0.546		4.4	
1,2-Dichloroethane-d4	0.149	0.145		2.2	
Methyl methacrylate	0.041	0.046		-12.4	
Toluene-d8	1.219	1.269		-4.1	
Ethyl methacrylate	0.111	0.139		-26.1	
trans-1,4-Dichloro-2-butene	0.025	0.033		-31.0	
4-Bromofluorobenzene	1.603	1.752		-9.3	
Average %D				17.7	

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

VBLKU1

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: B011700MVOWU1

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117006.D

Level: (low/med) LOW

Date Received:

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	0.4	J
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

VBLKU1

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: B011700MVOWU1

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117006.D

Level: (low/med) LOW

Date Received:

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

VBLKU1

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: B011700MVOWU1

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0117006.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/17/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

VBLKU2

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: B011800MVOWU1

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118007.D

Level: (low/med) LOW

Date Received:

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
79-01-6	Trichloroethene	1.0	U
75-00-3	Chloroethane	1.0	U
75-09-2	Methylene chloride	0.3	J
75-34-3	1,1-Dichloroethane	1.0	U
67-66-3	Chloroform	0.3	U
71-55-6	1,1,1-Trichloroethane	1.0	U
56-23-5	Carbon tetrachloride	0.3	U
71-43-2	Benzene	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
127-18-4	Tetrachloroethene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
74-87-3	Chloromethane	1.0	U
74-83-9	Bromomethane	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
78-87-5	1,2-Dichloropropane	0.5	U
75-27-4	Bromodichloromethane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	0.5	U
79-00-5	1,1,2-Trichloroethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
108-90-7	Chlorobenzene	1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	U
100-42-5	Styrene	1.0	U
75-25-2	Bromoform	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
74-95-3	Dibromomethane	1.0	U
106-93-4	1,2-Dibromoethane	1.0	U
96-18-4	1,2,3-Trichloropropane	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1.0	U
67-67-1	Acetone	5.0	U
78-93-3	2-Butanone	5.0	U
75-15-0	Carbon disulfide	1.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
591-78-6	2-Hexanone	5.0	U

FORM I VOA

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

VBLKU2

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: B011800MVOWU1

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118007.D

Level: (low/med) LOW

Date Received:

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
95-47-6	Xylene (total)	1.0	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

VBLKU2

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: B011800MVOWU1

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118007.D

Level: (low/med) LOW

Date Received: 01/13/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-05-4	Vinyl acetate	10	U
107-13-1	Acrylonitrile	5.0	U
110-57-6	trans-1,4-Dichloro-2-butene	10	U
107-02-8	Acrolein	10	U
107-05-1	Allyl chloride	10	U
126-99-8	Chloroprene	10	U
126-98-7	Methacrylonitrile	1.0	U
80-62-6	Methyl methacrylate	10	U
97-63-2	Ethyl methacrylate	10	U
74-88-4	Iodomethane	10	U

MS/MSD Report

Lab Name : LAUCKS TESTING LABS

Client ID : 030-GW-003-02

Lab ID : 0001334-03
Matrix : WATER
Units : UG/L

Description : Volatiles by GC/MS, Full List

(Database Reference: K011800_MVOW01)

Matrix Spike Data

Analyte	Spike Added	Sample Found	MS Found	MS Rec	Recovery Limits
Vinyl Chloride	10.0	0	12.200	122	60 140
1,1-Dichloroethene	10.0	0	9.6000	96	60 140
trans-1,2-Dichloroethene	10.0	0	10.800	108	60 140
cis-1,2-Dichloroethene	10.0	0	11.100	111	60 140
Trichloroethene	10.0	0	10.500	105	60 140
Chloroethane	10.0	0	10.500	105	60 140
Methylene Chloride	10.0	0	9.7900	98	60 140
1,1-Dichloroethane	10.0	0	10.200	102	60 140
Chloroform	10.0	0	10.900	109	60 140
1,1,1-Trichloroethane	10.0	0	9.7800	98	60 140
Carbon Tetrachloride	10.0	0	9.4300	94	60 140
Benzene	10.0	0	11.400	114	60 140
1,2-Dichloroethane	10.0	0	11.600	116	60 140
Toluene	10.0	0	10.600	106	60 140
Ethylbenzene	10.0	0	10.400	104	60 140
Tetrachloroethene	10.0	0	8.7200	87	60 140
Dichlorodifluoromethane	10.0	0	14.300	143 *	60 140
Chloromethane	10.0	0	11.300	113	60 140
Bromomethane	10.0	0	12.800	128	60 140
Trichlorofluoromethane	10.0	0	9.4700	95	60 140
Bromochloromethane	10.0	0	10.900	109	60 140
1,2-Dichloropropane	10.0	0	12.300	123	60 140
Bromodichloromethane	10.0	0	12.200	122	60 140
cis-1,3-Dichloropropene	10.0	0	12.200	122	60 140
trans-1,3-Dichloropropene	10.0	0	10.500	105	60 140
1,1,2-Trichloroethane	10.0	0	12.300	123	60 140
Dibromochloromethane	10.0	0	10.800	108	60 140
Chlorobenzene	10.0	0	11.000	110	60 140
1,1,1,2-Tetrachloroethane	10.0	0	10.700	107	60 140
Styrene	10.0	0	11.400	114	60 140
Bromoform	10.0	0	10.600	106	60 140
1,1,2,2-Tetrachloroethane	10.0	0	13.400	134	60 140
2,2-Dichloropropane	10.0	0	5.8000	58 *	60 140
1,1-Dichloropropene	10.0	0	11.300	113	60 140
Dibromomethane	10.0	0	11.700	117	60 140
1,3-Dichloropropane	10.0	0	13.300	133	60 140
1,2-Dibromoethane	10.0	0	11.900	119	60 140
1,2,3-Trichloropropane	10.0	0	13.000	130	60 140
1,2-Dibromo-3-chloropropane	10.0	0	13.500	135	60 140
Acetone	10.0	0	14.400	144 *	60 140

Matrix Spike Duplicate Data

Analyte	Spike Added	MSD Found	MSD Rec	RPD	Control Limits Recov		RPD
Vinyl Chloride----------	10.0	11.800	118	3	60	140	30
1,1-Dichloroethene----------	10.0	9.3400	93	3	60	140	30
trans-1,2-Dichloroethene------	10.0	10.500	105	3	60	140	30
cis-1,2-Dichloroethene--------	10.0	10.800	108	3	60	140	30
Trichloroethene----------	10.0	10.200	102	3	60	140	30
Chloroethane----------	10.0	10.200	102	3	60	140	30
Methylene Chloride----------	10.0	9.6200	96	2	60	140	30
1,1-Dichloroethane----------	10.0	9.3400	93	9	60	140	30
Chloroform----------	10.0	10.600	106	3	60	140	30
1,1,1-Trichloroethane---------	10.0	9.4900	95	3	60	140	30
Carbon Tetrachloride----------	10.0	9.1000	91	3	60	140	30
Benzene----------	10.0	11.200	112	2	60	140	30
1,2-Dichloroethane----------	10.0	11.500	115	1	60	140	30
Toluene----------	10.0	10.600	106	0	60	140	30
Ethylbenzene----------	10.0	10.200	102	2	60	140	30
Tetrachloroethene----------	10.0	8.6900	87	0	60	140	30
Dichlorodifluoromethane-------	10.0	14.000	140	2	60	140	30
Chloromethane----------	10.0	11.100	111	2	60	140	30
Bromomethane----------	10.0	12.300	123	4	60	140	30
Trichlorofluoromethane--------	10.0	9.1900	92	3	60	140	30
Bromochloromethane----------	10.0	10.600	106	3	60	140	30
1,2-Dichloropropane----------	10.0	12.000	120	2	60	140	30
Bromodichloromethane----------	10.0	11.800	118	3	60	140	30
cis-1,3-Dichloropropene-------	10.0	11.800	118	3	60	140	30
trans-1,3-Dichloropropene-----	10.0	10.500	105	0	60	140	30
1,1,2-Trichloroethane---------	10.0	12.300	123	0	60	140	30
Dibromochloromethane----------	10.0	10.800	108	0	60	140	30
Chlorobenzene----------	10.0	11.100	111	1	60	140	30
1,1,1,2-Tetrachloroethane-----	10.0	10.800	108	1	60	140	30
Styrene----------	10.0	11.400	114	0	60	140	30
Bromoform----------	10.0	10.600	106	0	60	140	30
1,1,2,2-Tetrachloroethane-----	10.0	13.300	133	1	60	140	30
2,2-Dichloropropane----------	10.0	5.4900	55 *	5	60	140	30
1,1-Dichloropropene----------	10.0	10.900	109	4	60	140	30
Dibromomethane----------	10.0	11.600	116	1	60	140	30
1,3-Dichloropropane----------	10.0	13.300	133	0	60	140	30
1,2-Dibromoethane----------	10.0	12.100	121	2	60	140	30
1,2,3-Trichloropropane--------	10.0	13.000	130	0	60	140	30
1,2-Dibromo-3-chloropropane---	10.0	13.400	134	1	60	140	30
Acetone----------	10.0	15.600	156 *	8	60	140	30

Comments

Form MS/MSD-1

* = Recovery or RPD exceeded control limit

Form MS/MSD-1

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT: CTO 019 - NSWC CRANE		JOB NUMBER: CP1902	
SUBJECT: Volatiles		030GW00302MS	
BASED ON: Benzene		DRAWING NUMBER:	
BY: JWU	CHECKED BY:	APPROVED BY:	DATE: 02/18/00

$$= \frac{(\text{Area})(\text{Conc. IS})}{(\text{Area IS})(\overline{RRF_{IC}})}$$

$$= \frac{(1484500)(10\,\mu g/L)}{(188027)(0.690)}$$

$$= 11.4\,\mu g/L$$

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

030GW00302MS

Lab Name: Laucks Testing Labs

SDG No.: C1902

Matrix: (soil/water) WATER

Lab Sample ID: 0001334-03MS

Sample wt/vol: 25.0 (g/ml) ML

Lab File ID: U0118014.D

Level: (low/med) LOW

Date Received: 01/15/00

% Moisture: not dec.

Date Analyzed: 01/18/00

GC Column: DB-624 ID: 0.45 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
75-01-4	Vinyl chloride	12	
75-35-4	1,1-Dichloroethene	9.6	
156-60-5	trans-1,2-Dichloroethene	11	
79-01-6	Trichloroethene	10	
75-00-3	Chloroethane	10	
75-09-2	Methylene chloride	9.8	B
75-34-3	1,1-Dichloroethane	10	
67-66-3	Chloroform	11	
71-55-6	1,1,1-Trichloroethane	9.8	
56-23-5	Carbon tetrachloride	9.4	
71-43-2	Benzene	11	
107-06-2	1,2-Dichloroethane	12	
108-88-3	Toluene	11	
100-41-4	Ethylbenzene	10	
127-18-4	Tetrachloroethene	8.7	
75-71-8	Dichlorodifluoromethane	14	
74-87-3	Chloromethane	11	
74-83-9	Bromomethane	13	
75-69-4	Trichlorofluoromethane	9.5	
78-87-5	1,2-Dichloropropane	12	
75-27-4	Bromodichloromethane	12	
10061-01-5	cis-1,3-Dichloropropene	12	
10061-02-6	trans-1,3-Dichloropropene	10	
79-00-5	1,1,2-Trichloroethane	12	
124-48-1	Dibromochloromethane	11	
108-90-7	Chlorobenzene	11	
630-20-6	1,1,1,2-Tetrachloroethane	11	
100-42-5	Styrene	11	
75-25-2	Bromoform	11	
79-34-5	1,1,2,2-Tetrachloroethane	13	
74-95-3	Dibromomethane	12	
106-93-4	1,2-Dibromoethane	12	
96-18-4	1,2,3-Trichloropropane	13	
96-12-8	1,2-Dibromo-3-chloropropane	14	
67-67-1	Acetone	14	
78-93-3	2-Butanone	16	
75-15-0	Carbon disulfide	11	
108-10-1	4-Methyl-2-pentanone	13	
591-78-6	2-Hexanone	11	

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FORM I VOA

Data File : V:\URSULA\011800\U0118014.D
Acq On : 18 Jan 00 16:36
Sample : 0001334-03MS 030GW00302MS
Misc : 25ML + IS/SS BOTTLE#14 C1902
MS Integration Params: rteint.p
Quant Time: Jan 19 8:58 2000

Vial: 7
Operator: JMD
Inst : URSULA
Multiplr: 1.00

Quant Results File: U8260.RES

Quant Method : V:\URSULA\METHODS\QUANT\U8260.M (RTE Integrator)
Title : SW-846 Method 8260
Last Update : Tue Jan 18 13:29:54 2000
Response via : Initial Calibration
DataAcq Meth : METHOD.M

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Fluorobenzene	11.29	96	188027	10.00 ug/L	-0.02
33) Chlorobenzene-d5	17.64	117	107274	10.00 ug/L	-0.04
51) 1,4-Dichlorobenzene-d4	23.06	152	47782	10.00 ug/L	-0.03
System Monitoring Compounds					
20) Dibromofluoromethane	9.97	111	102264	10.79 ug/L	-0.02
Spiked Amount 10.000			Recovery	= 107.90%	
24) 1,2-Dichloroethane-d4	10.61	65	31116	11.82 ug/L	-0.02
Spiked Amount 10.000			Recovery	= 118.20%	
34) Toluene-d8	14.52	98	136572	9.56 ug/L	-0.03
Spiked Amount 10.000			Recovery	= 95.60%	
52) 4-Bromofluorobenzene	20.33	95	80514	10.13 ug/L	-0.04
Spiked Amount 10.000			Recovery	= 101.30%	
Target Compounds					Qvalue
2) Dichlorodifluoromethane	2.74	85	58774	14.30 ug/L	100
3) Chloromethane	3.11	50	54499	11.34 ug/L	99
4) Vinyl chloride	3.25	62	58398	12.15 ug/L	99
5) Bromomethane	3.87	96	54873	12.81 ug/L	98
6) Chloroethane	4.05	64	33294	10.49 ug/L	98
7) Trichlorofluoromethane	4.53	101	84546	9.47 ug/L	99
8) 1,1-Dichloroethene	5.54	96	50526	9.60 ug/L	94
9) Acetone	5.73	43	2065	14.38 ug/L	96
10) Carbon disulfide	5.94	76	182032	10.65 ug/L #	100
11) Methylene chloride	6.51	84	45285	9.79 ug/L #	85
12) trans-1,2-Dichloroethene	7.05	96	60619	10.80 ug/L	91
13) Methyl tert-butyl ether	7.09	73	16	N.D.	
14) 1,1-Dichloroethane	7.87	63	105334	10.18 ug/L	99
15) 2,2-Dichloropropane	9.00	77	35388	5.80 ug/L	100
16) cis-1,2-Dichloroethene	9.01	96	53820	11.11 ug/L	97
17) 2-Butanone	9.14	43	3192m B	15.91 ug/L	
18) Bromochloromethane	9.48	128	20819	10.88 ug/L #	61
19) Chloroform	9.65	83	100749	10.86 ug/L	97
21) 1,1,1-Trichloroethane	9.99	97	73272	9.78 ug/L	94
22) Carbon tetrachloride	10.34	117	68190	9.43 ug/L	98
23) 1,1-Dichloropropene	10.34	75	87316	11.27 ug/L	97
25) Benzene	10.73	78	148450	11.44 ug/L	99
26) 1,2-Dichloroethane	10.76	62	29646	11.64 ug/L	98
27) Trichloroethene	12.04	95	73281	10.48 ug/L	88
28) 1,2-Dichloropropane	12.46	63	59116	12.31 ug/L	100
29) Dibromomethane	12.71	93	30755	11.74 ug/L #	86
30) Bromodichloromethane	13.04	83	87801	12.21 ug/L	98

(#) = qualifier out of range (m) = manual integration

1/19/00

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: C1902

Instrument ID: Ursula Calibration Date(s): 10/25/99 10/25/99

Heated Purge (Y/N): N Calibration Times: 12:05 16:19

GC Column: DB-624 ID: 0.45 (mm)

LAB FILE ID: RRF1 = U1025007.D RRF5 = U1025005.D RRF100 = U1025011.D
RRF10 = U1025004.D RRF25 = U1025008.D RRF50 = U1025009.D

COMPOUND	RRF1	RRF5	RRF10	RRF25	RRF50	RRF100	$\overline{RRF}$	% RSD
Dichlorodifluoromethane	0.229	0.209	0.221	0.225	0.210		0.219	4.0
Chloromethane	0.269	0.247	0.253	0.262	0.247		0.256	3.8
Vinyl chloride	0.265	0.244	0.256	0.265	0.249		0.256	3.7
Bromomethane	0.224	0.218	0.238	0.238	0.221		0.228	4.3
Chloroethane	0.178	0.163	0.173	0.171	0.160		0.169	4.5
Trichlorofluoromethane	0.491	0.455	0.477	0.487	0.465		0.475	3.2
1,1-Dichloroethene	0.267	0.275	0.290	0.292	0.275		0.280	3.9
Acetone		0.007	0.008	0.007	0.008	0.008	0.008	5.4
Carbon disulfide	0.884	0.905	0.902	0.960	0.896		0.909	3.2
Methylene chloride		0.296	0.253	0.219	0.216	0.200	0.237	16.2
trans-1,2-Dichloroethene	0.289	0.293	0.311	0.307	0.293		0.299	3.2
1,1-Dichloroethane	0.550	0.536	0.552	0.567	0.545		0.550	2.1
2-Butanone		0.005	0.008	0.012	0.014	0.015	0.011	40.6
Chloroform	0.498	0.481	0.497	0.498	0.493		0.493	1.5
1,1,1-Trichloroethane	0.380	0.388	0.410	0.414	0.400		0.398	3.6
Carbon tetrachloride	0.372	0.375	0.394	0.400	0.383		0.385	3.2
1,2-Dichloroethane-d4	0.143	0.147	0.143	0.135	0.138	0.134	0.140	3.7
Benzene	0.682	0.674	0.709	0.708	0.677		0.690	2.5
1,2-Dichloroethane	0.137	0.132	0.134	0.136	0.139		0.135	1.9
Trichloroethene	0.365	0.367	0.381	0.384	0.364		0.372	2.6
1,2-Dichloropropane	0.253	0.248	0.258	0.261	0.257		0.255	2.0
Dibromomethane	0.139	0.136	0.139	0.139	0.144		0.139	2.3
Bromodichloromethane	0.377	0.375	0.391	0.384	0.386		0.383	1.7
cis-1,3-Dichloropropene	0.195	0.212	0.232	0.232	0.240		0.222	8.3
4-Methyl-2-pentanone		0.020	0.025	0.032	0.039	0.041	0.031	28.5
Toluene-d8	1.339	1.330	1.334	1.359	1.294	1.339	1.332	1.6
Toluene	0.756	0.725	0.782	0.786	0.722		0.754	4.0
trans-1,3-Dichloropropene	0.250	0.221	0.245	0.254	0.261		0.246	6.2
1,1,2-Trichloroethane	0.185	0.178	0.181	0.185	0.183		0.182	1.6
Tetrachloroethene	0.598	0.621	0.659	0.662	0.598		0.628	5.0
2-Hexanone		0.025	0.029	0.024	0.033	0.038	0.030	19.4
Dibromochloromethane	0.382	0.362	0.386	0.389	0.393		0.382	3.2
1,2-Dibromoethane	0.251	0.256	0.277	0.281	0.284		0.270	5.7
Chlorobenzene	0.814	0.794	0.832	0.836	0.799		0.815	2.3
1,1,1,2-Tetrachloroethane	0.351	0.357	0.373	0.373	0.363		0.363	2.6
Ethylbenzene	1.428	1.455	1.529	1.576	1.462		1.490	4.1
m,p-Xylene	0.442	0.496	0.523	0.529	0.485		0.495	7.0

MS/MSD Report

Lab Name : LAUCKS TESTING LABS

Client ID : 030-GW-003-02

Description : Ordnance by 8330

Lab ID : 0001334-03
Matrix : WATER
Units : UG/L

(Database Reference: K011800_HSVW01)

Matrix Spike Data

Analyte	Spike Added	Sample Found	MS Found	MS Rec	Recovery Limits
HMX----------	26.0	0	25.700	99	75 125
RDX----------	26.0	0	24.300	94	75 125
1,3,5-Trinitrobenzene---------	26.0	0	23.200	89	75 125
1,3-Dinitrobenzene----------	26.0	0	28.900	111	75 125
Nitrobenzene----------	26.0	0	25.000	96	75 125
Tetryl----------	26.0	0	8.3800	32 *	75 125
2,4,6-Trinitrotoluene--------	26.0	0	34.000	131 *	75 125
4-Amino-2,6-Dinitrotoluene----	26.0	0	26.100	100	75 125
2-Amino-4,6-Dinitrotoluene----	26.0	0	26.100	100	75 125
2,6-Dinitrotoluene----------	26.0	0	25.000	96	75 125
2,4-Dinitrotoluene----------	26.0	0	25.200	97	75 125
2-Nitrotoluene----------	26.0	0	25.100	96	75 125
4-Nitrotoluene----------	26.0	0	25.200	97	75 125
3-Nitrotoluene----------	26.0	0	25.200	97	75 125

Matrix Spike Duplicate Data

Analyte	Spike Added	MSD Found	MSD Rec	RPD	Control Limits Recov		RPD
HMX----------	26.0	24.800	95	4	75	125	30
RDX----------	26.0	23.700	91	3	75	125	30
1,3,5-Trinitrobenzene---------	26.0	22.800	88	1	75	125	30
1,3-Dinitrobenzene----------	26.0	28.300	109	2	75	125	30
Nitrobenzene----------	26.0	23.100	89	8	75	125	30
Tetryl----------	26.0	11.000	42 *	27	75	125	30
2,4,6-Trinitrotoluene--------	26.0	34.300	132 *	1	75	125	30
4-Amino-2,6-Dinitrotoluene----	26.0	25.900	100	0	75	125	30
2-Amino-4,6-Dinitrotoluene----	26.0	25.900	100	0	75	125	30
2,6-Dinitrotoluene----------	26.0	24.700	95	1	75	125	30
2,4-Dinitrotoluene----------	26.0	25.000	96	1	75	125	30
2-Nitrotoluene----------	26.0	24.600	95	1	75	125	30
4-Nitrotoluene----------	26.0	24.600	95	2	75	125	30
3-Nitrotoluene----------	26.0	24.900	96	1	75	125	30

