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Site 31 (Area of Concern 1)

Supplemental Groundwater Sampling Summary Report

Naval Weapons Station Seal Beach Detachment Concord

September 26, 2003

Prepared for

DEPARTMENT OF THE NAVY
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ACRONYMS AND ABBREVIATIONS

AOC 1	Area of concern 1
bgs	below ground surface
CTR	California Toxics Rule
CCC	criteria continuous concentrations
EPA	U.S. Environmental Protection Agency
NRWQC	national recommended water quality criteria
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MCL	maximum contaminant level
Navy	U.S. Department of the Navy
PA	preliminary assessment
PCB	polychlorinated biphenyl
PRG	EPA Region 9 preliminary remediation goal
PVC	polyvinyl chloride
RWQCB	California Regional Water Quality Control Board, San Francisco Bay Region
RI	remedial investigation
SAP	sampling and analysis plan
SVOC	semivolatile organic compound
SWRCB	State Water Resource Control Board
TCRA	time-critical removal action
TDS	total dissolved solids
TSS	total suspended solids
Tetra Tech	Tetra Tech EM Inc.
VOC	volatile organic compound

1.0 INTRODUCTION

Site 31, formerly known as area of concern 1 (AOC 1) is an undeveloped 17.2-acre site on Port Chicago Highway, about 1/2 mile east of the eastern entrance to Naval Weapons Station Seal Beach Detachment Concord. The site is the former location of a nitrogen-phosphorus-potassium (N-P-K) fertilizer plant that operated from 1955 to 1976 by Union Oil Company of California. The Navy acquired the property in 1983 and demolished all site structures in 1986. During installation of a pumping station in 1998 by the Contra Costa Water District, it became known that soils and waste materials at the site were contaminated with lead, selenium, and mercury. The Navy conducted a preliminary assessment (PA) and PA addendum from 1999 through 2001 that concluded that lead, selenium, and mercury concentrations in soils pose unacceptable risk to birds (Tetra Tech EM Inc. [Tetra Tech] 1999, 2001). From June 2002 to March 2003, the U.S. Department of the Navy (Navy) conducted a time-critical removal action (TCRA) to excavate and remove approximately 2,070 cubic yards (4,000 tons) of wastes and soils contaminated by lead, selenium, and mercury from the site to reduce the site risks.

In addition to the TCRA, the Navy and regulatory agencies agreed that supplemental soil and groundwater sampling was required to guide additional Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigations planned at Site 31, including a remedial investigation (RI). The Navy collected and analyzed soil samples and installed four groundwater monitoring wells at the site to assess groundwater quality and to evaluate whether site groundwater has been affected by contaminants present in soils. The rationale for collecting soil and groundwater samples and the field methods and analytical techniques used to collect and analyze the samples were developed in consultation with the regulatory agencies and are described in a sampling and analysis plan (SAP) (Tetra Tech 2002). The supplemental soil investigation and analytical results for soils are presented in the supplemental soils sampling summary report (Navy 2003), which is included as Appendix A to this report. The supplemental groundwater investigation and analytical data for groundwater are presented in this report.

This supplemental groundwater sampling summary report consists of five sections: this introduction (Section 1.0); monitoring well site selection, well installation, and development (Section 2.0); monitoring well sampling information (Section 3.0); analytical results for groundwater (Section 4.0); groundwater flow directions and velocities (Section 5.0); and conclusions and recommendations (Section 6.0). Supporting documentation, including chains of custody, laboratory analytical summaries, a review of analytical data quality, and field forms are included as appendices to this report. References, figures, and tables follow the text.

2.0 MONITORING WELL INSTALLATION AND DEVELOPMENT

Gregg Drilling, Inc., of Signal Hill, California, installed four monitoring wells at Site 31 in January 2003 in the manner described in the SAP (Tetra Tech 2002) under the direction of a Tetra Tech field geologist. The objective of installing monitoring wells at Site 31 was to determine groundwater flow directions and to evaluate whether groundwater quality has been affected by the presence of site-related contaminants. Locations for the wells were selected in

consultation with the regulatory agencies during a remedial project manager's meeting on October 1, 2002, and were modified slightly based on subsequent discussions with the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) on October 2 and 3, 2002. Monitoring well locations are shown on Figure 1.

Well locations were selected using regional groundwater flow as an indication of local gradient, assuming that regional groundwater flow is directed northward from the Los Medanos Hills toward Suisun Bay. Rationale for selecting the location of each monitoring well is described as follows:

- Monitoring well MW-01 was installed immediately north of the pump station to assess whether the materials removed from the pump station area have affected groundwater. An additional objective of well MW-01 was to assess whether the metals-contaminated cinders that remain in place beneath the pump station act as an source of contamination that affects groundwater.