Comments

Form MS/MSD-1

Blank Spike Report

Lab Name : LAUCKS TESTING LABS

Description : Ordnance by 8330
Lab ID : S011800HORWLC
Matrix : W
Units : UG/L

(Database Reference: S011800_HSVW01)

Analyte	Spike Added	Amount Found	% Rec	Recovery Limits	
HMX----------	25.97	24.720	95	75	125
RDX----------	25.97	23.040	89	75	125
1,3,5-Trinitrobenzene---------	25.97	23.340	90	75	125
1,3-Dinitrobenzene----------	25.97	26.600	102	75	125
Nitrobenzene----------	25.97	23.760	91	75	125
Tetryl----------	25.97	15.990	62*	75	125
2,4,6-Trinitrotoluene---------	25.97	30.100	116	75	125
4-Amino-2,6-Dinitrotoluene----	25.97	24.920	96	75	125
2-Amino-4,6-Dinitrotoluene----	25.97	25.160	97	75	125
2,6-Dinitrotoluene----------	25.97	24.180	93	75	125
2,4-Dinitrotoluene----------	25.97	24.540	94	75	125
2-Nitrotoluene----------	25.97	23.980	92	75	125
4-Nitrotoluene----------	25.97	24.240	93	75	125
3-Nitrotoluene----------	25.97	24.540	94	75	125

* = Recovery exceeded control limit

Form BLKSPK-1

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT: CTO 019- NSWC CRANE		JOB NUMBER: C1902	
SUBJECT: Explosive		030-GW-003-02MSD	
BASED ON: Nitrobenzene		DRAWING NUMBER:	
BY: JWD	CHECKED BY:	APPROVED BY:	DATE: 02/18/00

$$= \frac{(\text{Area})(\text{Final Ext})}{(\overline{CF}_{AVG})(\text{Initial Ext})(\text{Vol. Inj})}$$

$$= \frac{(1024281)(10700\,\mu L)}{(12309.67)(770\,mL)(50\,\mu L)}$$

$$= 23.1\ \mu g/L$$

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

030-GW-003-02MSD

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 770 (g/ml) ml

% Moisture: N/A

Extraction: SALTING OUT

Concentrated Extract Volume: 10700 (uL)

Dilution Factor: 2.0

SDG No.: C1902

Lab Sample ID: 0001334-03MSD

Lab File ID: 3128015.D

Date Collected: 01/13/00

Date Received: 01/15/00

Date Prepared: 01/18/00

Date Analyzed: 01/29/00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	SDL
2691-41-0	HMX	25		1.4
121-82-4	RDX	24		1.4
99-35-4	1,3,5-Trinitrobenzene	23		1.4
99-65-0	1,3-Dinitrobenzene	28		1.4
479-45-8	Tetryl	11		1.4
98-95-3	Nitrobenzene	23		1.4
118-96-7	2,4,6-Trinitrotoluene	34		1.4
1946-51-0	4-Amino-2,6-Dinitrotoluene	26		1.4
35572-78-2	2-Amino-4,6-Dinitrotoluene	26		1.4
606-20-2	2,6-Dinitrotoluene	25		1.4
121-14-2	2,4-Dinitrotoluene	25		1.4
88-72-2	2-Nitrotoluene	25		1.4
99-99-0	4-Nitrotoluene	25		1.4
99-08-1	3-Nitrotoluene	25		1.4

Laucks Testing Labs, Inc.
Quantitation Report

Data File : //AMDK645003/DROOT/chem/HPLC3.i/31280B.b/3128015.d
Injection Date : 29-JAN-2000 00:49
Sample Info : 0001334-03MSD
Misc. Info :
Laboratory ID : 0001334-03MSD
Instrument ID : HPLC3.i
Method : 3C219B04.m
Quantitation : ESTD
Dilution Factor : 2.00
Column : C18

Integrator : HP Genie
Sample Type: MSD
Column Size: 0.15m 4.60mm

UnitFactor : 1.000
FinalVolume : 10700 ul
SampleVolume: 770.0 ml
InjectionVolume: 50.00 ul

Compound	RT	RT Window	Response	Concentrations Soln ng/mL	Concentrations Final ug/L
	5.11		25823		
	6.89		21850		
HMX	8.05	7.98 - 8.12	428163	893.43	24.80
	8.73		11180		
	8.90		1652		
	9.29		4453		
RDX	9.54	9.47 - 9.61	524012	853.93	23.70
	9.97		13418		
1,3,5-Trinitrobenzene	10.45	10.36 - 10.54	1045677	819.54	22.80
	10.79		36018		
	11.27		71128		
1,2-Dinitrobenzene	11.48	11.41 - 11.55	639575 M	814.66	22.60
1,3-Dinitrobenzene	11.58	11.48 - 11.66	1764898 M	1018.40	28.30
	11.90		4852		
Nitrobenzene	12.22	12.12 - 12.34	1024281 M	832.09	23.10
Tetryl	12.31	12.15 - 12.45	342117 M	396.69	11.00
2,4,6-Trinitrotoluene	12.82	12.63 - 13.03	1505412	1235.30	34.30
4-Amino-2,6-Dinitrotoluene	13.60	13.34 - 13.84	770249	931.04	25.90
2-Amino-4,6-Dinitrotoluene	13.92	13.62 - 14.20	1102587	932.52	25.90
2,6-Dinitrotoluene	14.45	14.07 - 14.81	754925	890.30	24.70
2,4-Dinitrotoluene	14.90	14.44 - 15.32	1407067	898.50	25.00
2-Nitrotoluene	18.17	17.66 - 18.64	646038	884.32	24.60
4-Nitrotoluene	20.01	19.55 - 20.43	531837	884.03	24.60
3-Nitrotoluene	21.50	21.00 - 21.94	694562	896.94	24.90
	22.42		606		
	22.67		341		
	23.57		1827	50	
	23.77		176		
	25.29		5531	2-4-00	
	25.42		2084		
	25.52		2939		
	25.82		446		

Response is in area units.
M - The peak was manually integrated.
E - The quantitated amount exceeds the calibration range.

Laucks Testing Labs, Inc.
Initial Calibration Linearity Summary

Start Cal Date: 21-DEC-1999 15:11
End Cal Date : 21-DEC-1999 20:17
Quant Method : ESTD
Cal Curve Type: Average CF
Integrator : HP Genie
Method File : \\AMDK645003\DROOT\chem\HPLC3.i\3C219B.b\3C219B01.m
Sublist : 8330.sub
Column : C18
Column Size : 0m L - 4.60mm ID

Calibration Files:
Level 1: //AMDK645003/DROOT/chem/HPLC3.i/3C219B.b/3C16947.d/3C16947.dat
Level 2: //AMDK645003/DROOT/chem/HPLC3.i/3C219B.b/3C16948.d/3C16948.dat
Level 3: //AMDK645003/DROOT/chem/HPLC3.i/3C219B.b/3C16949.d/3C16949.dat
Level 4: //AMDK645003/DROOT/chem/HPLC3.i/3C219B.b/3C16950.d
Level 5: //AMDK645003/DROOT/chem/HPLC3.i/3C219B.b/3C16951.d/3C16951.dat
Level 6: //AMDK645003/DROOT/chem/HPLC3.i/3C219B.b/3C16952.d/3C16952.dat

Compound	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Ave CF	%RSD
4 HMX	573.4000	469.7600	464.0980	459.1110	458.6660	450.3709	479.2343	9.7
6 RDX	636.5400	618.9200	626.6160	603.5310	606.9152	589.3454	613.6446	2.8
7 1,3,5-Trinitrobenzene	1407.140	1287.170	1278.352	1251.994	1212.389	1218.493	1275.923	5.6
9 1,3-Dinitrobenzene	1653.640	1780.600	1787.014	1775.214	1775.696	1625.609	1732.962	4.2
11 Nitrobenzene	1262.140	1246.130	1244.282	1216.902	1214.661	1201.687	1230.967	1.9
12 Tetryl	950.8000	931.7100	965.7800	818.7420	678.1570	829.4357	862.4374	12.7
13 2,4,6-Trinitrotoluene	1251.980	1250.540	1227.212	1197.564	1174.086	1210.408	1218.632	2.5
14 4-Amino-2,6-Dinitrotoluene	798.7400	836.8800	814.4440	826.8800	869.2148	817.6363	827.2992	2.9
15 2-Amino-4,6-Dinitrotoluene	1161.400	1185.800	1187.352	1179.273	1195.595	1184.824	1182.374	1.0
16 2,6-Dinitrotoluene	947.8000	848.1500	830.0120	821.4540	824.1078	816.1396	847.9439	5.9

Amount = Response divided by CF

CF - Calibration Factor (response divided by concentration).
RSD - Relative Standard Deviation.

Mark Francis

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. CLARK**	**DATE:**	**MARCH 16, 2000**
FROM:	**JENNIFER MALLE**	**COPIES:**	**DV FILE/REV. 1**

SUBJECT: **INORGANIC DATA VALIDATION –TOTAL AND DISSOLVED APPENDIX IX METALS, AMMONIA, CYANIDE, NITRATE/NITRITE, TOTAL KJELDAHL NITROGEN, PHOSPHORUS AND DISSOLVED PHOSPHORUS**
CTO 019 – NSWC CRANE
SDG – C1902

SAMPLES: 16/Aqueous/

030-GW-001-02	030-GW-001-02-F	030-GW-002-02	030-GW-002-02-F
030-GW-003-02	030-GW-003-02-F	030-GW-004-02	030-GW-004-02-F
030-GW-005-02	030-GW-005-02-F	030-GW-006-02	030-GW-006-02-F
030-GW-007-02	030-GW-007-02-F	DUP-GW-001-02	DUP-GW-001-02-F

Overview

The sample set for CTO 019, NSWC Crane, SDG C1902, consists of sixteen (16) aqueous environmental samples. Two (2) field duplicate pairs (030-GW-006-02/DUP-GW-001-02 and 030-GW-006-02-F/DUP-GW-001-02-F) were included within this SDG.

All samples, with exception to those designated –F, were analyzed for Appendix IX metals, ammonia, cyanide, nitrate/nitrite, total kjeldahl nitrogen (TKN) and total phosphorus. The samples designated –F were analyzed for dissolved Appendix IX metals, and dissolved phosphorus. The samples were collected by Tetra Tech NUS on January 11-13, 2000 and analyzed by Laucks Testing Labs, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria.

Metals analyses, with the exception of mercury, were conducted using SW 846 method 6020. Mercury analyses were conducted using SW 846 method 7470A. Cyanide analyses were conducted using SW 846 method 9012A. Ammonia analyses were conducted using EPA method 350.1. Nitrate/Nitrite analyses were conducted using EPA method 353.2. Total and dissolved phosphorus analyses were conducted using EPA method 365.2. TKN analyses were conducted using EPA method 351.2.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
  • Calibration Verifications
  • Laboratory Blank Analyses
  • Laboratory Duplicate Results
* • Field Duplicate Results
  • ICP Interference Check Sample Results
  • Matrix Spike Analyses
* • Post Digestion Spike Analyses

- Laboratory Control Sample Results
- * ICP Serial Dilution Results
- * Sample Quanitation
- * Detection Limits

* - All quality control criteria were met for this parameter.

Calibration Verification

An Initial Calibration Verification (ICV) for ammonia was greater than the 110% quality control limits. The positive result reported for ammonia was qualified as estimated, "J".

Laboratory Blank Analyses

The following contaminants were detected in the aqueous preparation blanks at the following maximum concentrations:

Samples affected: All

Analyte	Maximum Concentration	Action Level (aqueous)
Selenium	1.6 ug/L	8.0 ug/L
TKN	0.31 mg/L	1.55 mg/L
Nitrate/Nitrite	0.013 mg/L	0.065 mg/L

An action level of 5X the maximum concentration has been used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluating for blank contamination. Positive results less than the action level for selenium, TKN and nitrate/nitrite were qualified as nondetected "U". Positive results greater than the action level for selenium, TKN and nitrate/nitrite were qualified as estimated, "J".

Matrix Spike Analyses

The Matrix Spike (MS) Percent Recovery (%R) for selenium was less than the 75% quality control limit. Nondetected and positive results reported for selenium were qualified as estimated, "UJ" and "J", respectively.

The Matrix Spike (MS) Percent Recoveries (%Rs) reported for phosphorus were greater than the 129% quality control limits. Positive results reported for phosphorus were qualified as estimated, "J".

Laboratory Duplicate Precision

Laboratory duplicate imprecision greater than the 27 Relative Percent Difference (%RPD) was noted for phosphorus. Positive results reported for phosphorus were qualified as estimated, "J".

Laboratory Control Sample Results

The Laboratory Control Sample (LCS) Percent Recovery (%R) reported for selenium was less than the 80% quality control limits. Nondetected and positive results reported for selenium were qualified as estimated, "UJ" and "J", respectively.

Notes

As noted in the laboratory's inorganic case narrative, cadmium, selenium and zinc were to be reanalyzed. The laboratory has completed the reanalysis and these results can be found in Appendix C. It should be noted that the original data was used in the data validation process and not the reanalysis data. This decision was based on the fact that the original data was not significantly affected by the reasons given in the inorganic case narrative. For example, the narrative lists a high calibration recovery for the reason behind the cadmium reanalysis. However, all results reported for cadmium were nondetected and remained unaffected by this noncompliance. Second, the ICP Interference Check Sample Results for zinc contained percent recoveries below quality control limits in the original package. In the reanalysis, it was discovered that this was due to a laboratory error where they were reporting the incorrect true value for zinc in the ICS solution. Finally, low recoveries for LCS and MS results did not affect the results reported for selenium in either package. The resubmitted results support the decision to use the original data since the results reported in the original package and the resubmitted package are essentially the same.

The Contract Required Detection Limit (CRDL) Percent Recoveries (%Rs) for several analytes affecting both the total and dissolved metals were outside the 80-120% quality control limit. No validation action was required per Region V guidance.

An Initial Calibration Verification (ICV) Percent Recovery (%R) for cadmium was greater than the 110% quality control limit. However, no validation action was required as all results reported for cadmium were nondetected.

As a result of the sample preparation procedure for the metals samples (45mL diluted to 50mL), reporting limits are marginally higher than those specified in the Quality Assurance Project Plan.

A comparison of field duplicate pairs is included in Appendix C.

Executive Summary

Laboratory Performance: Selenium, TKN and nitrate/nitrite were present in the preparation blanks. Ammonia was qualified for calibration noncompliance.

Other Factors Affecting Data Quality: Selenium and phosphorus were qualified for MS noncompliance. Phosphorus was qualified for laboratory duplicate imprecision. Selenium was below the QC limits for LCS.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994, "EPA Region V Standard Operating Procedures for Validation of CLP Inorganic Review", September 1993, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Jennifer Malle

Tetra Tech NUS
Jennifer Malle
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

CTO01 NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-001-02			030-GW-001-02-F			030-GW-002-02			030-GW-002-02-F		
SAMPLE DATE:	01/12/00			01/12/00			01/12/00			01/12/00		
LABORATORY ID:	0001252-05			0001252-10			0001252-04			0001252-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	3.1			3.2			1.7			2.2		
BARIUM	7.2			7.4			6.2			6.7		
BERYLLIUM	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	
CHROMIUM	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	
COPPER	10.2			9.2			8.9			8.7		
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		11.1	U		11.1	U		11.1	U	
SELENIUM	2	U	A	1.1	UJ	DE	7.3	U	A	6.9	U	A
SILVER	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	
TIN	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	
ZINC	11.1	U		11.1	U		11.1	U		11.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-003-02			030-GW-003-02-F			030-GW-004-02			030-GW-004-02-F		
SAMPLE DATE:	01/13/00			01/13/00			01/11/00			01/11/00		
LABORATORY ID:	0001334-03			0001334-07			0001252-01			0001252-07		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.1	U		1.1	U		2.6			2.8		
BARIUM	17.2			17.2			24.3			23.7		
BERYLLIUM	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	
CHROMIUM	5.6	U		5.6	U		5.6	U		5.6	U	
COBALT	3.3	U		3.3	U		8.4			8.3		
COPPER	9.2			9.4			12.2			11.2		
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		11.1	U		23			22.3		
SELENIUM	4.4	U	A	4.7	U	A	3	U	A	1.9	U	A
SILVER	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	
TIN	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	
ZINC	11.1	U		11.1	U		28.7			26.7		

CTO0[illegible] NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-005-02			030-GW-005-02-F			030-GW-006-02			030-GW-006-02-F		
SAMPLE DATE:	01/11/00			01/11/00			01/13/00			01/13/00		
LABORATORY ID:	0001252-02			0001252-08			0001334-05			0001334-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.3			1.6			1.3			1.4		
BARIUM	24.9			23.9			6.2			6.9		
BERYLLIUM	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	
CHROMIUM	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	
COPPER	9.6			8.8			10.7			8.7		
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		11.1	U		11.1	U		11.1	U	
SELENIUM	1.1	UJ	DE	1.1	U	A	11.2	J	ADE	10.8	J	ADE
SILVER	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	
TIN	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	
ZINC	11.1	U		11.1	U		11.1	U		11.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-007-02			030-GW-007-02-F			DUP-GW-001-02			DUP-GW-001-02-F		
SAMPLE DATE:	01/12/00			01/12/00			01/13/00			01/13/00		
LABORATORY ID:	0001334-02			0001334-06			0001334-04			0001334-08		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:							030-6W-006-02			030-6W-006-02-F		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.8			1.8			1.3			1.3		
BARIUM	14.3			13.6			5.2			7.1		
BERYLLIUM	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	
CHROMIUM	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	
COPPER	10.1			10.6			9.1			8.7		
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		11.1	U		11.1	U		11.1	U	
SELENIUM	1.1	UJ	DE	1.1	UJ	DE	11.2	J	ADE	10.7	J	ADE
SILVER	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	
TIN	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	
ZINC	11.4			32.2			11.1	U		11.1	U	

CTO0[illegible] NSWC CRANE
WATER[illegible]TA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-001-02			030-GW-001-02-F			030-GW-002-02			030-GW-002-02-F		
SAMPLE DATE:	01/12/00			01/12/00			01/12/00			01/12/00		
LABORATORY ID:	0001252-05			0001252-10			0001252-04			0001252-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.010	U				
CYANIDE	0.01	U					0.01	U				
NITRATE/NITRITE, AS N	1.3	J	A				0.97	J	A			
TOTAL KJELDAHL NITROGEN	0.8	U	A				0.6	U	A			
TOTAL PHOSPHORUS	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-003-02			030-GW-003-02-F			030-GW-004-02			030-GW-004-02-F		
SAMPLE DATE:	01/13/00			01/13/00			01/11/00			01/11/00		
LABORATORY ID:	0001334-03			0001334-07			0001252-01			0001252-07		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.11	J	C			
CYANIDE	0.01	U					0.01	U				
NITRATE/NITRITE, AS N	0.65	J	A				0.03	U	A			
TOTAL KJELDAHL NITROGEN	0.8	U	A				1.7	J	A			
TOTAL PHOSPHORUS	0.1	U		0.1	U		0.16	J	DF	0.1	U	

CTO01 NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-005-02			030-GW-005-02-F			030-GW-006-02			030-GW-006-02-F		
SAMPLE DATE:	01/11/00			01/11/00			01/13/00			01/13/00		
LABORATORY ID:	0001252-02			0001252-08			0001334-05			0001334-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.01	U				
CYANIDE	0.01	U					0.01	U				
NITRATE/NITRITE, AS N	6.9	J	A				4.9	J	A			
TOTAL KJELDAHL NITROGEN	0.3	U	A				0.3	U	A			
TOTAL PHOSPHORUS	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1902

SAMPLE NUMBER:	030-GW-007-02			030-GW-007-02-F			DUP-GW-001-02			DUP-GW-001-02-F		
SAMPLE DATE:	01/12/00			01/12/00			01/13/00			01/13/00		
LABORATORY ID:	0001334-02			0001334-06			0001334-04			0001334-08		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:							030-6W-006-02			030-6W-006-02-F		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.01	U				
CYANIDE	0.01	U					0.01	U				
NITRATE/NITRITE, AS N	0.4	J	A				5.0	J	A			
TOTAL KJELDAHL NITROGEN	0.6	U	A				0.3	U	A			
TOTAL PHOSPHORUS	0.13	J	DF	0.1	U		0.1	U		0.1	U	

APPENDIX B

Results as Reported by the Laboratory

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: DGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: __ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-05

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	3.1			M
7440-39-3	Barium	7.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	10.2			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	2.		N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-001-02

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: HGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-10

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	3.2			M
7440-39-3	Barium	7.4			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	9.2			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-001-02-F

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: CGW002

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: __ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-04

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.7			M
7440-39-3	Barium	6.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	8.9			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	7.3		N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-002-02

FORM I - IN

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: GGW002

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-09

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.2			M
7440-39-3	Barium	6.7			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	8.7			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	6.9			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-002-02-F

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: JGW003

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-03

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1	U		M
7440-39-3	Barium	17.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	9.2			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	4.4		N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-003-02

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: NGW003

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-07

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.1	U		M
7440-39-3	Barium	17.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	9.4			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	4.7			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-003-02-F

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: AGW004

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: __ SAS No.: __ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-01

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.6			M
7440-39-3	Barium	24.3			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	8.4			M
7440-50-8	Copper	12.2			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	23.			M
7440-09-7	Potassium				
7782-49-2	Selenium	3.		N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	28.7			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-004-02

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: EGW004

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-07

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	2.8			M
7440-39-3	Barium	23.7			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	8.3			M
7440-50-8	Copper	11.2			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	22.3			M
7440-09-7	Potassium				
7782-49-2	Selenium	1.9			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	26.7			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-004-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: BGW005

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-02

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.3			M
7440-39-3	Barium	24.9			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	9.6			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	1.1	U	N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-005-02

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: FGW005

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: __ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01252-08

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.6			M
7440-39-3	Barium	23.9			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	8.8			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	1.1			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-005-02-F

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: LGW006

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-05

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.3			M
7440-39-3	Barium	6.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	10.7			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	11.2		N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-006-02

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: PGW006

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-09

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.4			M
7440-39-3	Barium	6.9			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	8.7			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	10.8			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-006-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: IGW007

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-02

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.8			M
7440-39-3	Barium	14.3			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	10.1			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	1.1	U	N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.4			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-007-02

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: MGW007

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: __ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-06

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.8			M
7440-39-3	Barium	13.6			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	10.6			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	32.2			M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-007-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: KGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-04

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.3			M
7440-39-3	Barium	5.2			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	9.1			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	11.2		N	P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: DUP-GW-001-02

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: OGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: __ SAS No.: __ SDG No.: C1902

Matrix (soil/water): WATER Lab Sample ID: 01334-08

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony	1.1	U		M
7440-38-2	Arsenic	1.3			M
7440-39-3	Barium	7.1			M
7440-41-7	Beryllium	1.1	U		M
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium	5.6	U		M
7440-48-4	Cobalt	3.3	U		M
7440-50-8	Copper	8.7			M
7439-89-6	Iron				
7439-92-1	Lead	1.1	U		M
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.2	U		AV
7440-02-0	Nickel	11.1	U		M
7440-09-7	Potassium				
7782-49-2	Selenium	10.7			P
7440-22-4	Silver	3.3	U		M
7440-23-5	Sodium				
7440-28-0	Thallium	1.1	U		M
7440-62-2	Vanadium	2.2	U		M
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin	11.1	U		M

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: DUP-GW-001-02-F

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-001-02
Lab Sample ID: 0001252-05
Date Received: 01/13/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	1.3		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	01/14/00	01/17/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.8		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-001-02-F
Lab Sample ID: 0001252-10
Date Received: 01/13/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/14/00	01/17/00	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs.
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-002-02
Lab Sample ID: 0001252-04
Date Received: 01/13/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	0.97		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	01/14/00	01/17/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.6		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-002-02-F
Lab Sample ID: 0001252-09
Date Received: 01/13/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/14/00	01/17/00	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-003-02
Lab Sample ID: 0001334-03
Date Received: 01/15/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	0.65		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	01/19/00	01/20/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.8		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-003-02-F
Lab Sample ID: 0001334-07
Date Received: 01/15/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/19/00	01/20/00	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-004-02
Lab Sample ID: 0001252-01
Date Received: 01/13/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.11		mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	0.03		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.16		mg/L	01/14/00	01/17/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	1.7		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-004-02-F
Lab Sample ID: 0001252-07
Date Received: 01/13/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/14/00	01/17/00	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-005-02
Lab Sample ID: 0001252-02
Date Received: 01/13/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	6.9		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	01/14/00	01/17/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-005-02-F
Lab Sample ID: 0001252-08
Date Received: 01/13/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/14/00	01/17/00	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-006-02
Lab Sample ID: 0001334-05
Date Received: 01/15/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	4.9		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	01/19/00	01/20/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-006-02-F
Lab Sample ID: 0001334-09
Date Received: 01/15/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/26/00	01/27/00	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-007-02
Lab Sample ID: 0001334-02
Date Received: 01/15/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	0.40		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.13		mg/L	01/19/00	01/20/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.6		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : 030-GW-007-02-F
Lab Sample ID: 0001334-06
Date Received: 01/15/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/19/00	01/20/00	0.10	EPA 365.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : DUP-GW-001-02
SDG No. : C1902 Lab Sample ID: 0001334-04
Matrix : WATER Date Received: 01/15/00

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Cyanide (Method 9012)	0.010	U	mg/L	01/20/00	01/21/00	0.010	SW 9012
Ammonia as N (EPA 350.1)	0.01	U	mg/L	01/28/00	01/28/00	0.01	EPA 350 1
Nitrate + Nitrite as N	5.0		mg/L	01/20/00	01/20/00	0.01	EPA 353.2
Total Phosphorus as P	0.10	U	mg/L	01/19/00	01/20/00	0.10	EPA 365.2
Total Kjeldahl Nitrogen N	0.3		mg/L	01/18/00	01/19/00	0.3	EPA 351.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : C1902
Matrix : WATER

Sample ID : DUP-GW-001-02-F
Lab Sample ID: 0001334-08
Date Received: 01/15/00

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Phosphorus as P	0.10 U	mg/L	01/26/00	01/27/00	0.10	EPA 365.2

APPENDIX C

Support Documentation

#0001[illegible]2
C1902

00323

12

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7393/CTO 19

SITE NAME: NSWC CRANE, INDIANA

SAMPLERS (SIGNATURE): Scott W. Reid

	STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	METALS (T)	METALS (DIS)	CYANIDE	DIS. PHOS.	NH3, TKN, NITRATE/NITRITE, PHOS(T).	REMARKS
6	TB	1/11/00	1030		✓	030-TB-001-02	3	3							TRIP BLANK 6
1,7	LF	↓	1455		✓	030-GW-004-02	10	3	2	1	1	1	1	1	1 + 7
2,8	LF	↓	1530		✓	030-GW-005-02	10	3	2	1	1	1	1	1	2 + 8
3	TB	1/12/00	0720		✓	030-TB-002-02	3	3	2 (GW)						TRIP BLANK 3
4,9	LF	↓	1035		✓	030-GW-002-02	10	3	2	1	1	1	1	1	4 + 9
5,10	LF	↓	1100		✓	030-GW-001-02	10	3	2	1	1	1	1	1	5 + 10

LAUCKS

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
Scott W. Reid	1/12/00 1600	FED EX			
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE / TIME:	REMARKS: Temp. blank @ shipment = 4°C.	
			1/13/00 8:45	FED EX AIR BILL #: 8168 8343 7177	

[illegible] 2440 (0693)

0001334 C1902 00326

CHAIN OF CUSTODY RECORD

PROJECT NO.: 7393/CTO 19

SITE NAME: LANDFARM - NSWC CRANE, IN.

SAMPLERS (SIGNATURE): Scott W. Neil, Troy Rozik

	STATION NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	EXPLOSIVES	TOTAL METALS	DIS. METALS	CYANIDE	DIS. PHOS.	NH3, TKN, NITRATE/NITRITE, PHOS (T)	REMARKS
5	TB	1/12/00	0720		✓	030-TB-002-02	3	3							TRIP BLANK
6	LF	↓	1657		✓	030-GW-007-02	10	3	2	1	1	1	1	1	
7	LF	1/13/00	0955		✓	030-GW-003-02	30	9	6	3	3	3	3	3	Run MS/MSD
18	LF	1/13/00	0000		✓	DUP-GW-001-02	10	3	2	1	1	1	1	1	
19	LF	1/13/00	1205		✓	030-GW-006-02	10	3	2	1	1	1	1	1	

RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
Scott W. Neil	1/14/00 1300	FED EX		1/15/00 1200	Hugh Prentice - Lands
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE / TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE): Pam Johnson	DATE / TIME: 1/15/00 1200	REMARKS: TEMP BLANK @ SHIPPING = 4°C FED EX AIR BILL # 8168 8343 7166 2.3°C	

Order No. 70-[illegible]693)

C1902

HOLDING TIME
02/16/00

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	CN	01/12/00	01/20/00	01/21/00	36,532	-36,523	9
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	CN	01/12/00	01/20/00	01/21/00	36,532	-36,523	9
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	CN	01/13/00	01/20/00	01/21/00	36,531	-36,523	8
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	CN	01/11/00	01/20/00	01/21/00	36,533	-36,523	10
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	CN	01/11/00	01/20/00	01/21/00	36,533	-36,523	10
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	CN	01/13/00	01/20/00	01/21/00	36,531	-36,523	8
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	CN	01/12/00	01/20/00	01/21/00	36,532	-36,523	9
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	CN	01/13/00	01/20/00	01/21/00	36,531	-36,523	8
MG/L	030-GW-001-02-F	0001252-10	NORMAL	C1902	DPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-002-02-F	0001252-09	NORMAL	C1902	DPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-003-02-F	0001334-07	NORMAL	C1902	DPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7
MG/L	030-GW-004-02-F	0001252-07	NORMAL	C1902	DPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-005-02-F	0001252-08	NORMAL	C1902	DPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-006-02-F	0001334-09	NORMAL	C1902	DPHO	01/13/00	01/26/00	01/27/00	36,537	-36,523	14
MG/L	030-GW-007-02-F	0001334-06	NORMAL	C1902	DPHO	01/12/00	01/19/00	01/20/00	36,531	-36,523	8
MG/L	DUP-GW-001-02-F	0001334-08	NORMAL	C1902	DPHO	01/13/00	01/26/00	01/27/00	36,537	-36,523	14
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	EXP	01/12/00	01/18/00	01/28/00	36,530	-36,514	16
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	EXP	01/12/00	01/18/00	01/28/00	36,530	-36,514	16
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	EXP	01/13/00	01/18/00	01/28/00	36,529	-36,514	15
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	EXP	01/11/00	01/18/00	01/28/00	36,531	-36,514	17
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	EXP	01/11/00	01/18/00	01/28/00	36,531	-36,514	17
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	EXP	01/13/00	01/18/00	01/29/00	36,529	-36,513	16
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	EXP	01/12/00	01/18/00	01/28/00	36,530	-36,514	16
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	EXP	01/13/00	01/18/00	01/29/00	36,529	-36,513	16

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	HG	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	HG	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	HG	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	HG	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	HG	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	HG	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	HG	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	HG	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-001-02-F	0001252-10	NORMAL	C1902	HGF	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-002-02-F	0001252-09	NORMAL	C1902	HGF	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	030-GW-003-02-F	0001334-07	NORMAL	C1902	HGF	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-004-02-F	0001252-07	NORMAL	C1902	HGF	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-005-02-F	0001252-08	NORMAL	C1902	HGF	01/11/00	01/27/00	01/31/00	36,540	-36,520	20
UG/L	030-GW-006-02-F	0001334-09	NORMAL	C1902	HGF	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-007-02-F	0001334-06	NORMAL	C1902	HGF	01/12/00	01/27/00	01/31/00	36,539	-36,520	19
UG/L	DUP-GW-001-02-F	0001334-08	NORMAL	C1902	HGF	01/13/00	01/27/00	01/31/00	36,538	-36,520	18
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	M	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	M	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	M	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	M	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	M	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	M	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	M	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	M	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-001-02-F	0001252-10	NORMAL	C1902	MF	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	030-GW-002-02-F	0001252-09	NORMAL	C1902	MF	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	[illegible]-GW-003-02-F	0001334-07	NORMAL	C1902	[illegible]	01/13/00	01/18/00	02/01/00	36,529	-36,510	19

Units	Nsample	Lab Id	Qc Type	Sdg	ort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DAT TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-004-02-F	0001252-07	NORMAL	C1902	MF	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-005-02-F	0001252-08	NORMAL	C1902	MF	01/11/00	01/18/00	02/01/00	36,531	-36,510	21
UG/L	030-GW-006-02-F	0001334-09	NORMAL	C1902	MF	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
UG/L	030-GW-007-02-F	0001334-06	NORMAL	C1902	MF	01/12/00	01/18/00	02/01/00	36,530	-36,510	20
UG/L	DUP-GW-001-02-F	0001334-08	NORMAL	C1902	MF	01/13/00	01/18/00	02/01/00	36,529	-36,510	19
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	NH3	01/12/00	01/28/00	01/28/00	36,540	-36,524	16
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	NH3	01/12/00	01/28/00	01/28/00	36,540	-36,524	16
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	NH3	01/13/00	01/28/00	01/28/00	36,539	-36,524	15
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	NH3	01/11/00	01/28/00	01/28/00	36,541	-36,524	17
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	NH3	01/11/00	01/28/00	01/28/00	36,541	-36,524	17
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	NH3	01/13/00	01/28/00	01/28/00	36,539	-36,524	15
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	NH3	01/12/00	01/28/00	01/28/00	36,540	-36,524	16
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	NH3	01/13/00	01/28/00	01/28/00	36,539	-36,524	15
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	NTIA	01/12/00	01/20/00	01/20/00	36,532	-36,524	8
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	NTIA	01/12/00	01/20/00	01/20/00	36,532	-36,524	8
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	NTIA	01/13/00	01/20/00	01/20/00	36,531	-36,524	7
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	NTIA	01/11/00	01/20/00	01/20/00	36,533	-36,524	9
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	NTIA	01/11/00	01/20/00	01/20/00	36,533	-36,524	9
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	NTIA	01/13/00	01/20/00	01/20/00	36,531	-36,524	7
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	NTIA	01/12/00	01/20/00	01/20/00	36,532	-36,524	8
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	NTIA	01/13/00	01/20/00	01/20/00	36,531	-36,524	7
UG/L	030-GW-001-02	0001252-05	NORMAL	C1902	OV	01/12/00	01/17/00	01/17/00	36,529	-36,524	5
UG/L	030-GW-002-02	0001252-04	NORMAL	C1902	OV	01/12/00	01/17/00	01/17/00	36,529	-36,524	5
UG/L	030-GW-003-02	0001334-03	NORMAL	C1902	OV	01/13/00	01/18/00	01/18/00	36,529	-36,524	5
UG/L	030-GW-004-02	0001252-01	NORMAL	C1902	OV	01/11/00	01/17/00	01/17/00	36,530	-36,524	6
UG/L	030-GW-005-02	0001252-02	NORMAL	C1902	OV	01/11/00	01/17/00	01/17/00	36,530	-36,524	6
UG/L	030-GW-006-02	0001334-05	NORMAL	C1902	OV	01/13/00	01/18/00	01/18/00	36,529	-36,524	5

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	030-GW-007-02	0001334-02	NORMAL	C1902	OV	01/12/00	01/18/00	01/18/00	36,530	-36,524	6
UG/L	030-TB-001-02	0001252-06	NORMAL	C1902	OV	01/11/00	01/17/00	01/17/00	36,530	-36,524	6
UG/L	030-TB-002-02	0001334-01	NORMAL	C1902	OV	01/12/00	01/18/00	01/18/00	36,530	-36,524	6
UG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	OV	01/13/00	01/18/00	01/18/00	36,529	-36,524	5
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	TKN	01/12/00	01/18/00	01/19/00	36,530	-36,523	7
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	TKN	01/12/00	01/18/00	01/19/00	36,530	-36,523	7
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	TKN	01/13/00	01/18/00	01/19/00	36,529	-36,523	6
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	TKN	01/11/00	01/18/00	01/19/00	36,531	-36,523	8
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	TKN	01/11/00	01/18/00	01/19/00	36,531	-36,523	8
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	TKN	01/13/00	01/18/00	01/19/00	36,529	-36,523	6
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	TKN	01/12/00	01/18/00	01/19/00	36,530	-36,523	7
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	TKN	01/13/00	01/18/00	01/19/00	36,529	-36,523	6
MG/L	030-GW-001-02	0001252-05	NORMAL	C1902	TPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-002-02	0001252-04	NORMAL	C1902	TPHO	01/12/00	01/14/00	01/17/00	36,526	-36,521	5
MG/L	030-GW-003-02	0001334-03	NORMAL	C1902	TPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7
MG/L	030-GW-004-02	0001252-01	NORMAL	C1902	TPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-005-02	0001252-02	NORMAL	C1902	TPHO	01/11/00	01/14/00	01/17/00	36,527	-36,521	6
MG/L	030-GW-006-02	0001334-05	NORMAL	C1902	TPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7
MG/L	030-GW-007-02	0001334-02	NORMAL	C1902	TPHO	01/12/00	01/19/00	01/20/00	36,531	-36,523	8
MG/L	DUP-GW-001-02	0001334-04	NORMAL	C1902	TPHO	01/13/00	01/19/00	01/20/00	36,530	-36,523	7

acetone and 2,2-dichloropropane. The elevated recovery values for dichlorodifluoromethane and acetone may be partially due to the discrepancy between standard sources. The low recovery for 2,2-dichloropropane may be due to matrix interference. Since these analytes were not detected in any of the associated samples, no corrective action was taken.

Sample Identifications:
Client sample identifications have been shortened for the purpose of reporting in CLP-type format. On all forms for the volatile fraction, the following method of abbreviation was used. By deleting the hyphens, sample 030-GW-003-02 was shortened to 030GW00302. All client sample identifications have been truncated in this manner.

Ordnance Fraction:

Analytical Comments:
Samples were analyzed for ordnance compounds in accordance with method SW 8330 utilizing a UV detector. A C18 (octadecyl) analytical column was used as the quantitation column. A CN (cyano phase) column was used for confirming any positive analyte responses detected on the C18 column.

Quality Control Samples:
Analyses of the extracts for samples 030-GW-003-02MS, 030-GW-003-02MSD and the blank spike yielded recovery values for tetryl which fell below the lower control limit. Method 8330 indicates that tetryl decomposes rapidly in methanol/water solutions, as well as with heat. Care was taken during both the extraction process and analysis not to expose the samples to temperatures above room temperature. Since tetryl was not detected in any of the samples associated with this QC set, and since all surrogate recoveries were in control, no further action was taken.

MS/MSD analyses performed on sample 030-GW-003-02 yielded recovery values for 2,4,6-trinitrotoluene which exceeded the upper control limit. Since 2,4,6-trinitrotoluene was not detected in any of the associated samples, and since 2,4,6-trinitrotoluene recovery was in control in the blank spike, no further action was taken.

GENERAL REMARKS ON INORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON INORGANIC ANALYSES."

ICP and ICP-MS Metals:

EPA SW846 method 3015 was used for the digestion of the samples. Method 6010B was used for the determination of selenium due to apparent false positives in 6020B caused by the sample matrix (Chloride concentrations were high), and method 6020 was used for the determination of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, nickel, silver, thallium, vanadium, zinc and tin.

On the first timed and dated page of each ICP and ICP-MS run, the data to be reported or rejected will be tabulated for that run.

Mercury:

Laucks purchases a 1000 mg/L Hg stock solution from Inorganic Ventures. The 1.0 mg/L working standard is made by diluting 100 µL to 100 mL with 2% HNO_3. The calibration curve is made by placing 0, 20, 50, 100, 200, 500 and 1000 µL of the working standard in BOD bottles and diluting up to 100 mL. The standard curve is equivalent to 0, 0.2, 0.5, 1.0, 2.0, 5.0 and 10.0 µg/L.

SPECIFIC REMARKS ON INORGANIC ANALYSES:

Holding Time Compliance:

Laucks calculates holding time compliance for inorganic determinations using the date on which reportable data were acquired.

Metals:

The holding time for metals is six months from the date of collection, excepting mercury, which is 28 days. All analyses were performed within holding time.

Miscellaneous:

The holding times tabulated below derive from the relevant EPA methods and are applicable when the sample was appropriately preserved and/or cooled. All samples submitted followed the preservation guidelines unless explicitly noted otherwise.

Analyte	Holding Time	Violations
Phosphate	28 days	None
CN	14 days	None
TKN	28 days	None
Ammonia	28 days	None
Nitrate+Nitrite	28 days	None

Total Metals and Dissolved Metals:

The matrix spike sample percent recovery of Selenium was outside of the established control limits of 75-125% for sample 030-GW-003-02 . No further corrective action was required. All relevant data have been flagged with an "N" on Forms I and V.

The cadmium ICV recovery was slightly above the control limit and was not observed in time to be included with the reanalysis for As, Ba, and Pb. The CCBs and CCVs all

passed and no samples showed any sign of Cd contamination. Therefore, the slight out of control situation for the Cd ICV had no affect on the reported analytical results.

The selenium determined by ICP/MS (method 6020) had problems with high CCBs (up to 2 ug/L versus a reporting limit of 1 ug/L) and sample matrix with high Cl35 intensities that can cause false positive selenium concentrations. The digestates were then reanalyzed by ICP (method 6010B) and reported. The 6010B determinations for these digestages exhibited low LCS recovery (64.6%) and MS recoveries of 65.3% and 88%. This was likely due to the fact that these samples were spiked at a low level, suitable for ICP/MS analysis but inadequate for ICP.

Zinc failed the interference check sample with a low recovery and the CRDL check sample recovered high in the absence of interferences. This did not affect the reported results, most samples were below the reporting limit for Cd, Se, and Zn.

Due to these outliers, all these samples will be reanalyzed. These enclosed data are being provided in order that further sampling decisions can be made. It is not anticipated that the final results for Cd, Se, and Zn will differ greatly from those reported in this package.

Conventionals:

Both the ICB and the preparation blank for TKN, prepped on 01/18/2000 were detectable at the detection limit, but were below the Laucks action limit of 0.60 mg/L, therefore no corrective action was taken.

The preparation blank for Nitrate + Nitrite, prepped on 01/20/2000 was detectable at 0.013 mg/L (approximately the detection limit), but was below the Laucks action limit of 0.020 mg/L, therefore no corrective action was taken.

The recoveries for MS and MSD and the associated RPD for phosphorus analyzed on 01/14/2000 were out of control. All other QC was in control, therefore no corrective action was taken.

The recovery for MS and the associated RPD for phosphorus analyzed on 01/19/2000 were out of control. All other QC was in control, therefore no corrective action was taken.

The RPD for the MS and MSD for phosphorus analyzed on 02/02/2000 was out of control. Both the MS and MSD and all other QC were in control, therefore no corrective action was taken.

The duplicate RPD for TKN analyzed on 01/18/2000 was out of control. All other QC was in control, therefore no corrective action was taken.

FIELD DUPLICATE PRECISION

COMPOUND	DUP-GW-001-02-F	030-GW-006-02-F	RPD
	UG/L	UG/L	%
Antimony	1.1	1.1	0.00
Arsenic	1.3	1.4	7.41
Barium	7.1	6.9	2.86
Beryllium	1.1	1.1	0.00
Cadmium	1.1	1.1	0.00
Chromium	5.6	5.6	0.00
Cobalt	3.3	3.3	0.00
Copper	8.7	8.7	0.00
Lead	1.1	1.1	0.00
Mercury	0.2	0.2	0.00
Nickel	11.1	11.1	0.00
Selenium	10.7	10.8	0.93
Silver	3.3	3.3	0.00
Thallium	1.1	1.1	0.00
Tin	11.1	11.1	0.00
Vanadium	2.2	2.2	0.00
Zinc	11.1	11.1	0.00

COMPOUND	DUP-GW-001-02-F	030-GW-006-02-F	RPD
	UG/L	UG/L	%
Ammonia	NA	NA	NA
Cyanide	NA	NA	NA
Nitrate/Nitrite	NA	NA	NA
TKN	NA	NA	NA
Phosphorus	0.1	0.1	0.00

FIELD DUPLICATE PRECISION

COMPOUND	DUP-GW-001-02	030-GW-006-02	RPD
	UG/L	UG/L	%
Antimony	1.1	1.1	0.00
Arsenic	1.3	1.3	0.00
Barium	5.2	6.2	17.54
Beryllium	1.1	1.1	0.00
Cadmium	1.1	1.1	0.00
Chromium	5.6	5.6	0.00
Cobalt	3.3	3.3	0.00
Copper	9.1	10.7	16.16
Lead	1.1	1.1	0.00
Mercury	0.2	0.2	0.00
Nickel	11.1	11.1	0.00
Selenium	11.2	11.2	0.00
Silver	3.3	3.3	0.00
Thallium	1.1	1.1	0.00
Tin	11.1	11.1	0.00
Vanadium	2.2	2.2	0.00
Zinc	11.1	11.1	0.00

COMPOUND	DUP-GW-001-02	030-GW-006-02	RPD
	UG/L	UG/L	%
Ammonia	0.01	0.01	0.00
Cyanide	0.01	0.01	0.00
Nitrate/Nitrite	5	4.9	2.02
TKN	0.3	0.3	0.00
Phosphorus	0.1	0.1	0.00

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Initial Calibration Source: EPA-LV/SPEX

Continuing Calibration Source: SPEX/VWR

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony	50.0	51.60	103.2	30.0	31.60	105.3	32.10	107.0	M
Arsenic	20.0	19.80	99.0	50.0	51.00	102.0	48.40	96.8	M
Barium	200.0	195.40	97.7	200.0	191.50	95.8	200.90	100.4	M
Beryllium	10.0	9.90	99.0	25.0	24.20	96.8	23.30	93.2	M
Cadmium	10.0	11.40	114.0	25.0	27.30	109.2	25.40	101.6	M
Calcium									
Chromium	100.0	99.80	99.8	50.0	49.90	99.8	51.00	102.0	M
Cobalt	100.0	99.80	99.8	50.0	48.90	97.8	49.40	98.8	M
Copper	100.0	101.00	101.0	25.0	25.30	101.2	25.50	102.0	M
Iron									
Lead	20.0	18.20	91.0	25.0	25.20	100.8	24.70	98.8	M
Magnesium									
Manganese									
Mercury	4.0	4.04	101.0	5.0	5.10	102.0	4.97	99.4	AV
Nickel	200.0	197.80	98.9	200.0	207.00	103.5	205.80	102.9	M
Potassium									
Selenium	1000.0	1009.50	101.0	1000.0	1007.20	100.7	1006.40	100.6	P
Silver	100.0	104.20	104.2	50.0	50.90	101.8	50.80	101.6	M
Sodium									
Thallium	100.0	92.30	92.3	50.0	48.10	96.2	47.70	95.4	M
Vanadium	100.0	99.50	99.5	50.0	49.00	98.0	48.30	96.6	M
Zinc	200.0	202.50	101.2	100.0	99.30	99.3	101.10	101.1	M
Tin	100.0	97.90	97.9	100.0	105.20	105.2	104.20	104.2	M

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony									
Arsenic				30.0	31.50	105.0	31.00	103.3	M
Barium				50.0	50.80	101.6	50.40	100.8	M
Beryllium				200.0	201.30	100.6	209.00	104.5	M
Cadmium				25.0	26.20	104.8	26.50	106.0	M
Calcium				25.0	27.00	108.0	26.10	104.4	M
Chromium									
Cobalt				50.0	49.30	98.6	50.40	100.8	M
Copper				50.0	50.10	100.2	49.80	99.6	M
Iron				25.0	26.30	105.2	25.30	101.2	M
Lead									
Magnesium				25.0	25.00	100.0	23.40	93.6	M
Manganese									
Mercury									
Nickel				5.0	4.92	98.4	4.94	98.8	AV
Potassium				200.0	207.80	103.9	210.10	105.0	M
Selenium									
Silver				1000.0	1026.60	102.7	1025.80	102.6	P
Sodium				50.0	51.70	103.4	50.30	100.6	M
Thallium									
Vanadium				50.0	50.80	101.6	50.90	101.8	M
Zinc				50.0	49.50	99.0	50.80	101.6	M
Tin				100.0	105.30	105.3	98.60	98.6	M
				100.0	106.40	106.4	100.80	100.8	M

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony				30.0	31.70	105.7	31.60	105.3	M
Arsenic				50.0	50.50	101.0			M
Barium				200.0	205.70	102.8			M
Beryllium				25.0	26.50	106.0	24.60	98.4	M
Cadmium				25.0	25.60	102.4	26.40	105.6	M
Calcium									
Chromium				50.0	50.10	100.2	51.30	102.6	M
Cobalt				50.0	49.20	98.4	51.00	102.0	M
Copper				25.0	24.90	99.6	25.20	100.8	M
Iron									
Lead				25.0	24.00	96.0			M
Magnesium									
Manganese									
Mercury									
Nickel				200.0	208.60	104.3	206.80	103.4	M
Potassium									
Selenium				1000.0	1022.30	102.2	1013.50	101.4	P
Silver				50.0	51.50	103.0	50.30	100.6	M
Sodium									
Thallium				50.0	49.30	98.6	48.00	96.0	M
Vanadium				50.0	49.80	99.6	50.50	101.0	M
Zinc				100.0	97.10	97.1	95.50	95.5	M
Tin				100.0	107.70	107.7	103.70	103.7	M

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902_

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver				1000.0	1034.40	103.4	1011.10	101.1	P
Sodium									
Thallium									
Vanadium									
Zinc									
Tin									

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2B

CRDL STANDARD FOR AA AND ICP

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

AA CRDL Standard Source: IV

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Found	%R	Final Found	%R
Aluminum								
Antimony				2.0	2.00	100.0	2.00	100.0
Arsenic				2.0	1.90	95.0	2.10	105.0
Barium				4.0	5.30	132.5	5.30	132.5
Beryllium				2.0	2.60	130.0	2.80	140.0
Cadmium				2.0	3.20	160.0	3.00	150.0
Calcium								
Chromium				10.0	12.00	120.0	11.70	117.0
Cobalt				6.0	8.20	136.7	8.10	135.0
Copper				4.0	5.30	132.5	4.90	122.5
Iron								
Lead				2.0	2.40	120.0	2.50	125.0
Magnesium								
Manganese								
Mercury	0.2	0.21	105.0					
Nickel				20.0	21.70	108.5	21.90	109.5
Potassium								
Selenium				6.0	8.20	136.7	9.20	153.3
Silver				6.0	9.10	151.7	8.80	146.7
Sodium								
Thallium				2.0	2.40	120.0	2.40	120.0
Vanadium				4.0	4.60	115.0	4.80	120.0
Zinc				20.0	49.00	245.0	49.30	246.5
Tin				20.0	1.70	8.5	1.60	8.0

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3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Arsenic	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Barium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Calcium											
Chromium	5.0	U	5.0	U	5.0	U	5.0	U	5.600	U	M
Cobalt	3.0	U	3.0	U	3.0	U	3.0	U	3.300	U	M
Copper	2.0	U	2.0	U	2.0	U	2.0	U	2.200	U	M
Iron											
Lead	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Magnesium											
Manganese											
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	AV
Nickel	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M
Potassium											
Selenium	1.0	U	1.0	U	1.0	U	1.0	U	1.600		P
Silver	3.0	U	3.0	U	3.0	U	3.0	U	3.300	U	M
Sodium											
Thallium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U	2.200	U	M
Zinc	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M
Tin	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M

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3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony			1.0	U	1.0	U	1.0	U			M
Arsenic			1.0	U	1.0	U					M
Barium			1.0	U	1.0	U					M
Beryllium			1.0	U	1.0	U	1.0	U			M
Cadmium			1.0	U	1.0	U	1.0	U			M
Calcium											
Chromium			5.0	U	5.0	U	5.0	U			M
Cobalt			3.0	U	3.0	U	3.0	U			M
Copper			2.0	U	2.0	U	2.0	U			M
Iron											
Lead			1.0	U	1.0	U					M
Magnesium											
Manganese											
Mercury			0.2	U							AV
Nickel			10.0	U	10.0	U	10.0	U			M
Potassium											
Selenium			1.0	U	1.0	U	1.0	U			P
Silver			3.0	U	3.0	U	3.0	U			M
Sodium											
Thallium			1.0	U	1.0	U	1.0	U			M
Vanadium			2.0	U	2.0	U	2.0	U			M
Zinc			10.0	U	10.0	U	10.0	U			M
Tin			10.0	U	10.0	U	10.0	U			M

U.S. EPA - CLP

3

BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium			1.0	U	1.0	U					
Silver											P
Sodium											
Thallium											
Vanadium											
Zinc											
Tin											

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

ICP ID Number: ELAN5000 ICS Source: SPEX

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum								
Antimony			0	0.1		0	0.0	
Arsenic		20	0	20.6	103.0	0	20.7	103.5
Barium			0	-0.3		0	-0.3	
Beryllium			0	0.0		0	0.0	
Cadmium		20	0	21.7	108.5	0	21.4	107.0
Calcium								
Chromium		40	0	40.3	100.8	0	38.6	96.5
Cobalt		40	0	40.5	101.2	0	38.6	96.5
Copper		40	0	40.9	102.2	0	39.9	99.8
Iron								
Lead			0	0.0		0	0.0	
Magnesium								
Manganese								
Mercury								
Nickel		40	0	40.0	100.0	0	39.8	99.5
Potassium								
Selenium								
Silver		10	0	9.0	90.0	0	9.2	92.0
Sodium								
Thallium			0	0.1		0	0.0	
Vanadium		40	0	40.4	101.0	0	39.1	97.8
Zinc		40	0	21.0	52.5	1	19.6	49.0
Tin			0	0.0		0	0.0	

ICP INTERFERENCE CHECK SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

ICP ID Number: TRACEICM ICS Source: SPEX

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium		60	4	59.2	98.7	4	58.3	97.2
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Tin								

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5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

JGW003S

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix: WATER Level: LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight: UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	24.8889		1.1111	U	27.78	89.6		M
Arsenic	75-125	10.6667		1.1111	U	11.11	96.0		M
Barium	75-125	110.3333		17.2222		111.11	83.8		M
Beryllium	75-125	4.6667		1.1111	U	5.56	83.9		M
Cadmium	75-125	4.4444		1.1111	U	5.56	79.9		M
Calcium									NR
Chromium	75-125	45.7778		5.5556	U	55.56	82.4		M
Cobalt	75-125	44.7778		3.3333	U	55.56	80.6		M
Copper	75-125	54.3333		9.2222		55.56	81.2		M
Iron									NR
Lead	75-125	9.2222		1.1111	U	11.11	83.0		M
Magnesium									NR
Manganese									NR
Mercury	75-125	4.7561		0.2000	U	5.00	95.1		AV
Nickel	75-125	93.1111		11.1111	U	111.11	83.8		M
Potassium									NR
Selenium	75-125	15.3333		4.4444		16.67	65.3	N	F
Silver	75-125	43.0000		3.3333	U	55.56	77.4		M
Sodium									NR
Thallium	75-125	44.4444		1.1111	U	55.56	80.0		M
Vanadium	75-125	47.5556		2.2222	U	55.56	85.6		M
Zinc	75-125	99.8889		11.1111	U	111.11	89.9		M
Tin	75-125	561.7778		11.1111	U	555.56	101.1		M

Comments:

U.S. EPA - CLP

5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

NGW003S

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix: WATER Level: LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight: UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	34.0000		1.1111	U	27.78	122.4		M
Arsenic	75-125	13.1111		1.1111	U	11.11	118.0		M
Barium	75-125	134.8889		17.2222		111.11	105.9		M
Beryllium	75-125	6.1111		1.1111	U	5.56	109.9		M
Cadmium	75-125	6.1111		1.1111	U	5.56	109.9		M
Calcium									NR
Chromium	75-125	58.3333		5.5556	U	55.56	105.0		M
Cobalt	75-125	55.4444		3.3333	U	55.56	99.8		M
Copper	75-125	66.5556		9.4444		55.56	102.8		M
Iron									NR
Lead	75-125	12.0000		1.1111	U	11.11	108.0		M
Magnesium									NR
Manganese									NR
Mercury	75-125	4.8860		0.2000	U	5.00	97.7		AV
Nickel	75-125	119.6667		11.1111	U	111.11	107.7		M
Potassium									NR
Selenium	75-125	19.3333		4.6667		16.67	88.0		F
Silver	75-125	56.3333		3.3333	U	55.56	101.4		M
Sodium									NR
Thallium	75-125	54.0000		1.1111	U	55.56	97.2		M
Vanadium	75-125	60.8889		2.2222	U	55.56	109.6		M
Zinc	75-125	129.0000		11.1111	U	111.11	116.1		M
Tin	75-125	626.0000		11.1111	U	555.56	112.7		M

Comments:

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5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

JGW003A

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix: WATER Level: LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony		57.50		1.00	U	50.0	115.0		M
Arsenic		23.40		1.00	U	20.0	117.0		M
Barium		227.10		15.50		200.0	105.8		M
Beryllium		10.50		1.00	U	10.0	105.0		M
Cadmium		10.10		1.00	U	10.0	101.0		M
Calcium									NR
Chromium		102.30		5.00	U	100.0	102.3		M
Cobalt		98.40		3.00	U	100.0	98.4		M
Copper		108.90		8.30		100.0	100.6		M
Iron									NR
Lead		19.90		1.00	U	20.0	99.5		M
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel		203.20		10.00	U	200.0	101.6		M
Potassium									NR
Selenium									NR
Silver		90.90		3.00	U	100.0	90.9		M
Sodium									NR
Thallium		98.80		1.00	U	100.0	98.8		M
Vanadium		105.10		2.00	U	100.0	105.1		M
Zinc		211.70		10.00	U	200.0	105.8		M
Tin		1043.90		10.00	U	1000.0	104.4		M

Comments:

U.S. EPA - CLP

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POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

NGW003A

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: __ SAS No.: __ SDG No.: C1902

Matrix: WATER Level: LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony		55.30		1.00	U	50.0	110.6		M
Arsenic		23.20		1.00	U	20.0	116.0		M
Barium		215.30		15.50		200.0	99.9		M
Beryllium		10.30		1.00	U	10.0	103.0		M
Cadmium		9.70		1.00	U	10.0	97.0		M
Calcium									NR
Chromium		94.00		5.00	U	100.0	94.0		M
Cobalt		93.00		3.00	U	100.0	93.0		M
Copper		102.90		8.50		100.0	94.4		M
Iron									NR
Lead		19.00		1.00	U	20.0	95.0		M
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel		188.80		10.00	U	200.0	94.4		M
Potassium									NR
Selenium									NR
Silver		88.60		3.00	U	100.0	88.6		M
Sodium									NR
Thallium		93.40		1.00	U	100.0	93.4		M
Vanadium		98.80		2.00	U	100.0	98.8		M
Zinc		194.50		10.00	U	200.0	97.2		M
Tin		1000.40		10.00	U	1000.0	100.0		M

Comments:

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LABORATORY CONTROL SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Solid LCS Source: ERA 233

Aqueous LCS Source: IV

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits		%R
Aluminum									
Antimony	27.8	27.00	97.1						
Arsenic	11.1	9.89	89.1						
Barium	111.1	104.78	94.3						
Beryllium	5.6	5.22	93.2						
Cadmium	5.6	4.56	81.4						
Calcium									
Chromium	55.6	49.44	88.9						
Cobalt	55.6	50.00	89.9						
Copper	55.6	61.56	110.7						
Iron									
Lead	11.1	9.11	82.1						
Magnesium									
Manganese									
Mercury	4.0	4.05	101.2						
Nickel	111.1	105.78	95.2						
Potassium									
Selenium	16.7	10.78	64.6						
Silver	55.6	50.78	91.3						
Sodium									
Thallium	55.6	49.33	88.7						
Vanadium	55.6	48.67	87.5						
Zinc	111.1	97.33	87.6						
Tin	555.6	553.67	99.7						

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Instrument Detection Limits (Quarterly)

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

ICP ID Number: _____ Date: 10/08/99

Flame AA ID Number: _____

Furnace AA ID Number: TRACEICP

Analyte	Wavelength (nm)	Background	CRDL (ug/L)	IDL (ug/L)	M
Aluminum					
Antimony			1		
Arsenic			1		
Barium			1		
Beryllium			1		
Cadmium			1		
Calcium	315.80		1000	1000.0	P
Chromium			5		
Cobalt			3		
Copper			2		
Iron	259.90		100	100.0	P
Lead			1		
Magnesium	279.00		1000	1000.0	P
Manganese	257.60		15	15.0	P
Mercury			0.2		
Nickel			10		
Potassium	766.40		1000	1000.0	P
Selenium	196.00		1	1.0	P
Silver			3		
Sodium	588.90		1000	1000.0	P
Thallium			1		
Vanadium			2		
Zinc			10		

Comments:

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Instrument Detection Limits (Quarterly)

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

ICP ID Number: ELAN5000 Date: 07/23/99

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Wavelength (nm)	Background	CRDL (ug/L)	IDL (ug/L)	M
Aluminum					
Antimony	121.00		1	1.0	M
Arsenic	75.00		1	1.0	M
Barium	137.00		1	1.0	M
Beryllium	9.00		1	1.0	M
Cadmium	111.00		1	1.0	M
Calcium			1000		
Chromium	52.00		5	5.0	M
Cobalt	59.00		3	3.0	M
Copper	63.00		2	2.0	M
Iron			100		
Lead	208.00		1	1.0	M
Magnesium			1000		
Manganese			15		
Mercury			0.2		
Nickel	60.00		10	10.0	M
Potassium			1000		
Selenium	82.00		1	1.0	M
Silver	107.00		3	3.0	M
Sodium			1000		
Thallium	205.00		1	1.0	M
Vanadium	51.00		2	2.0	M
Zinc	66.00		10	10.0	M
Tin	118.00		10	10.0	M

Comments:

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Instrument Detection Limits (Quarterly)

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902_

ICP ID Number: _____ Date: 11/10/99

Flame AA ID Number: FIMS400 __

Furnace AA ID Number: _____

Analyte	Wavelength (nm)	Background	CRDL (ug/L)	IDL (ug/L)	M
Aluminum					
Antimony			1		
Arsenic			1		
Barium			1		
Beryllium			1		
Cadmium			1		
Calcium			1000		
Chromium			5		
Cobalt			3		
Copper			2		
Iron			100		
Lead			1		
Magnesium			1000		
Manganese			15		
Mercury	253.60		0.2	0.2	AV
Nickel			10		
Potassium			1000		
Selenium			1		
Silver			3		
Sodium			1000		
Thallium			1		
Vanadium			2		
Zinc			10		

Comments:

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Method: AV Mercury JMM 2/17/00

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
AGW004	01/27/00		100
BGW005	01/27/00		100
CGW002	01/27/00		100
DGW001	01/27/00		100
EGW004	01/27/00		100
FGW005	01/27/00		100
GGW002	01/27/00		100
HGW001	01/27/00		100
IGW007	01/27/00		100
JGW003	01/27/00		100
JGW003D	01/27/00		100
JGW003S	01/27/00		100
KGW001	01/27/00		100
LCSW1	01/27/00		100
LGW006	01/27/00		100
MGW007	01/27/00		100
NGW003	01/27/00		100
NGW003D	01/27/00		100
NGW003S	01/27/00		100
OGW001	01/27/00		100
PBW1	01/27/00		100
PGW006	01/27/00		100
S0.2	01/27/00		
S0.5	01/27/00		
S10.0	01/27/00		
S1.0	01/27/00		
S2.0	01/27/00		
S5.0	01/27/00		
S0	01/27/00		

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Method: P Metals 2/17/00

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
AGW004	01/18/00	45	50
BGW005	01/18/00	45	50
CGW002	01/18/00	45	50
DGW001	01/18/00	45	50
EGW004	01/18/00	45	50
FGW005	01/18/00	45	50
GGW002	01/18/00	45	50
HGW001	01/18/00	45	50
IGW007	01/18/00	45	50
JGW003	01/18/00	45	50
JGW003D	01/18/00	45	50
JGW003L	01/18/00	45	50
JGW003S	01/18/00	45	50
KGW001	01/18/00	45	50
LCSW1	01/18/00	45	50
LGW006	01/18/00	45	50
MGW007	01/18/00	45	50
NGW003	01/18/00	45	50
NGW003D	01/18/00	45	50
NGW003L	01/18/00	45	50
NGW003S	01/18/00	45	50
OGW001	01/18/00	45	50
PBW1	01/18/00	45	50
PGW006	01/18/00	45	50

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Method: M Metals 2/17/00

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
AGW004	01/18/00	45	50
BGW005	01/18/00	45	50
CGW002	01/18/00	45	50
DGW001	01/18/00	45	50
EGW004	01/18/00	45	50
FGW005	01/18/00	45	50
GGW002	01/18/00	45	50
HGW001	01/18/00	45	50
IGW007	01/18/00	45	50
JGW003	01/18/00	45	50
JGW003D	01/18/00	45	50
JGW003S	01/18/00	45	50
KGW001	01/18/00	45	50
LCSW1	01/18/00	45	50
LGW006	01/18/00	45	50
MGW007	01/18/00	45	50
NGW003	01/18/00	45	50
NGW003D	01/18/00	45	50
NGW003S	01/18/00	45	50
OGW001	01/18/00	45	50
PBW1	01/18/00	45	50
PGW006	01/18/00	45	50

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Instrument ID Number: ELAN5000 Method: M

Start Date: 02/07/00 End Date: 02/07/00

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1055			X			X	X		X	X	X						X			X		X	X	X	X
S1	1.00	1100			X			X	X		X	X	X						X			X		X	X	X	X
S2	1.00	1105			X			X	X		X	X	X						X			X		X	X	X	X
S3	1.00	1110			X			X	X		X	X	X						X			X		X	X	X	X
ICV1	1.00	1115			X			X	X		X	X	X						X			X		X	X	X	X
ICB1	1.00	1121			X			X	X		X	X	X						X			X		X	X	X	X
CCV1	1.00	1126			X			X	X		X	X	X						X			X		X	X	X	X
CCB1	1.00	1131			X			X	X		X	X	X						X			X		X	X	X	X
CRII1	1.00	1136			X			X	X		X	X	X						X			X		X	X	X	X
ZZZZZZ	1.00	1141																									
ICSABI1	1.00	1146			X			X	X		X	X	X						X			X		X	X	X	X
ICSAI1	1.00	1154			X			X	X		X	X	X						X			X		X	X	X	X
CCV2	1.00	1159			X			X	X		X	X	X						X			X		X	X	X	X
CCB2	1.00	1205			X			X	X		X	X	X						X			X		X	X	X	X
ZZZZZZ	1.00	1210																									
ZZZZZZ	1.00	1215																									
PBW1	1.00	1221			X			X	X		X	X	X						X			X		X	X	X	X
AGW004	1.00	1227			X			X	X		X	X	X						X			X		X	X	X	X
BGW005	1.00	1232			X			X	X		X	X	X						X			X		X	X	X	X
CGW002	1.00	1237			X			X	X		X	X	X						X			X		X	X	X	X
DGW001	1.00	1242			X			X	X		X	X	X						X			X		X	X	X	X
IGW007	1.00	1248			X			X	X		X	X	X						X			X		X	X	X	X
JGW003	1.00	1253			X			X	X		X	X	X						X			X		X	X	X	X
JGW003D	1.00	1258			X			X	X		X	X	X						X			X		X	X	X	X
CCV3	1.00	1303			X			X	X		X	X	X						X			X		X	X	X	X
CCB3	1.00	1308			X			X	X		X	X	X						X			X		X	X	X	X
JGW003S	1.00	1313			X			X	X		X	X	X						X			X		X	X	X	X
JGW003A	1.00	1318			X			X	X		X	X	X						X			X		X	X	X	X
JGW003L	5.00	1324			X			X	X		X	X	X						X			X		X	X	X	X
LCSW1	1.00	1329			X			X	X		X	X	X						X			X		X	X	X	X
KGW001	1.00	1334			X			X	X		X	X	X						X			X		X	X	X	X
LGW006	1.00	1339			X			X	X		X	X	X						X			X		X	X	X	X

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Instrument ID Number: ELAN5000 Method: M

Start Date: 02/07/00 End Date: 02/07/00

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
EGW004	1.00	1344			X			X	X		X	X	X						X			X		X	X	X	X
FGW005	1.00	1349			X			X	X		X	X	X						X			X		X	X	X	X
GGW002	1.00	1355			X			X	X		X	X	X						X			X		X	X	X	X
CCV4	1.00	1400			X			X	X		X	X	X						X			X		X	X	X	X
CCB4	1.00	1405			X			X	X		X	X	X						X			X		X	X	X	X
HGW001	1.00	1410			X			X	X		X	X	X						X			X		X	X	X	X
MGW007	1.00	1416			X			X	X		X	X	X						X			X		X	X	X	X
NGW003	1.00	1421			X			X	X		X	X	X						X			X		X	X	X	X
NGW003D	1.00	1426			X			X	X		X	X	X						X			X		X	X	X	X
NGW003S	1.00	1431			X			X	X		X	X	X						X			X		X	X	X	X
NGW003A	1.00	1436			X			X	X		X	X	X						X			X		X	X	X	X
NGW003L	5.00	1441			X			X	X		X	X	X						X			X		X	X	X	X
CCV5	1.00	1447			X			X	X		X	X	X						X			X		X	X	X	X
CCB5	1.00	1452			X			X	X		X	X	X						X			X		X	X	X	X
OGW001	1.00	1457			X			X	X		X	X	X						X			X		X	X	X	X
PGW006	1.00	1502			X			X	X		X	X	X						X			X		X	X	X	X
CRIF1	1.00	1507			X			X	X		X	X	X						X			X		X	X	X	X
ICSAF1	1.00	1512			X			X	X		X	X	X						X			X		X	X	X	X
ICSABF1	1.00	1517			X			X	X		X	X	X						X			X		X	X	X	X
CCV6	1.00	1523			X			X	X		X	X	X						X			X		X	X	X	X
CCB6	1.00	1528			X			X	X		X	X	X						X			X		X	X	X	X

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Instrument ID Number: ELAN5000 Method: M

Start Date: 02/08/00 End Date: 02/08/00

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	0803				X	X								X												
S1	1.00	0806				X	X								X												
S2	1.00	0809				X	X								X												
S3	1.00	0812				X	X								X												
ICV1	1.00	0815				X	X								X												
ICB1	1.00	0819				X	X								X												
CCV1	1.00	0822				X	X								X												
CCB1	1.00	0825				X	X								X												
CRII1	1.00	0828				X	X								X												
ICSAI1	1.00	0831				X	X								X												
ICSABI1	1.00	0835				X	X								X												
CCV2	1.00	0838				X	X								X												
CCB2	1.00	0841				X	X								X												
ZZZZZZ	1.00	0844																									
LCSW1	1.00	0848				X	X								X												
PBW1	1.00	0851				X	X								X												
AGW004	1.00	0854				X	X								X												
BGW005	1.00	0857				X	X								X												
CGW002	1.00	0900				X	X								X												
DGW001	1.00	0904				X	X								X												
IGW007	1.00	0907				X	X								X												
JGW003	1.00	0910				X	X								X												
JGW003D	1.00	0913				X	X								X												
CCV3	1.00	0917				X	X								X												
CCB3	1.00	0920				X	X								X												
JGW003S	1.00	0924				X	X								X												
JGW003A	1.00	0927				X	X								X												
JGW003L	5.00	0930				X	X								X												
KGW001	1.00	0933				X	X								X												
LGW006	1.00	0936				X	X								X												
EGW004	1.00	0940				X	X								X												
FGW005	1.00	0943				X	X								X												

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Instrument ID Number: ELAN5000 Method: M

Start Date: 02/08/00 End Date: 02/08/00

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
GGW002	1.00	0946				X	X								X												
HGW001	1.00	0949				X	X								X												
MGW007	1.00	0952				X	X								X												
CCV4	1.00	0956				X	X								X												
CCB4	1.00	0959				X	X								X												
NGW003	1.00	1002				X	X								X												
NGW003D	1.00	1005				X	X								X												
NGW003S	1.00	1008				X	X								X												
NGW003A	1.00	1012				X	X								X												
NGW003L	5.00	1015				X	X								X												
OGW001	1.00	1018				X	X								X												
PGW006	1.00	1021				X	X								X												
CRIF1	1.00	1024				X	X								X												
ICSAF1	1.00	1028				X	X								X												
ICSABF1	1.00	1031				X	X								X												
CCV5	1.00	1034				X	X								X												
CCB5	1.00	1037				X	X								X												

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: __ SAS No.: ___ SDG No.: C1902_

Instrument ID Number: TRACEICP__ Method: P_

Start Date: 02/09/00 End Date: 02/09/00

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	1600																			X						
S	1.00	1604																			X						
ICV1	1.00	1615																			X						
ICB1	1.00	1620																			X						
CCV1	1.00	1625																			X						
CCB1	1.00	1630																			X						
CRII1	1.00	1635																			X						
ICSAI1	1.00	1640																			X						
ICSABI1	1.00	1644																			X						
CCV2	1.00	1650																			X						
CCB2	1.00	1655																			X						
ZZZZZZ	1.00	1701																									
ZZZZZZ	1.00	1705																									
ZZZZZZ	1.00	1710																									
ZZZZZZ	1.00	1714																									
ZZZZZZ	1.00	1718																									
ZZZZZZ	1.00	1723																									
ZZZZZZ	1.00	1727																									
ZZZZZZ	1.00	1731																									
ZZZZZZ	1.00	1736																									
ZZZZZZ	1.00	1740																									
CCV3	1.00	1746																			X						
CCB3	1.00	1751																			X						
ZZZZZZ	1.00	1755																									
ZZZZZZ	1.00	1801																									
ZZZZZZ	1.00	1805																									
ZZZZZZ	1.00	1809																									
ZZZZZZ	1.00	1814																									
ZZZZZZ	1.00	1818																									
ZZZZZZ	1.00	1822																									
ZZZZZZ	1.00	1827																									
ZZZZZZ	1.00	1831																									

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Instrument ID Number: TRACEICP Method: P

Start Date: 02/09/00 End Date: 02/09/00

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
ZZZZZZ	1.00	1835																									
CCV4	1.00	1841																			X						
CCB4	1.00	1846																			X						
ZZZZZZ	1.00	1851																									
ZZZZZZ	1.00	1855																									
ZZZZZZ	1.00	1859																									
ZZZZZZ	1.00	1904																									
ZZZZZZ	1.00	1908																									
ZZZZZZ	1.00	1914																									
ZZZZZZ	1.00	1918																									
ZZZZZZ	1.00	1922																									
CCV5	1.00	1927																			X						
CCB5	1.00	1932																			X						
PBW1	1.00	1936																			X						
LCSW1	1.00	1941																			X						
AGW004	1.00	1945																			X						
BGW005	1.00	1949																			X						
CGW002	1.00	1954																			X						
DGW001	1.00	1958																			X						
IGW007	1.00	2003																			X						
JGW003	1.00	2007																			X						
JGW003D	1.00	2011																			X						
JGW003S	1.00	2016																			X						
CCV6	1.00	2021																			X						
CCB6	1.00	2027																			X						
JGW003L	5.00	2031																			X						
KGW001	1.00	2035																			X						
LGW006	1.00	2040																			X						
EGW004	1.00	2044																			X						
FGW005	1.00	2048																			X						
GGW002	1.00	2053																			X						
HGW001	1.00	2057																			X						

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902_

Instrument ID Number: TRACEICP Method: P

Start Date: 02/09/00 End Date: 02/09/00

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
MGW007	1.00	2101																			X						
NGW003	1.00	2106																			X						
NGW003D	1.00	2110																			X						
CCV7	1.00	2116																			X						
CCB7	1.00	2121																			X						
NGW003S	1.00	2125																			X						
NGW003L	5.00	2130																			X						
OGW001	1.00	2134																			X						
PGW006	1.00	2138																			X						
CRIF1	1.00	2144																			X						
ICSAF1	1.00	2148																			X						
ICSABF1	1.00	2153																			X						
CCV8	1.00	2158																			X						
CCB8	1.00	2204																			X						

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Instrument ID Number: FIMS400 Method: AV

Start Date: 01/31/00 End Date: 01/31/00

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
S0	1.00	1203																X									
S0.2	1.00	1206																X									
S0.5	1.00	1209																X									
S1.0	1.00	1212																X									
S2.0	1.00	1215																X									
S5.0	1.00	1218																X									
S10.0	1.00	1221																X									
ICV1	1.00	1225																X									
ICB1	1.00	1228																X									
CCV1	1.00	1231																X									
CCB1	1.00	1234																X									
LCSW1	1.00	1237																X									
CRA1	1.00	1240																X									
PBW1	1.00	1243																X									
AGW004	1.00	1246																X									
BGW005	1.00	1249																X									
CGW002	1.00	1252																X									
DGW001	1.00	1255																X									
IGW007	1.00	1258																X									
JGW003	1.00	1301																X									
CCV2	1.00	1304																X									
CCB2	1.00	1308																X									
JGW003D	1.00	1310																X									
JGW003S	1.00	1314																X									
KGW001	1.00	1317																X									
LGW006	1.00	1320																X									
EGW004	1.00	1323																X									
FGW005	1.00	1326																X									
GGW002	1.00	1329																X									
HGW001	1.00	1332																X									
MGW007	1.00	1335																X									
CCV3	1.00	1338																X									

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Instrument ID Number: FIMS400 Method: AV

Start Date: 01/31/00 End Date: 01/31/00

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	SN
CCB3	1.00	1341																X									
NGW003	1.00	1344																X									
NGW003D	1.00	1347																X									
NGW003S	1.00	1350																X									
OGW001	1.00	1353																X									
PGW006	1.00	1356																X									
ZZZZZZ	1.00	1359																									
ZZZZZZ	1.00	1402																									
ZZZZZZ	1.00	1405																									
ZZZZZZ	1.00	1408																									
CCV4	1.00	1411																X									
CCB4	1.00	1414																X									

14:10:08 Feb 7 2000

QUANTITATIVE ANALYSIS: SUMMARY REPORT

Set:	0207
Set Description:	
Parameter File:	crane
Sample ID:	01252-101 030-GW-001-02-F
Sample Description:	
Sample Type:	Sample
Sequence Number:	038
Blank:	Subtracted (001)
Dilution Factor:	1
Number of Repeats:	3
Time:	14:10:26 Feb 7 2000
Signal Profile Processing:	Average
Spectral Peak Processing:	Average
Deadtime Correction:	35
Calibration File:	MING
Calibration:	External Standard

	Sample Intensity	Std. Dev.	Blank Intensity	Std. Dev.
Be 9	41	2.9291	42	8.2373
Cl 35	986937	2.749E+04	14691	631.2021
Cl 37	1349227	2.902E+04	1013000	3.133E+04
Sc 45	261553	1070.4718	261499	4746.1143
Ti 46	5667	1409.5743	766	104.2833
Ti 47	261	27.1122	86	6.7905
Ti 48	377900	1.209E+04	-819	20.5252
Ti 49	1076	61.0789	23	2.5006
Ti 50	3679	74.5874	41	28.6483
Cr 50	3788	84.1658	276	25.2536
Cr 52	5850	94.9975	5785	214.4481
Cr 53	911	71.0435	587	39.5938
Cr 54	-5923	342.9586	-3342	220.7924
V 50	3490	79.7621	-22	33.5866
V 51	715	43.5313	385	116.1105
Ni 58	3808	100.4820	93	89.4277
Ni 60	2333	172.2936	212	14.2719
Ni 61	711	37.3419	337	21.4839
Ni 62	349	30.4026	111	9.4207
Ni 64	7483	387.3085	-79	29.9205
Co 59	1016	91.7126	441	49.0974
Cu 63	10238	424.7088	1217	78.2636
Cu 65	5406	106.9418	567	54.3421
Zn 64	12252	454.5834	615	41.6140
Zn 66	2767	43.2376	400	17.3436
Zn 67	371	37.5822	71	8.7724
Zn 68	2481	109.4072	1475	39.4970
Zn 70	-235	21.2731	-80	9.8786
As 75	923	94.8921	131	9.5772

QUANTITATIVE ANALYSIS: SUMMARY REPORT

		Net Ratio/ Intensity	Std. Dev.	Conc.	Std. Dev.		% RSD
[illegible] 13	3	1.238E-03	3.110E-04	1.518E-03	3.812E-04	mg/L	25.1093
[illegible] 54	3	-9.868E-03	1.560E-03	-0.0438	6.927E-03	mg/L	15.8046
[illegible] 50	3	0.0134	3.309E-04	-0.8185	0.0202	mg/L	2.4642
[illegible] 51	3	1.258E-03	4.742E-04	1.657E-04	6.246E-05	mg/L	37.6918
Ni 58	3	0.0142	5.143E-04	3.279E-03	1.187E-04	mg/L	3.6206
Ni 60	3	8.109E-03	6.610E-04	4.395E-03	3.583E-04	mg/L	8.1514
Ni 61	3	1.429E-03	1.647E-04	0.0177	2.041E-03	mg/L	11.5241
Ni 62	3	9.100E-04	1.217E-04	3.291E-03	4.402E-04	mg/L	13.3735
Ni 64	3	0.0289	1.485E-03	1.1116	0.0571	mg/L	5.1365
Co 59	3	2.198E-03	3.977E-04	2.686E-04	4.861E-05	mg/L	18.0988
Cu 63	3	0.0345	1.651E-03	8.254E-03	3.951E-04	mg/L	4.7872
Cu 65	3	0.0185	4.587E-04	8.941E-03	2.216E-04	mg/L	2.4788
Zn 64	3	0.0445	1.745E-03	0.0282	1.106E-03	mg/L	3.9226
Zn 66	3	9.052E-03	1.781E-04	9.481E-03	1.866E-04	mg/L	1.9678
Zn 67	3	1.149E-03	1.476E-04	7.657E-03	9.830E-04	mg/L	12.8372
Zn 68	3	3.846E-03	4.447E-04	5.522E-03	6.385E-04	mg/L	11.5626
Zn 70	3	-5.923E-04	8.968E-05	-0.0262	3.968E-03	mg/L	15.1414
As 75	3	3.029E-03	3.646E-04	2.844E-03	3.424E-04	mg/L	12.0388
Se 74	3	-1.295E-03	1.472E-04	-0.2525	0.0287	mg/L	11.3597
Se 76	3	5.773E-03	1.270E-03	0.0922	0.0203	mg/L	21.9926
Se 77	3	2.699E-04	8.845E-05	4.973E-03	1.630E-03	mg/L	32.7717
[illegible] 78	3	1.259E-03	3.507E-04	7.166E-03	1.995E-03	mg/L	27.8431
[illegible] 80	3	0.8062	0.1759	-0.4445	0.0967	mg/L	21.7626
Se 82	Y	1.261E-03	1.813E-04	0.0174	2.507E-03	mg/L	14.3740
Ag 107	?	1.796E-05	5.809E-05	2.123E-06	6.868E-06	mg/L	323.4836
Ag 109	3	1.930E-05	4.842E-05	2.412E-06	6.049E-06	mg/L	250.8369
Cd 106	3	-7.115E-04	1.319E-04	-4.959E-03	9.196E-04	mg/L	18.5445
Cd 108	3	-5.658E-04	1.821E-04	-4.898E-03	1.577E-03	mg/L	32.1926
Cd 110	3	-4.100E-04	1.301E-04	-2.517E-04	7.989E-05	mg/L	31.7369
Cd 111	3	-1.738E-04	1.730E-04	-1.092E-04	1.087E-04	mg/L	99.5552
Cd 112	3	-1.997E-04	1.280E-04	-6.147E-05	3.941E-05	mg/L	64.1164
Cd 113	3	-1.497E-03	3.691E-03	-9.644E-04	2.378E-03	mg/L	246.6003
Cd 114	3	-2.397E-04	2.113E-04	-6.295E-05	5.548E-05	mg/L	88.1361
Cd 116	3	-3.791E-04	2.679E-04	-4.113E-04	2.906E-04	mg/L	70.6525
In 115	<3	165694	1.261E+04			ions/sec	
Sn 118	3	2.814E-03	3.954E-04	5.863E-04	8.236E-05	mg/l	14.0474
Sn 120	3	3.601E-03	3.264E-04	5.453E-04	4.943E-05	mg/l	9.0647
Sb 121	3	2.817E-03	4.331E-04	4.866E-04	7.480E-05	mg/L	15.3731
Sb 123	3	2.120E-03	3.307E-04	4.636E-04	7.233E-05	mg/L	15.6017
Ba 130	3	-9.941E-05	1.747E-04	-4.986E-03	8.763E-03	mg/L	175.7615
Ba 132	3	-1.549E-04	5.183E-04	-8.263E-03	0.0276	mg/L	334.4933
Ba 134	3	3.429E-03	3.881E-04	6.773E-03	7.665E-04	mg/L	11.3162
Ba 135	3	9.101E-03	5.377E-04	6.653E-03	3.931E-04	mg/L	5.9088
Ba 136	3	0.0104	1.144E-03	6.175E-03	6.765E-04	mg/L	10.9558
Ba 137	3	0.0158	1.530E-03	6.490E-03	6.275E-04	mg/L	9.6669
Ba 138	Y	0.1040	9.152E-03	7.122E-03	6.267E-04	mg/L	8.8005
Tl 203	?	4.351E-04	1.264E-04	5.423E-05	1.576E-05	mg/L	29.0624
Tl 205	3	1.004E-03	1.248E-04	5.273E-05	6.556E-06	mg/L	12.4330
Pb 204	3	6.433E-05	7.514E-05	1.809E-04	2.113E-04	mg/L	116.8106

$.002844\ mg/L \left(\frac{1000\ ug}{1\ mg}\right)\left(\frac{50\ mL}{45\ mL}\right) = 3.16 \cong 3.2\ ug/L$

FORM 2-A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABORATORIES, INC.

SDG No: C1902

Concentration Units: MG/L

ANALYTE	INITIAL CALIBRATION			CONTINUING CALIBRATION					
	TRUE	FOUND	%R	TRUE	FOUND	%R	TRUE	FOUND	%R
Cyanide 01/20/2000	0.500	0.520	104	0.105	0.113	108	0.105	0.118	112
NH3 as N 01/28/2000	~~15.71~~	17.57	112	0.500	0.492	98	0.500	0.520	104
				0.500	0.494	99	0.500	0.509	102
TKN 01/18/2000	8.75	9.47	108	5.0	5.11	102	5.0	5.27	105
NO3/NO2 as N 01/20/2000	15.7	15.71	100	0.500	0.476	95	0.500	0.471	94
				0.500	0.475	95	0.500	0.477	95

FORM 3-A

BLANKS

Lab Name: LAUCKS TESTING LABORATORIES, INC.

SDG No.C1902 Preparation Blank Concentration Units: MG/L

ANALYTE	INITIAL CALIB. (MG/L)		CONTINUING CALIBRATION (MG/L)						PREPARATION BLANK	
	Value	C		C		C		C	Value	C
Cyanide 01/20/2000	~~0.005~~	U	0.005	U	0.005	U			0.005	U
NH3 as N 01/28/2000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
			0.01	U						
TKN 01/18/2000	0.3		0.3	U	0.3	U			0.31	
NO3/NO2 as N 01/20/2000	0.01	U	0.01	U	0.01	U	0.01	U	0.013	
			0.01	U						

Preparation Blanks Database Report

Lab Name : LAUCKS TESTING LABS

Lab Sample ID : B011400_TP_W01 Preparation Date : 01/14/00

Analyte	Reported		Units	Limit
PO4_SPEC	0.010	U	mg/L	0.020

Form BLANK-1

Preparation Blanks Database Report

Lab Name : LAUCKS TESTING LABS

Lab Sample ID : B011800_TKN_W02 Preparation Date : 01/18/00

Analyte	Reported	Units	Limit
TKN	0.31	mg/L	0.60

Form BLANK-1

Preparation Blanks Database Report

Lab Name : LAUCKS TESTING LABS

Lab Sample ID : B011900_TP_W01 Preparation Date : 01/19/00

Analyte	Reported	Units	Limit
PO4_SPEC	0.010 U	mg/L	0.020

Form BLANK-1

Preparation Blanks Database Report

Lab Name : LAUCKS TESTING LABS

Lab Sample ID : B012000_CN_W01 Preparation Date : 01/20/00

Analyte	Reported	Units	Limit
CN_TOT	0.0050 U	mg/L	0.010

Form BLANK-1

Preparation Blanks Database Report

Lab Name : LAUCKS TESTING LABS

Lab Sample ID : B012000_NN_W02 Preparation Date : 01/20/00

Analyte	Reported	Units	Limit
NO3NO2_SPEC	0.013	mg/L	0.020

Form BLANK-1

Preparation Blanks Database Report

Lab Name : LAUCKS TESTING LABS

Lab Sample ID : B012600_TP_W01 Preparation Date : 01/26/00

Analyte	Reported	Units	Limit
PO4_SPEC	0.010 U	mg/L	0.020

Form BLANK-1

Preparation Blanks Database Report

Lab Name : LAUCKS TESTING LABS

Lab Sample ID : B012800_NH3_W03 Preparation Date : 01/28/00

Analyte	Reported	Units	Limit
NH3_SPEC	0.010 U	mg/L	0.020

Form BLANK-1

MS/MSD Report

Lab Name : LAUCKS TESTING LABS

Client ID : 030-GW-003-02

Lab ID : 0001334-03
Matrix : WATER
Units : MG/L

Description : Total Phosphorus

(Database Reference: K011900_TPW01)

Matrix Spike Data

Analyte	Spike Added	Sample Found	MS Found	MS Rec	Recovery Limits	
Total Phosphorus----------	0.10	0.0500	0.1900	140 *	54	129

Matrix Spike Duplicate Data

Analyte	Spike Added	MSD Found	MSD Rec	RPD	Control Limits Recov		RPD
Total Phosphorus----------	0.10	0.1300	80	55 *	54	129	27

Comments

Form MS/MSD-1

* = Recovery or RPD exceeded control limit

Form MS/MSD-1

MS/Duplicate Database

Laucks Testing Labs

Record name: M011800_TKNW01

Spike Frac : TKN
Description: Total Kjeldahl Nitrogen as N
QC Fraction: TKN
Date Prep'd: 01/18/00 Spk Sample: 0001334-03
Matrix : WATER Client ID : 030-GW-003-02
Sequence No: 01 Units : MG/L

Analyte	Conc(1)	Conc(2)	RPD	Limit
Total Kjeldahl Nitrogen as N	0.792	0.589	29.4*P	19/20

OK GMA 2/17/00

* = Value is outside control limit
L = Control limit is 5x limit of detection; RPD value is difference of 2 sample values
P = Control limit is RPD; RPD value is calculated

If RPD = -1 value could not be calculated.

Form MS/DUPE-1

MS/Duplicate Database

Laucks Testing Labs

Record name: M011800_TKNW01

Spike Frac : TKN
Description: Total Kjeldahl Nitrogen as N
QC Fraction: TKN
Date Prep'd: 01/18/00 Spk Sample: 0001334-03
Matrix : WATER Client ID : 030-GW-003-02
Sequence No: 01 Units : MG/L

Analyte	Conc(1)	Spike Added	Spike Found	% Recov	LCL	UCL
Total Kjeldahl Nitrogen as N	0.7920	10.00	11.10	103	61	142

* = Value is outside control limit

If RECOV = -1 value could not be calculated.
If RECOV = 999 value exeeded 999%.

Form MS/Dupe-2

MS/Duplicate Database

Laucks Testing Labs

Record name: M012000_CNW01

Spike Frac : CN
Description: Cyanide
QC Fraction: CN
Date Prep'd: 01/20/00
Matrix : WATER
Sequence No: 01

Spk Sample: 0001334-03
Client ID : 030-GW-003-02
Units : MG/L

Analyte	Conc(1)	Conc(2)	RPD	Limit
Cyanide	0	0	0 L	0.025

* = Value is outside control limit
L = Control limit is 5x limit of detection; RPD value is difference of 2 sample values
P = Control limit is RPD; RPD value is calculated

If RPD = -1 value could not be calculated.

Form MS/DUPE-1

MS/Duplicate Database

Laucks Testing Labs

Record name: M012000_CNW01

Spike Frac : CN
Description: Cyanide
QC Fraction: CN
Date Prep'd: 01/20/00
Matrix : WATER
Sequence No: 01

Spk Sample: 0001334-03
Client ID : 030-GW-003-02
Units : MG/L

Analyte	Conc(1)	Spike Added	Spike Found	% Recov	LCL	UCL
Cyanide	0	0.0420	0.046	111	64	135

* = Value is outside control limit

If RECOV = -1 value could not be calculated.
If RECOV = 999 value exeeded 999%.

Form MS/Dupe-2

MS/Duplicate Database

Laucks Testing Labs

Record name: M012000_NNW01

Spike Frac : NO3-NO2
Description: NO3/NO2, Lachat, Cd reduction
QC Fraction: NN
Date Prep'd: 01/20/00
Matrix : WATER
Sequence No: 01

Spk Sample: 0001334-03
Client ID : 030-GW-003-02
Units : MG/L

Analyte	Conc(1)	Conc(2)	RPD	Limit
Nitrate/Nitrite (EPA 353.2)	0.647	0.646	0.139 P	10

* = Value is outside control limit
L = Control limit is 5x limit of detection; RPD value is difference of 2 sample values
P = Control limit is RPD; RPD value is calculated

If RPD = -1 value could not be calculated.

Form MS/DUPE-1

MS/Duplicate Database

Laucks Testing Labs

Record name: M012000_NNW01

Spike Frac : NO3-NO2
Description: NO3/NO2, Lachat, Cd reduction
QC Fraction: NN
Date Prep'd: 01/20/00 Spk Sample: 0001334-03
Matrix : WATER Client ID : 030-GW-003-02
Sequence No: 01 Units : MG/L

Analyte	Conc(1)	Spike Added	Spike Found	% Recov	LCL	UCL
Nitrate/Nitrite (EPA 353.2)	0.6472	0.5000	1.111	93	68	122

* = Value is outside control limit

If RECOV = -1 value could not be calculated.
If RECOV = 999 value exeeded 999%.

Form MS/Dupe-2

MS/Duplicate Database

Laucks Testing Labs

Record name: M012800_NH3W01

Spike Frac : NH3
Description: Ammonia, Lachat phenate method
QC Fraction: NH3
Date Prep'd: 01/28/00
Matrix : WATER
Sequence No: 01

Spk Sample: 0001334-03
Client ID : 030-GW-003-02
Units : MG/L

Analyte	Conc(1)	Conc(2)	RPD	Limit
Ammonia as N (EPA 350.1)	0	0	0 L	0.050

* = Value is outside control limit
L = Control limit is 5x limit of detection; RPD value is difference of 2 sample values
P = Control limit is RPD; RPD value is calculated

If RPD = -1 value could not be calculated.

Form MS/DUPE-1

MS/Duplicate Database

Laucks Testing Labs

Record name: M012800_NH3W01

Spike Frac : NH3
Description: Ammonia, Lachat phenate method
QC Fraction: NH3
Date Prep'd: 01/28/00 Spk Sample: 0001334-03
Matrix : WATER Client ID : 030-GW-003-02
Sequence No: 01 Units : MG/L

Analyte	Conc(1)	Spike Added	Spike Found	% Recov	LCL	UCL
Ammonia as N (EPA 350.1)	0	0.5000	0.432	86	53	120

* = Value is outside control limit

If RECOV = -1 value could not be calculated.
If RECOV = 999 value exeeded 999%.

Form MS/Dupe-2

Metals (re-analysis) Data

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: DGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01252-05

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-001-02

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: HGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01252-10

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	14.			M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-001-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: CGW002

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01252-04

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	10.			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-002-02

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: GGW002

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01252-09

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	9.6			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-002-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: JGW003

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-03

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	6.6			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-003-02

FORM I - IN

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: NGW003

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-07

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	6.8			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	13.2			M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-003-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: AGW004

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01252-01

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	6.1			P-
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	29.4			M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-004-02

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: EGW004

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C[illegible]A

Matrix (soil/water): WATER Lab Sample ID: 01252-07

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	25.8			M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-004-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: BGW005

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01252-02

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-005-02

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: FGW005

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01252-08

Level (low/med): LOW Date Received: 01/13/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-005-02-F

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: LGW006

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-05

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	13.			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: 030-GW-006-02

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: PGW006

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-09

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	13.9			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-006-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: IGW007

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-02

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-007-02

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: MGW007

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-06

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	5.6	U		P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	12.			M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: _

Comments:

CLIENT ID: 030-GW-007-02-F

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: KGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-04

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	14.1			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: DUP-GW-001-02

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.: OGW001

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water): WATER Lab Sample ID: 01334-08

Level (low/med): LOW Date Received: 01/15/00

% Solids: 0.0

ConcentrationUnits (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				
7440-36-0	Antimony				
7440-38-2	Arsenic				
7440-39-3	Barium				
7440-41-7	Beryllium				
7440-43-9	Cadmium	1.1	U		M
7440-70-2	Calcium				
7440-47-3	Chromium				
7440-48-4	Cobalt				
7440-50-8	Copper				
7439-89-6	Iron				
7439-92-1	Lead				
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury				
7440-02-0	Nickel				
7440-09-7	Potassium				
7782-49-2	Selenium	13.1			P
7440-22-4	Silver				
7440-23-5	Sodium				
7440-28-0	Thallium				
7440-62-2	Vanadium				
7440-66-6	Zinc	11.1	U		M
7440-31-5	Tin				

Color Before: COLORLESS Clarity Before: CLEAR Texture: ___

Color After: COLORLESS Clarity After: CLEAR Artifacts: ___

Comments:

CLIENT ID: DUP-GW-001-02-F

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Initial Calibration Source: EPA-LV/SPEX

Continuing Calibration Source: SPEX/VWR

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium	10.0	10.50	105.0	25.0	23.30	93.2	25.50	102.0	M
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium	1000.0	1000.50	100.0	1000.0	1019.30	101.9	1031.80	103.2	P
Silver									
Sodium									
Thallium									
Vanadium									
Zinc	200.0	202.80	101.4	100.0	95.00	95.0	99.20	99.2	M
Tin									

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium				25.0	24.60	98.4	23.90	95.6	M
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium				1000.0	1044.70	104.5	1033.50	103.4	P
Silver									
Sodium									
Thallium									
Vanadium									
Zinc				100.0	103.80	103.8	100.90	100.9	M
Tin									

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium				25.0	24.60	98.4			M
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium				1000.0	1056.90	105.7	1079.80	108.0	P
Silver									
Sodium									
Thallium									
Vanadium									
Zinc				100.0	103.10	103.1			M
Tin									

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Initial Calibration Source: _____

Continuing Calibration Source: _____

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium				1000.0	1078.20	107.8	1077.40	107.7	P
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Tin									

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2B

CRDL STANDARD FOR AA AND ICP

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

AA CRDL Standard Source: IV

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Found	%R	Final Found	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium				2.0	1.40	70.0	1.50	75.0
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium				10.0	11.20	112.0	12.00	120.0
Silver								
Sodium								
Thallium								
Vanadium								
Zinc				20.0	0.60	3.0	0.60	3.0
Tin								

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BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	1.100	U	M
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium	5.0	U	5.0	U	5.0	U	5.0	U	5.600	U	P
Silver											
Sodium											
Thallium											
Vanadium											
Zinc	10.0	U	10.0	U	10.0	U	10.0	U	11.100	U	M
Tin											

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BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium			1.0	U	1.0	U					M
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium			5.0	U	5.0	U	5.0	U			P
Silver											
Sodium											
Thallium											
Vanadium											
Zinc			10.0	U	10.0	U					M
Tin											

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BLANKS

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium			5.0	U	5.0	U					P
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Tin											

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

ICP ID Number: ELAN5000 ICS Source: SPEX

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium		20	0	17.9	89.5	0	18.5	92.5
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc		20	0	19.7	98.5	0	19.9	99.5
Tin								

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

ICP ID Number: TRACEICP__ ICS Source: _____

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium		50	-1	50.5	101.0	-4	49.6	99.2
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Tin								

U.S. EPA - CLP

5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

JGW003S

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix: WATER Level: LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight: UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium	75-125	5.1111		1.1111	U	5.56	91.9		M
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium	75-125	21.6667		6.5556		16.67	90.6		P
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc	75-125	113.0000		11.1111	U	111.11	101.7		M
Tin									NR

Comments:

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5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

NGW003S

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix: WATER Level: LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight: UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium	75-125	5.1111		1.1111	U	5.56	91.9		M
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium	75-125	23.5556		6.7778		16.67	100.6		P
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc	75-125	121.2222		13.2222		111.11	97.2		M
Tin									NR

Comments:

U.S. EPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

JGW003A

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix: WATER Level: LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium		8.90		1.00	U	10.0	89.0		M
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc		185.20		10.00	U	200.0	92.6		M
Tin									NR

Comments:

U.S. EPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

NGW003A

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix: WATER Level: LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium		8.40		1.00	U	10.0	84.0		M
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc		195.50		11.90		200.0	91.8		M
Tin									NR

Comments:

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6

DUPLICATES

EPA SAMPLE NO.

JGW003D

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix: WATER Level: LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight: UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium		1.1111	U	1.1111	U			M
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.6	6.5556		6.2222		5.2		P
Silver								
Sodium								
Thallium								
Vanadium								
Zinc		11.1111	U	11.1111	U			M
Tin								

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DUPLICATES

EPA SAMPLE NO.

NGW003D

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix: WATER Level: LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight: UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium		1.1111	U	1.1111	U			M
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.6	6.7778		8.0000		16.5		P
Silver								
Sodium								
Thallium								
Vanadium								
Zinc	11.1	13.2222		12.0000		9.7		M
Tin								

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LABORATORY CONTROL SAMPLE

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Solid LCS Source: ERA 233

Aqueous LCS Source: IV

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium	5.6	5.44	97.1						
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium	16.7	16.56	99.2						
Silver									
Sodium									
Thallium									
Vanadium									
Zinc	111.1	108.89	98.0						
Tin									

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ICP SERIAL DILUTIONS

EPA SAMPLE NO.

JGW003L

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902

Matrix (soil/water) : WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ-ence	Q	M
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium	1.00	U	5.00	U			M
Calcium							
Chromium							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury							
Nickel							
Potassium							
Selenium	5.90		25.00	U	100.0		P
Silver							
Sodium							
Thallium							
Vanadium							
Zinc	10.00	U	50.00	U			M
Tin							

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ICP SERIAL DILUTIONS

EPA SAMPLE NO.

NGW003L

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Matrix (soil/water) : WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium	1.00	U	5.00	U			M
Calcium							
Chromium							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury							
Nickel							
Potassium							
Selenium	6.10		25.00	U	100.0		P
Silver							
Sodium							
Thallium							
Vanadium							
Zinc	11.90		50.00	U	100.0		M
Tin							

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Method: P

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
AGW004	02/16/00	45	50
BGW005	02/16/00	45	50
CGW002	02/16/00	45	50
DGW001	02/16/00	45	50
EGW004	02/16/00	45	50
FGW005	02/16/00	45	50
GGW002	02/16/00	45	50
HGW001	02/16/00	45	50
IGW007	02/16/00	45	50
JGW003	02/16/00	45	50
JGW003D	02/16/00	45	50
JGW003S	02/16/00	45	50
KGW001	02/16/00	45	50
LCSW1	02/16/00	45	50
LGW006	02/16/00	45	50
MGW007	02/16/00	45	50
NGW003	02/16/00	45	50
NGW003D	02/16/00	45	50
NGW003S	02/16/00	45	50
OGW001	02/16/00	45	50
PBW1	02/16/00	45	50
PGW006	02/16/00	45	50

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PREPARATION LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Method: M

EPA Sample No.	Preparation Date	Volume (mL) Initial	Volume (mL) Final
AGW004	02/16/00	45	50
BGW005	02/16/00	45	50
CGW002	02/16/00	45	50
DGW001	02/16/00	45	50
EGW004	02/16/00	45	50
FGW005	02/16/00	45	50
GGW002	02/16/00	45	50
HGW001	02/16/00	45	50
IGW007	02/16/00	45	50
JGW003	02/16/00	45	50
JGW003D	02/16/00	45	50
JGW003S	02/16/00	45	50
KGW001	02/16/00	45	50
LCSW1	02/16/00	45	50
LGW006	02/16/00	45	50
MGW007	02/16/00	45	50
NGW003	02/16/00	45	50
NGW003D	02/16/00	45	50
NGW003S	02/16/00	45	50
OGW001	02/16/00	45	50
PBW1	02/16/00	45	50
PGW006	02/16/00	45	50

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Instrument ID Number: ELAN5000 Method: M

Start Date: 02/17/00 End Date: 02/17/00

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0837							X																	X	
S1	1.00	0840							X																	X	
S2	1.00	0843							X																	X	
S3	1.00	0846							X																	X	
ICV1	1.00	0849							X																	X	
ICB1	1.00	0852							X																	X	
CCV1	1.00	0855							X																	X	
CCB1	1.00	0858							X																	X	
CRII1	1.00	0901							X																	X	
ICSAI1	1.00	0904							X																	X	
ICSABI1	1.00	0907							X																	X	
CCV2	1.00	0910							X																	X	
CCB2	1.00	0913							X																	X	
PBW1	1.00	0917							X																	X	
LCSW1	1.00	0920							X																	X	
AGW004	1.00	0923							X																	X	
BGW005	1.00	0926							X																	X	
CGW002	1.00	0929							X																	X	
DGW001	1.00	0932							X																	X	
IGW007	1.00	0935							X																	X	
JGW003	1.00	0938							X																	X	
JGW003D	1.00	0941							X																	X	
JGW003S	1.00	0944							X																	X	
CCV3	1.00	0947							X																	X	
CCB3	1.00	0950							X																	X	
JGW003A	1.00	0953							X																	X	
JGW003L	5.00	0956							X																	X	
KGW001	1.00	0959							X																	X	
LGW006	1.00	1003							X																	X	
EGW004	1.00	1006							X																	X	
FGW005	1.00	1009							X																	X	
GGW002	1.00	1012							X																	X	

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Instrument ID Number: ELAN5000 Method: M

Start Date: 02/17/00 End Date: 02/17/00

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
HGW001	1.00	1015							X																	X	
MGW007	1.00	1018							X																	X	
CCV4	1.00	1021							X																	X	
CCB4	1.00	1024							X																	X	
NGW003	1.00	1027							X																	X	
NGW003D	1.00	1030							X																	X	
NGW003S	1.00	1033							X																	X	
NGW003A	1.00	1036							X																	X	
NGW003L	5.00	1039							X																	X	
OGW001	1.00	1042							X																	X	
PGW006	1.00	1045							X																	X	
CRIF1	1.00	1049							X																	X	
ICSAF1	1.00	1052							X																	X	
ICSABF1	1.00	1055							X																	X	
CCV5	1.00	1058							X																	X	
CCB5	1.00	1101							X																	X	

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Instrument ID Number: TRACEICP Method: P

Start Date: 02/24/00 End Date: 02/24/00

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0923																			X						
S	1.00	0926																			X						
ICV1	1.00	0937																			X						
ICB1	1.00	0942																			X						
CCV1	1.00	0949																			X						
CCB1	1.00	0954																			X						
CRII1	1.00	0957																			X						
ZZZZZZ	1.00	1001																									
ZZZZZZ	1.00	1005																									
ICSAI2	1.00	1011																			X						
ICSABI2	1.00	1015																			X						
CCV2	1.00	1020																			X						
CCB2	1.00	1025																			X						
ZZZZZZ	1.00	1029																									
ZZZZZZ	1.00	1032																									
ZZZZZZ	1.00	1036																									
ZZZZZZ	1.00	1040																									
ZZZZZZ	1.00	1044																									
ZZZZZZ	1.00	1048																									
ZZZZZZ	1.00	1052																									
ZZZZZZ	1.00	1055																									
ZZZZZZ	1.00	1059																									
ZZZZZZ	1.00	1103																									
CCV3	1.00	1108																			X						
CCB3	1.00	1113																			X						
ZZZZZZ	1.00	1117																									
ZZZZZZ	1.00	1121																									
ZZZZZZ	1.00	1124																									
ZZZZZZ	1.00	1128																									
ZZZZZZ	1.00	1132																									
ZZZZZZ	1.00	1136																									
ZZZZZZ	1.00	1140																									

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Instrument ID Number: TRACEICP Method: P

Start Date: 02/24/00 End Date: 02/24/00

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1144																									
CCV4	1.00	1149																			X						
CCB4	1.00	1153																			X						
ZZZZZZ	1.00	1157																									
ZZZZZZ	1.00	1249																									
ZZZZZZ	1.00	1253																									
CCV5	1.00	1258																			X						
CCB5	1.00	1313																			X						
ZZZZZZ	1.00	1320																									
LCSW1	1.00	1324																			X						
AGW004	1.00	1328																			X						
BGW005	1.00	1332																			X						
CGW002	1.00	1336																			X						
DGW001	1.00	1340																			X						
IGW007	1.00	1343																			X						
JGW003	1.00	1347																			X						
JGW003D	1.00	1351																			X						
JGW003S	1.00	1355																			X						
CCV6	1.00	1400																			X						
CCB6	1.00	1409																			X						
JGW003L	5.00	1413																			X						
KGW001	1.00	1416																			X						
LGW006	1.00	1420																			X						
EGW004	1.00	1424																			X						
FGW005	1.00	1428																			X						
GGW002	1.00	1432																			X						
HGW001	1.00	1436																			X						
MGW007	1.00	1439																			X						
NGW003	1.00	1443																			X						
NGW003D	1.00	1447																			X						
CCV7	1.00	1452																			X						
CCB7	1.00	1457																			X						

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ANALYSIS RUN LOG

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

Instrument ID Number: TRACEICP Method: P

Start Date: 02/24/00 End Date: 02/24/00

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
NGW003S	1.00	1501																			X						
NGW003L	5.00	1505																			X						
OGW001	1.00	1508																			X						
PGW006	1.00	1512																			X						
PBW1	1.00	1525																			X						
CRIF1	1.00	1529																			X						
ICSAF2	1.00	1533																			X						
ICSABF2	1.00	1537																			X						
CCV8	1.00	1542																			X						
CCB8	1.00	1547																			X						

Instrument Detection Limits (Quarterly)

Lab Name: LAUCKS TESTING LABS, INC. Contract: ____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

ICP ID Number: ____ Date: 10/08/99

Flame AA ID Number: ____

Furnace AA ID Number: TRACEICP

Analyte	Wavelength (nm)	Background	CRDL (ug/L)	IDL (ug/L)	M
Aluminum					
Antimony			1		
Arsenic			1		
Barium			1		
Beryllium			1		
Cadmium			1		
Calcium	315.80		1000	1000.0	P
Chromium			5		
Cobalt			3		
Copper			2		
Iron	259.90		100	100.0	P
Lead			1		
Magnesium	279.00		1000	1000.0	P
Manganese	257.60		15	15.0	P
Mercury			0.2		
Nickel			10		
Potassium	766.40		1000	1000.0	P
Selenium	196.00		5	5.0	P
Silver			3		
Sodium	588.90		1000	1000.0	P
Thallium			1		
Vanadium			2		
Zinc			10		

Comments:

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Instrument Detection Limits (Quarterly)

Lab Name: LAUCKS TESTING LABS, INC. Contract: _____

Lab Code: LAUCKS Case No.: ___ SAS No.: ___ SDG No.: C1902A

ICP ID Number: ELAN5000 Date: 07/23/99

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Mass (amu)	Background	CRDL (ug/L)	IDL (ug/L)	M
Aluminum					
Antimony	121.00		1	1.0	M
Arsenic	75.00		1	1.0	M
Barium	137.00		1	1.0	M
Beryllium	9.00		1	1.0	M
Cadmium	111.00		1	1.0	M
Calcium			1000		
Chromium	52.00		5	5.0	M
Cobalt	59.00		3	3.0	M
Copper	63.00		2	2.0	M
Iron			100		
Lead	208.00		1	1.0	M
Magnesium			1000		
Manganese			15		
Mercury			0.2		
Nickel	60.00		10	10.0	M
Potassium			1000		
Selenium	82.00		1	1.0	M
Silver	107.00		3	3.0	M
Sodium			1000		
Thallium	205.00		1	1.0	M
Vanadium	51.00		2	2.0	M
Zinc	66.00		10	10.0	M
Tin	118.00		10	10.0	M

Comments:

ROUND 3
APRIL 2000

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for MARK
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Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. CLARK**	**DATE:**	**JUNE 6, 2000**
FROM:	**GRETCHEN A. PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –TOTAL AND DISSOLVED APPENDIX IX METALS, AMMONIA, CYANIDE, NITRATE/NITRITE, TOTAL KJELDAHL NITROGEN, PHOSPHORUS AND DISSOLVED PHOSPHORUS**
CTO 019 – NSWC CRANE
SDG – C1903

SAMPLES: 16/Aqueous/

030-GW-001-03	030-GW-001-03-F	030-GW-002-03
030-GW-002-03-F	030-GW-003-03	030-GW-003-03-F
030-GW-004-03	030-GW-004-03-F	030-GW-005-03
030-GW-005-03-F	030-GW-006-03	030-GW-006-03-F
030-GW-007-03	030-GW-007-03-F	DUP-GW-001-03
DUP-GW-001-03-F		

Overview

The sample set for CTO 019, NSWC Crane, SDG C1903, consists of sixteen (16) aqueous environmental samples. Two (2) field duplicate pairs (030-GW-004-03 / DUP-GW-001-03 and 030-GW-004-03-F / DUP-GW-001-03-F) were included within this SDG.

All samples, with exception to those designated –F, were analyzed for Appendix IX metals, ammonia, cyanide, nitrate/nitrite, total kjeldahl nitrogen (TKN) and total phosphorus. The samples designated –F were analyzed for dissolved Appendix IX metals, and dissolved phosphorus. The samples were collected by Tetra Tech NUS on April 18 and 19, 2000 and analyzed by Laucks Testing Labs, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria.

Metals analyses, with the exception of mercury, were conducted using SW 846 method 6010B/6020B. Mercury analyses were conducted using SW 846 method 7470A. Cyanide analyses were conducted using SW 846 method 9012A. Ammonia analyses were conducted using EPA method 350.1. Nitrate/Nitrite analyses were conducted using EPA method 353.2. Total and dissolved phosphorus analyses were conducted using EPA method 365.2. TKN analyses were conducted using EPA method 351.2.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Verifications
* • Laboratory Blank Analyses
  • Laboratory Duplicate Results
  • Field Duplicate Results
  • Matrix Spike Analyses
* • Post Digestion Spike Analyses

* • Laboratory Control Sample Results
* • Sample Quanitation
* • Detection Limits

* - All quality control criteria were met for this parameter.

Matrix Spike Analyses

The Matrix Spike (MS) Percent Recovery (%R) for arsenic was >125% quality control limit affecting the total metals. The positive results reported for arsenic in the affected samples were qualified as estimated, "J".

The MS %Rs for silver were <75% quality control limit affecting all samples. The nondetected results reported for silver were qualified as estimated, "UJ".

The MS %R for cyanide was <75% quality control limit affecting the total samples. The nondetected results reported for cyanide in the affected samples were qualified as estimated, "UJ".

Laboratory Duplicate Results

Laboratory duplicate imprecision was noted for arsenic affecting the total metals. The positive results reported for arsenic in the affected samples were qualified as estimated, "J".

Field Duplicate Results

Field duplicate imprecision (>30%) was noted for zinc affecting the total metals. The positive results reported for zinc in the affected samples were qualified as estimated, "J".

Notes

The Contract Required Detection Limit (CRDL) Percent Recoveries (%Rs) for several analytes affecting both the total dissolved metals were outside the 80-120% quality control limit. No validation action was required per Region V guidance.

A comparison of the field duplicate pairs is included in Appendix C.

The QAPP requested selenium be reported to 1.0µg/L. The 1µg/L reporting limit can be achieved via ICP/MS. However, false positives for selenium were present due to high chloride (forming ArCl) in the samples. Therefore, samples were reanalyzed for selenium using trace ICP with a reporting limit of 5.0µg/L.

As a result of sample preparation procedure for metals samples (45ml diluted to 50ml), reporting limits are marginally higher than those specified in the QAPP.

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: The MS %Rs for several analytes were outside the 75-125% quality control limits. Laboratory duplicate imprecision was noted for arsenic. Field duplicate imprecision was noted for zinc.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994, "EPA Region V Standard Operating Procedures for Validation of CLP Inorganic Review", September 1993, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A Phipps

Tetra Tech NUS
Gretchen A. Phipps
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-001-03			030-GW-001-03-F			030-GW-002-03			030-GW-002-03-F		
SAMPLE DATE:	04/18/00			04/18/00			04/18/00			04/18/00		
LABORATORY ID:	0004596-04			0004596-12			0004596-01			0004596-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	3.8	J	DF	6.8			3.1	J	DF	5.3		
BARIUM	7.7			7.7			6.6			6.7		
BERYLLIUM	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	
CHROMIUM	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	
COPPER	2.2	U		2.2	U		2.2	U		2.2	U	
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.22	U		0.22	U		0.22	U		0.22	U	
NICKEL	11.1	U		11.1	U		11.1	U		11.1	U	
SELENIUM	5.6	U		5.6	U		8.1			9.7		
SILVER	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D
THALLIUM	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	
VANADIUM	2.2	U		2.2	U		2.2	U		2.2	U	
ZINC	11.1	U		11.1	U		11.1	U		11.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-003-03			030-GW-003-03-F			030-GW-004-03			030-GW-004-03-F		
SAMPLE DATE:	04/18/00			04/18/00			04/18/00			04/18/00		
LABORATORY ID:	0004596-02			0004596-10			0004596-03			0004596-11		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.1	U		1.7			3.4	J	DF	3.9		
BARIUM	16.7			17.8			22.3			21.4		
BERYLLIUM	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	
CHROMIUM	5.6	U		5.6	U		5.6	U		5.6	U	
COBALT	3.3	U		3.3	U		8.0			7.9		
COPPER	2.2	U		2.7			3.2			2.2	U	
LEAD	1.1	U		2.2			2.4			1.1	U	
MERCURY	0.22	U		0.22	U		0.22	U		0.22	U	
NICKEL	11.1	U		12.0			31.7			20.1		
SELENIUM	5.6	U		5.6	U		5.6	U		5.6	U	
SILVER	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D
THALLIUM	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	
VANADIUM	2.2	U		2.2	U		2.2	U		2.2	U	
ZINC	11.1	U		66.3			78.0	J	G	28.0		

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-005-03			030-GW-005-03-F			030-GW-006-03			030-GW-006-03-F		
SAMPLE DATE:	04/19/00			04/19/00			04/19/00			04/19/00		
LABORATORY ID:	0004596-07			0004596-15			0004596-06			0004596-14		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	3.0	J	DF	3.6			2.3	J	DF	3.8		
BARIUM	22.9			22.9			5.1			6.0		
BERYLLIUM	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	
CHROMIUM	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	
COPPER	2.2	U		2.2	U		2.2	U		2.2	U	
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.22	U		0.22	U		0.22	U		0.22	U	
NICKEL	11.1	U		11.1	U		11.1	U		11.1	U	
SELENIUM	5.6	U		5.6	U		11.8			13.0		
SILVER	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D
THALLIUM	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	
VANADIUM	2.2	U		2.2	U		2.2	U		2.2	U	
ZINC	11.1	U		11.1	U		11.1	U		11.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-007-03			030-GW-007-03-F			DUP-GW-001-03			DUP-GW-001-03-F		
SAMPLE DATE:	04/19/00			04/19/00			04/18/00			04/18/00		
LABORATORY ID:	0004596-08			0004596-16			0004596-05			0004596-13		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:							030-GW-004-03			030-GW-004-03-F		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.1	U		1.1	U		1.1	U	
ARSENIC	1.7	J	DF	2.4			4.0	J	DF	4.9		
BARIUM	10.7			15.2			21.3			22.3		
BERYLLIUM	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	
CHROMIUM	5.6	U		5.6	U		5.6	U		5.6	U	
COBALT	3.3	U		3.3	U		8.1			7.8		
COPPER	2.2	U		2.2	U		2.2			2.9		
LEAD	1.1	U		1.1	U		1.1	U		1.1	U	
MERCURY	0.22	U		0.22	U		0.22	U		0.22	U	
NICKEL	11.1	U		11.1	U		23.0			21.8		
SELENIUM	5.6	U		5.6	U		5.6	U		5.6	U	
SILVER	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D	3.3	UJ	D
THALLIUM	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	
VANADIUM	2.2	U		2.2	U		2.2	U		2.2	U	
ZINC	14.3	J	G	12.1			28.3	J	G	30.0		

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-001-03			030-GW-001-03-F			030-GW-002-03			030-GW-002-03-F		
SAMPLE DATE:	04/18/00			04/18/00			04/18/00			04/18/00		
LABORATORY ID:	0004596-04			0004596-12			0004596-01			0004596-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.01	U				
CYANIDE	0.01	UJ	D				0.01	UJ	D			
NITRATE/NITRITE, AS N	1.3						1					
TOTAL KJELDAHL NITROGEN	0.3						0.3					
TOTAL PHOSPHORUS	0.1	U		0.1	U		0.1	U		0.15		

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-003-03			030-GW-003-03-F			030-GW-004-03			030-GW-004-03-F		
SAMPLE DATE:	04/18/00			04/18/00			04/18/00			04/18/00		
LABORATORY ID:	0004596-02			0004596-10			0004596-03			0004596-11		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.12					
CYANIDE	0.01	UJ	D				0.01	UJ	D			
NITRATE/NITRITE, AS N	0.56						0.06					
TOTAL KJELDAHL NITROGEN	0.5						1.2					
TOTAL PHOSPHORUS	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-005-03			030-GW-005-03-F			030-GW-006-03			030-GW-006-03-F		
SAMPLE DATE:	04/19/00			04/19/00			04/19/00			04/19/00		
LABORATORY ID:	0004596-07			0004596-15			0004596-06			0004596-14		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.01	U				
CYANIDE	0.01	UJ	D				0.01	UJ	D			
NITRATE/NITRITE, AS N	7.9						5.7					
TOTAL KJELDAHL NITROGEN	0.3	U					0.3	U				
TOTAL PHOSPHORUS	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019 - NSWC CRANE
WATER DATA
LAUCKS
SDG: C1903

SAMPLE NUMBER:	030-GW-007-03			030-GW-007-03-F			DUP-GW-001-03			DUP-GW-001-03-F		
SAMPLE DATE:	04/19/00			04/19/00			04/18/00			04/18/00		
LABORATORY ID:	0004596-08			0004596-16			0004596-05			0004596-13		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:							030-GW-004-03			030-GW-004-03-F		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.13					
CYANIDE	0.01	UJ	D				0.01	UJ	D			
NITRATE/NITRITE, AS N	0.54						0.06					
TOTAL KJELDAHL NITROGEN	0.3	U					1.3					
TOTAL PHOSPHORUS	0.18			0.17			0.1	U		0.1	U	

ROUND 4
JULY 2000

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. CLARK**	**DATE:**	**DECEMBER 12, 2000**
FROM:	**DANEEN C. RESNICK**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –TOTAL AND DISSOLVED APPENDIX IX METALS, AMMONIA, CYANIDE, NITRATE/NITRITE, TOTAL KJELDAHL NITROGEN, PHOSPHORUS AND DISSOLVED PHOSPHORUS**
CTO 019 – NSWC CRANE
SDG – C1904

SAMPLES: 16/Aqueous/

030-GW-001-04	030-GW-001-04-F	030-GW-002-04
030-GW-002-04-F	030-GW-003-04	030-GW-003-04-F
030-GW-004-04	030-GW-004-04-F	030-GW-005-04
030-GW-005-04-F	030-GW-006-04	030-GW-006-04-F
030-GW-007-04	030-GW-007-04-F	DUP-GW-001-04
DUP-GW-001-04-F		

Overview

The sample set for Contract Task Order (CTO) 019, Naval Surface Warfare Center (NSWC) Crane, Sample Delivery Group (SDG) C1904 consists of 16 aqueous environmental samples. Two field duplicate pairs (030-GW-007-04 / DUP-GW-001-04 and 030-GW-007-04-F / DUP-GW-001-04-F) were included in this SDG.

All samples, with exception to those designated -F, were analyzed for Appendix IX metals, ammonia, cyanide, nitrate/nitrite, total kjeldahl nitrogen (TKN) and total phosphorus. The samples designated –F were analyzed for dissolved Appendix IX metals, and dissolved phosphorus. The samples were collected by Tetra Tech NUS (TtNUS) on July 25 through 27, 2000, and analyzed by Laucks Testing Laboratories, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria.

Metals analyses, with the exceptions of mercury and selenium, were conducted using SW-846 Method 6020. Selenium and mercury analyses were conducted using SW-846 Methods 6010B and 7470A, respectively. Cyanide analyses were conducted using SW-846 Method 9012A. Ammonia analyses were conducted using EPA Method 350.1. Nitrate/nitrite analyses were conducted using EPA Method 353.2. Total and dissolved phosphorus analyses were conducted using EPA Method 365.2. TKN analyses were conducted using EPA Method 351.2.

These data were evaluated based on the following parameters:

- Data Completeness
- Holding Times
- Calibration Verifications
- * Laboratory Blank Analyses
- Laboratory Duplicate Results
- * Field Duplicate Results
- Matrix Spike Analyses
- * Post Digestion Spike Analyses
- * Laboratory Control Sample Results
- Inductively Coupled Plasma (ICP) Serial Dilution Results
- * Sample Quanitation
- Detection Limits

* - All quality control criteria were met for this parameter.

Holding Times

All samples were initially analyzed for ammonia within holding times. However, upon receipt of the data by TtNUS, it was noted that dilutions were performed for seven of eight samples, which resulted in nondetected results reported for these samples at reporting limits greater than those specified in the Quality Assurance Project Plan (QAPP). The laboratory was contacted and indicated that the dilutions were necessary because the amount of preservative in the sample bottles (which were purchased pre-preserved by the laboratory) was too great, causing interference. The laboratory then reanalyzed the samples undiluted outside holding time after adding a neutralizing preservative. All samples except sample 030-GW-004-04 were analyzed from 20 to 22 days past the required holding time of 28 days. None of the samples were reported as nondetected results after reanalysis. Therefore, positive results in the affected samples were qualified as estimated, "J".

Calibration Verifications

Initial calibration verification (ICV) percent recoveries (%Rs) for ammonia, nitrate/nitrite, and TKN were >110% quality control limit. Positive results for ammonia, nitrate/nitrite, and TKN in the affected samples were qualified as estimated, "J".

Laboratory Duplicate Results

Laboratory duplicate imprecision was noted for barium, affecting the total metals samples. The positive results reported for barium in the affected samples were qualified as estimated, "J".

Matrix Spike Analyses

The matrix spike (MS) %Rs for barium, thallium, and vanadium were >125% quality control limit, affecting the total metals samples. No positive results were reported for vanadium. The positive results reported for barium and thallium in the affected samples were qualified as estimated, "J".

ICP Serial Dilutions

The ICP serial dilution percent difference (%D) for barium was >10% quality control limit, affecting both total and dissolved metals samples. The positive results reported for barium in the all samples were qualified as estimated, "J".

Notes

A comparison of the field duplicate pairs is included in Appendix C.

The QAPP specified that selenium be reported to 1.0 µg/L using ICP/MS methodology (SW-846 Method 6020). However, use of this method during previous sampling rounds yielded false positives for selenium due to high chloride (forming ArCl) causing interference in the samples. Therefore, with the approval of TtNUS, samples were reanalyzed for selenium using trace ICP (SW-846 Method 6010B) with a reporting limit of 5.0 µg/L. This reporting limit still meets the risk-based target level (RBTL) of 50 ug/L specified in the QAPP.

Discrepancies were noted upon review of total versus dissolved sample results for chromium and zinc. In general, dissolved sample results were greater (in some cases significantly greater) than total sample results for these metals. The laboratory reanalyzed the samples. The reanalyses yielded total metals results that were greater than dissolved metals results or, in general, within a reasonable margin of error. Therefore, results for chromium and zinc in Appendix A (Qualified Analytical Results) have been reported from the reanalyses.

The MS %R for silver was <30% quality control limit, affecting the total metals samples. Upon reanalysis, the matrix spike recovery for silver was acceptable. Therefore, results for silver in Appendix A (Qualified Analytical Results) have been reported from the reanalyses.

As a result of sample preparation procedure for metals samples (45ml diluted to 50ml), reporting limits for total metals samples are marginally higher than those specified in the QAPP.

The laboratory initially reported the results for total and dissolved metals, ammonia, cyanide, and total and dissolved phosphorus at reporting limits other than those specified in the QAPP. The laboratory was contacted and resubmitted the results for these parameters. As previously noted, resubmittal of results for ammonia required reanalysis of samples outside holding times.

Executive Summary

Laboratory Performance: Ammonia reanalyses were performed past the required holding time. ICV %Rs for ammonia, nitrate/nitrite, and TKN were >110% quality control limit. Laboratory duplicate imprecision was noted for barium. The ICP serial dilution percent difference (%D) for barium was >10% quality control limit. The laboratory initially reported the results for total and dissolved metals, ammonia, cyanide, and total and dissolved phosphorus at reporting limits other than those specified in the QAPP.

Other Factors Affecting Data Quality: The MS %Rs for barium, thallium, and vanadium were >125% quality control limit.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994; "EPA Region V Standard Operating Procedures for Validation of CLP Inorganic Review", September 1993;, and the NFESC document entitled Navy IRCDQM, September 1999.

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the QAPP."

Tetra Tech NUS
Daneen C. Resnick
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

C1904 - Field Duplicate %D

Parameter	Control Limit	030-GW-007-04	DUP-GW-001-04	RPD	Qualification
Barium		14.3	14.5	-1.39	OK
Cadmium	1.1	1.3	1.7	-26.67	OK
Nickel	11.1	11.1 U	11.2		OK
Selenium	5.6	5.6 U	5.6 U	~~#DIV/0!~~ 0	~~-~~ OK
Thallium	1.1	1.6	1.3	20.69	OK
Zinc		15.3	15.3	0.00	OK
Ammonia		0.03	0.03	0.00	OK
NO3/NO2		0.48	0.44	8.70	OK
Total Phos	0.1	0.1 U	0.10		OK

JAP 11-12-00

Parameter	Control Limit	030-GW-007-04-F	DUP-GW-001-04-F	RPD	Qualification
Barium		9.8	10.4	-5.94	OK
Chromium		11.4	7.8	37.50	OK
Copper	2	2.2	2.3		OK
Nickel	10	12.3	11.4		OK
Selenium	5	5.7	14.7	~~#DIV/0!~~	~~-~~ OK
Thallium	1	1.1	1		OK
Zinc	10	14.2	14.3		OK
Total Phos	0.1	0.15	0.1 U		OK

results < 5x CRDL
diff < 2x CRDL

88.2

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

WATER[illegible]TA
LAUCK[illegible]
SDG: C1904

SAMPLE NUMBER:	030-GW-001-04			030-GW-001-04-F			030-GW-002-04			030-GW-002-04-F		
SAMPLE DATE:	07/26/00			07/26/00			07/26/00			07/26/00		
LABORATORY ID:	0007579-02			0007579-10			0007579-03			0007579-11		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.0	U		1.1	U		1.0	U	
ARSENIC	1.1	U		1.0	U		1.1	U		1.0	U	
BARIUM	10.8	J	DFI	8.6	J	I	15.9	J	DFI	8.1	J	I
BERYLLIUM	1.1	U		1.0	U		1.1	U		1.0	U	
CADMIUM	1.1	U		1.0	U		2.1			1.0	U	
CHROMIUM	5.6	U		11.4			5.6	U		5.0	U	
COBALT	3.3	U		3.0	U		3.3	U		3.0	U	
COPPER	2.3			2.2			2.2	U		2.0	U	
LEAD	1.1	U		1.0	U		1.1	U		1.0	U	
MERCURY	0.20	U		0.20	U		0.20	U		0.20	U	
NICKEL	11.1	U		10.0	U		11.3			11.3		
SELENIUM	5.6	U		12.5	U		7.7			8.5		
SILVER	3.3	U		3.0	U		3.3	U		3.0	U	
THALLIUM	2.8	J	D	1.4			2.7	J	D	1.5		
TIN	11.1	U		10.0	U		11.1	U		10.0	U	
VANADIUM	2.2	U		2.0	U		2.2	U		2.0	U	
ZINC	12.9			12.3			11.1	U		10.0	U	

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1904

SAMPLE NUMBER:	030-GW-003-04			030-GW-003-04-F			030-GW-004-04			030-GW-004-04-F		
SAMPLE DATE:	07/25/00			07/25/00			07/27/00			07/27/00		
LABORATORY ID:	0007579-01			0007579-09			0007579-08			0007579-16		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.0	U		1.0	U		1.1	U		1.0	U	
ARSENIC	1.1	U		1.0	U		1.4			1.8		
BARIUM	24.9	J	DFI	18.6	J	I	26.4	J	DFI	22.6	J	I
BERYLLIUM	1.1	U		1.0	U		1.1	U		1.0	U	
CADMIUM	1.1	U		1.0	U		3.6			1.8	U	
CHROMIUM	5.6	U		5.0	U		5.6	U		7.5		
COBALT	3.3	U		3.0	U		7.6			7.8		
COPPER	2.2	U		4.2			2.8			2.6		
LEAD	1.1	U		1.2			1.1	U		1.0	U	
MERCURY	0.20	U		0.20	U		0.20	U		0.20	U	
NICKEL	11.6			10.8			35.2			35.8		
SELENIUM	6.1			8.2			6.4			5.0	U	
SILVER	3.3	U		3.0	U		3.3	U		3.0	U	
THALLIUM	1.1	U		1.0	U		1.4	J	D	1.0	U	
TIN	11.1	U		10.0	U		11.1	U		10.0	U	
VANADIUM	2.2	U		2.0	U		2.2	U		2.0	U	
ZINC	11.1	U		74.8			32.2			31.8		

SAMPLE NUMBER:	030-GW-005-04			030-GW-005-04-F			030-GW-006-04			030-GW-006-04-F		
SAMPLE DATE:	07/27/00			07/27/00			07/26/00			07/26/00		
LABORATORY ID:	0007579-07			0007579-15			0007579-06			0007579-14		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.0	U		1.1	U		1.0	U	
ARSENIC	1.1	U		1.0	U		1.1	U		1.0	U	
BARIUM	27.7	J	DFI	24.8	J	I	15.9	J	DFI	7.3	J	I
BERYLLIUM	1.1	U		1.0	U		1.1	U		1.0	U	
CADMIUM	1.9			1.0	U		5.3			1.0	U	
CHROMIUM	5.6	U		5.0	U		5.6	U		5.7		
COBALT	3.3	U		3.0	U		3.3	U		3.0	U	
COPPER	2.2	U		2.0	U		2.2	U		2.0	U	
LEAD	1.1	U		1.0	U		1.1	U		1.0	U	
MERCURY	0.20	U		0.20	U		0.20	U		0.20	U	
NICKEL	11.1	U		10.0	U		108			10.0	U	
SELENIUM	5.6	U		5.0	U		12.1			5.1		
SILVER	3.3	U		3.0	U		3.3	U		3.0	U	
THALLIUM	1.1	U		1.0	U		1.6	J	D	1.3		
TIN	11.1	U		10.0	U		11.1	U		10.0	U	
VANADIUM	2.2	U		2.0	U		2.2	U		2.0	U	
ZINC	11.1	U		10.0	U		11.1	U		10.0	U	

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1904

SAMPLE NUMBER:	030-GW-007-04			030-GW-007-04-F			DUP-GW-001-04			DUP-GW-001-04-F		
SAMPLE DATE:	07/26/00			07/26/00			07/26/00			07/26/00		
LABORATORY ID:	0007579-04			0007579-12			0007579-05			0007579-13		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1.0	U							
ARSENIC	1.1	U		1.0	U							
BARIUM	14.3	J	DFI	9.8	J	I						
BERYLLIUM	1.1	U		1.0	U							
CADMIUM	1.3			1.0	U							
CHROMIUM	5.6	U		11.4								
COBALT	3.3	U		3.0	U							
COPPER	2.2	U		2.2								
LEAD	1.1	U		1.0	U							
MERCURY	0.20	U		0.20	U							
NICKEL	11.1	U		12.3								
SELENIUM	5.6	U		5.7								
SILVER	3.3	U		3.0	U							
THALLIUM	1.6	J	D	1.1								
TIN	11.1	U		10.0	U							
VANADIUM	2.2	U		2.0	U							
ZINC	15.3			14.2								

CTO0 NSWC CRANE
WAT ATA
LAUC
SDG: C1904

SAMPLE NUMBER:	030-GW-001-04	030-GW-001-04-F	030-GW-002-04	030-GW-002-04-F
SAMPLE DATE:	07/26/00	07/26/00	07/26/00	07/26/00
LABORATORY ID:	0007579-02	0007579-10	0007579-03	0007579-11
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	MG/L	MG/L	MG/L	MG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA	0.07	J	CH				0.06	J	CH			
CYANIDE	0.01	U					0.01	U				
NITRATE, AS NITROGEN	1.5	J	C				1.1	J	C			
TOTAL KJELDAHL NITROGEN	0.4	J	C				0.5	J	C			
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.10			0.1	U	

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1904

SAMPLE NUMBER:	030-GW-003-04			030-GW-003-04-F			030-GW-004-04			030-GW-004-04-F		
SAMPLE DATE:	07/25/00			07/25/00			07/27/00			07/27/00		
LABORATORY ID:	0007579-01			0007579-09			0007579-08			0007579-16		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA	0.03	J	CH				0.11	J	C			
CYANIDE	0.01	U					0.01	U				
NITRATE, AS NITROGEN	0.76	J	C				0.02					
TOTAL KJELDAHL NITROGEN	0.3	U					1.5	J	C			
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

SAMPLE NUMBER:	030-GW-005-04			030-GW-005-04-F			030-GW-006-04			030-GW-006-04-F		
SAMPLE DATE:	07/27/00			07/27/00			07/26/00			07/26/00		
LABORATORY ID:	0007579-07			0007579-15			0007579-06			0007579-14		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA	0.05	J	CH				0.03	U	CH			
CYANIDE	0.01	U					0.01	U				
NITRATE, AS NITROGEN	8.1						4.6					
TOTAL KJELDAHL NITROGEN	0.3	U					0.3	U				
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

ROUND 5
OCTOBER 2000

5TH ROUND

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO: R. CLARK

DATE: DECEMBER 18, 2000

FROM: GRETCHEN A. PHIPPS

COPIES: DV FILE

SUBJECT: INORGANIC DATA VALIDATION –TOTAL AND DISSOLVED APPENDIX IX METALS, AMMONIA, CYANIDE, NITRATE/NITRITE, TOTAL KJELDAHL NITROGEN, PHOSPHORUS AND DISSOLVED PHOSPHORUS
CTO 019 – NSWC CRANE
SDG – C1905

SAMPLES: 16/Aqueous/

030-GW-001-05	030-GW-001-05-F
030-GW-002-05	030-GW-002-05-F
030-GW-003-05	030-GW-003-05-F
030-GW-004-05	030-GW-004-05-F
030-GW-005-05	030-GW-005-05-F
030-GW-006-05	030-GW-006-05-F
030-GW-007-05	030-GW-007-05-F
DUP-GW-001-05	DUP-GW-001-05-F

Overview

The sample set for CTO 019, NSWC Crane, SDG C1905, consists of sixteen (16) aqueous environmental samples. Two (2) field duplicate pairs (030-GW-007-05 / DUP-GW-001-05 and 030-GW-007-05-F / DUP-GW-001-05-F) were included within this SDG.

All samples, with exception to those designated –F, were analyzed for Appendix IX metals, ammonia, cyanide, nitrate/nitrite, total kjeldahl nitrogen (TKN) and total phosphorus. The samples designated –F were analyzed for dissolved Appendix IX metals, and dissolved phosphorus. The samples were collected by Tetra Tech NUS on October 17 and 18, 2000 and analyzed by Laucks Testing Labs, Inc. under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria.

Metals analyses, with the exception of mercury, were conducted using SW 846 method 6010B/6020A. Mercury analyses were conducted using SW 846 method 7470A. Cyanide analyses were conducted using SW 846 method 9012A. Ammonia analyses were conducted using EPA method 350.1. Nitrate/Nitrite analyses were conducted using EPA method 353.2. Total and dissolved phosphorus analyses were conducted using EPA method 365.2. TKN analyses were conducted using EPA method 351.2.

These data were evaluated based on the following parameters:

- Data Completeness
- Holding Times
- Calibration Verifications
- Laboratory Blank Analyses
- Laboratory Duplicate Results
- Field Duplicate Results

- Matrix Spike Analyses
- Post Digestion Spike Analyses
- * Laboratory Control Sample Results
- ICP Serial Dilution Results
- * Sample Quanitation
- * Detection Limits

* - All quality control criteria were met for this parameter.

Holding Times

The twenty-eight (28) day holding time for total and dissolved phosphate analyses was exceeded by 5 to 7 days affecting all samples. The nondetected results reported for total and dissolved phosphorus were qualified as estimated, "UJ".

The fourteen (14) day holding time for cyanide was exceeded by 1 day affecting samples 030-GW-002-01, 030-GW-003-01, 030-GW-004-01, 030-GW-007-01 and DUP-GW-001-01. The nondetected results reported for cyanide in the affected samples were qualified as rejected due to a more severe noncompliance.

Calibration Verification

The initial calibration verification (ICV) Percent Recoveries (%Rs) for ammonia and TKN were >110% quality control limit. No validation action was taken for the nondetected results. The positive results reported for ammonia were qualified as estimated, "J".

Laboratory Blank Analyses

The following contaminant was detected in the laboratory method / preparation blanks at the following maximum concentration:

Samples affected: All

Analyte	Maximum Concentration	Action Level
TKN	0.5 mg/L	2.5 mg/L

An action level of 5X the maximum concentration has been used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluating for blank contamination. Positive results less than the action level for TKN were qualified as nondetected "U".

Matrix Spike Analyses

The Matrix Spike (MS) %R for cyanide was <30% quality control limit affecting the total samples. The nondetected results reported for cyanide in the affected samples were qualified as rejected, "UR".

Post Digestion Spike Analyses

The Post Digestion Spike (PDS) %R for silver was <75% quality control limit affecting the total metals. The nondetected results reported for silver in the affected samples were qualified as estimated, "UJ".

ICP Serial Dilution

The ICP Serial Dilution Percent Difference (%D) for barium was >10% quality control limit affecting the total metals. The positive results reported for barium in the affected samples were qualified as estimated, "J".

Notes

The Contract Required Detection Limit (CRDL) barium was >120% quality control limit affecting the dissolved metals. No validation action was required per Region V guidance.

The Matrix Spike / Matrix Spike Duplicate (MS/MSD) RPD for cyanide exceeded the upper quality control limit affecting the total metals. No validation action was required per Region V guidance.

A comparison of the field duplicate pairs is included in Appendix C.

The QAPP requested selenium be reported to 1.0µg/L. The 1µg/L reporting limit can be achieved via ICP/MS. However, false positives for selenium were present due to high chloride (forming ArCl) in the samples. Therefore, samples were reanalyzed for selenium using trace ICP with a reporting limit of 5.0µg/L.

As a result of sample preparation procedure for metals samples (45ml diluted to 50ml), reporting limits are marginally higher than those specified in the QAPP.

Discrepancies were noted upon review of the total versus dissolved sample results for chromium and selenium. In general, dissolved sample results were greater than total samples results for these metals. The dissolved samples were reanalyses for selenium. The results from the reanalyses were reported.

Executive Summary

Laboratory Performance: The holding time for cyanide and phosphorus analyses were exceeded. Ammonia and TKN were qualified due to calibration noncompliances. TKN was present in the laboratory blanks.

Other Factors Affecting Data Quality: Cyanide was qualified due to MS noncompliance. Silver was qualified due to PDS noncompliance. Barium was qualified due to ICP Serial Dilution noncompliance.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994, "EPA Region V Standard Operating Procedures for Validation of CLP Inorganic Review", September 1993, and the NFESC document entitled "Navy Installation Restoration Chemical Data Quality Manual" (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-001-05			030-GW-001-05-F			030-GW-002-05			030-GW-002-05-F		
SAMPLE DATE:	10/18/00			10/18/00			10/17/00			10/17/00		
LABORATORY ID:	0010490-06			0010490-14			0010490-01			0010490-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1	U		1.1	U		1	U	
ARSENIC	1.4			1.6			1.1	U		1.1		
BARIUM	7.6	J	I	7.5			6.6	J	I	6.7		
BERYLLIUM	1.1	U		1	U		1.1	U		1	U	
CADMIUM	1.1	U		1	U		1.1	U		1	U	
CHROMIUM	5.6	U		16.3			5.6	U		10.6		
COBALT	3.3	U		3	U		3.3	U		3	U	
COPPER	2.2	U		2	U		2.2	U		2	U	
LEAD	1.1	U		1	U		1.1	U		1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		10	U		11.1	U		10	U	
SELENIUM	5.6	U		15.1			9.8			23.9		
SILVER	3.3	UJ	D	3	U		3.3	UJ	D	3	U	
THALLIUM	1.1	U		1	U		1.1	U		1	U	
TIN	11.1	U		10	U		11.1	U		10	U	
VANADIUM	2.2	U		2	U		2.2	U		2	U	
ZINC	13.8			11.4			11.1	U		10	U	

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-003-05			030-GW-003-05-F			030-GW-004-05			030-GW-004-05-F		
SAMPLE DATE:	10/17/00			10/17/00			10/17/00			10/17/00		
LABORATORY ID:	0010490-02			0010490-10			0010490-05			0010490-13		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1	U		1.1	U		1	U	
ARSENIC	1.1	U		1	U		1.8			2.7		
BARIUM	15.5	J	I	16			16.5	J	I	17.2		
BERYLLIUM	1.1	U		1	U		1.1	U		1	U	
CADMIUM	1.1	U		1	U		1.1	U		1	U	
CHROMIUM	5.6	U		13.8			5.6	U		8.2		
COBALT	3.3	U		3	U		7.8			7.4		
COPPER	2.2	U		2.3			6.8			2	U	
LEAD	1.1	U		1	U		1.1	U		1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		10	U		31.4			27.9		
SELENIUM	8.4			30.9			5.6	U		7.4		
SILVER	3.3	UJ	D	3	U		3.3	UJ	D	3	U	
THALLIUM	1.1	U		1	U		1.1	U		1	U	
TIN	11.1	U		10	U		11.1	U		10	U	
VANADIUM	2.2	U		2	U		2.2	U		2	U	
ZINC	11.1	U		11.8			47.9			32		

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-005-05			030-GW-005-05-F			030-GW-006-05			030-GW-006-05-F		
SAMPLE DATE:	10/18/00			10/18/00			10/18/00			10/18/00		
LABORATORY ID:	0010490-07			0010490-15			0010490-08			0010490-16		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1	U		1.1	U		1	U	
ARSENIC	1.1	U		1	U		1.1	U		1	U	
BARIUM	18.4	J	I	19.2			4.7	J	I	5		
BERYLLIUM	1.1	U		1	U		1.1	U		1	U	
CADMIUM	1.1	U		1	U		1.1	U		1	U	
CHROMIUM	5.6	U		13.6			5.6	U		18.4		
COBALT	3.3	U		3	U		3.3	U		3	U	
COPPER	2.2	U		2	U		2.2			2	U	
LEAD	1.1	U		1	U		1.1	U		1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		10	U		11.1	U		10	U	
SELENIUM	5.6	U		12.8			12.2			31.2		
SILVER	3.3	UJ	D	3	U		3.3	UJ	D	3	U	
THALLIUM	1.1	U		1	U		1.1	U		1	U	
TIN	11.1	U		10	U		11.1	U		10	U	
VANADIUM	2.2	U		2	U		2.2	U		2	U	
ZINC	11.1	U		10	U		11.1	U		10	U	

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-007-05			030-GW-007-05-F			DUP-GW-001-05			DUP-GW-001-05-F		
SAMPLE DATE:	10/17/00			10/17/00			10/17/00			10/17/00		
LABORATORY ID:	0010490-03			0010490-11			0010490-04			0010490-12		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:							030-GW-007-05			030-GW-007-05-F		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ANTIMONY	1.1	U		1	U		1.1	U		1	U	
ARSENIC	1.1	U		1	U		1.1	U		1	U	
BARIUM	8.1	J	I	7.9			8.1	J	I	8.1		
BERYLLIUM	1.1	U		1	U		1.1	U		1	U	
CADMIUM	1.1	U		1	U		1.1	U		1	U	
CHROMIUM	5.6	U		15.9			5.6	U		19.6		
COBALT	3.3	U		3	U		3.3	U		3	U	
COPPER	2.2			2	U		2.2	U		2	U	
LEAD	1.1	U		1	U		1.1	U		1	U	
MERCURY	0.2	U		0.2	U		0.2	U		0.2	U	
NICKEL	11.1	U		10	U		11.1	U		10	U	
SELENIUM	5.6	U		15.3			5.6	U		18.4		
SILVER	3.3	UJ	D	3	U		3.3	UJ	D	3	U	
THALLIUM	1.1	U		1	U		1.1	U		1	U	
TIN	11.1	U		10	U		11.1	U		10	U	
VANADIUM	2.2	U		2	U		2.2	U		2	U	
ZINC	15.6			13.3			15.4			14.3		

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-001-05			030-GW-001-05-F			030-GW-002-05			030-GW-002-05-F		
SAMPLE DATE:	10/18/00			10/18/00			10/17/00			10/17/00		
LABORATORY ID:	0010490-06			0010490-14			0010490-01			0010490-09		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.01	U				
CYANIDE	0.01	UR	D				0.01	UR	D			
NITRATE/NITRITE, AS N	1.6						0.98					
TOTAL KJELDAHL NITROGEN	0.3	UJ	H				0.4	U	A			
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-003-05			030-GW-003-05-F			030-GW-004-05			030-GW-004-05-F		
SAMPLE DATE:	10/17/00			10/17/00			10/17/00			10/17/00		
LABORATORY ID:	0010490-02			0010490-10			0010490-05			0010490-13		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.14	J	C			
CYANIDE	0.01	UR	D				0.01	UR	D			
NITRATE/NITRITE, AS N	1.1						1.6					
TOTAL KJELDAHL NITROGEN	0.3	UJ	H				1.4	U	A			
TOTAL PHOSPHORUS AS P	0.1	U		0.2	U		0.1	U		0.1		

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-005-05			030-GW-005-05-F			030-GW-006-05			030-GW-006-05-F		
SAMPLE DATE:	10/18/00			10/18/00			10/18/00			10/18/00		
LABORATORY ID:	0010490-07			0010490-15			0010490-08			0010490-16		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.01	U				
CYANIDE	0.01	UR	D				0.01	UR	D			
NITRATE/NITRITE, AS N	7.4						5.5					
TOTAL KJELDAHL NITROGEN	0.3	UJ	H				0.3	UJ	H			
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.1	U		0.1	U	

CTO019-NSWC CRANE
WATER DATA
LAUCKS
SDG: C1905

SAMPLE NUMBER:	030-GW-007-05			030-GW-007-05-F			DUP-GW-001-05			DUP-GW-001-05-F		
SAMPLE DATE:	10/17/00			10/17/00			10/17/00			10/17/00		
LABORATORY ID:	0010490-03			0010490-11			0010490-04			0010490-12		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	MG/L			MG/L			MG/L			MG/L		
FIELD DUPLICATE OF:							030-GW-007-05			030-GW-007-05-F		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
AMMONIA, AS NITROGEN	0.01	U					0.02	J	C			
CYANIDE	0.01	UR	D				0.01	UR	D			
NITRATE/NITRITE, AS N	0.51						0.62					
TOTAL KJELDAHL NITROGEN	0.4	U	A				0.3	UJ	H			
TOTAL PHOSPHORUS AS P	0.1	U		0.1	U		0.26			0.1	U	