- Monitoring well MW-02 was installed in an area where no contaminated materials were observed near the southern boundary of the site to serve as a background well.

- Monitoring well MW-03 was installed within the largest of the northern hot spots in an area where metals contaminated soils and wastes were excavated and removed to assess whether the contaminated materials removed from the hot spot area affected groundwater.

- Monitoring well MW-04 was installed in the location of the former spent acid pond to assess whether past activities at the acid pond had affected groundwater.

The borings were sampled continuously with split-spoon samplers for lithologic logging. The monitoring wells are constructed of 4-inch polyvinyl chloride (PVC) riser pipe equipped with 10-foot 0.010-inch (10 slot) PVC well screens. The monitoring well screens intersected the water table at the time of drilling with about 2 feet of the 10-foot well screen in the unsaturated zone. Monitoring well construction details are summarized in Table 1. Lithologic logs and field monitoring well completion reports for the monitoring wells are included as Appendix B.

The drilling program encountered the following two challenges when installing and developing the monitoring wells

- First, the site conditions were very muddy as a result of heavy winter rainfall, and several drill rigs became mired in the mud. The access difficulties delayed the development of well MW-03 until several months after the well was installed; accordingly, well MW-03 could not be sampled during the first sampling event in April 2002.

- Second, well MW-04 was screened from 5.5 to 15.5 feet below ground surface (bgs) to intersect a water table that was encountered at approximately 7.5 bgs during drilling. When the drillers returned to site to develop the well approximately 1 month after the well was installed and at other times thereafter, the well was dry. The reason for the drop in water level between when the well was installed and all other times the well was visited is not known. There is no lithologic interval that suggests that the well penetrated a basal confining unit that may have created a perched zone. Seasonal water level changes in the other wells did not approach the observed 8-foot drop in water level in well MW-04. The Navy intends to properly abandon monitoring well MW-04 and install a deeper replacement well in the same location during the RI planned for the site.

Wells MW-01 and MW-02 were developed using a surge block and pump technique on February 1, 2003. Monitoring wells MW-03 and MW-04 could not be developed at this time because of access difficulties and lack of water in well MW-04. Monitoring well MW-03 was developed using a surge block and pump technique on May 22, 2003. Monitoring well MW-04 was not developed because there was no water in the well from February through May. Monitoring well development forms that document the well development are included as Appendix C.

The horizontal and vertical coordinates of the wells were established by surveying by Hunter Surveying Inc. of Orangeville, California, on July 10, 2003. Hunter Surveying Inc. is licensed as a land surveyor by the State of California.

3.0 MONITORING WELL SAMPLING

Monitoring well sampling and analysis was conducted in accordance with the SAP, which was developed in consultation with and approved by the regulatory agencies (Tetra Tech 2002). The SAP specified that the Site 31 monitoring wells were to be sampled for metals, semivolatile organic compound (SVOC), total suspended solids (TSS), and total dissolved solids (TDS) only, unless volatile organic compounds (VOC), pesticides, polychlorinated biphenyls (PCB), or chlorinated herbicides were discovered in site soils at concentrations that may affect groundwater (Tetra Tech 2002). The supplemental soil sampling analytical data indicated that soils in isolated areas of Site 31 were contaminated with low concentrations of pesticides, PCBs, and chlorinated herbicides, but that VOCs were detected only at trace concentrations (up to 8 micrograms per kilogram in a small proportion of the soil samples) that could not act as source areas that would affect groundwater quality (Appendix A). Accordingly, groundwater samples were analyzed for metals, SVOCs, pesticides, PCBs, chlorinated herbicides, TSS, and TDS, but were not analyzed for VOCs.

The primary reason that soils and waste material were removed from Site 31 during the TCRA was that mercury contamination in the wastes and soils at the site posed an unacceptable risk to ecological receptors. Because mercury was present at elevated concentrations (up to 113 milligrams per kilogram [mg/kg]) in surface soils and because the basin plan criterion for mercury in surface water was lower than the reporting limit for standard analytical techniques for

metals (RWQCB 1995), groundwater samples were analyzed for mercury using both the contract laboratory program method (with a reporting limit of 0.2 micrograms per liter [µg/L]) and a low-level technique for mercury (Method 1631E, with reporting limit of 0.001 µg/L). The Navy used ultra-clean sampling techniques described in U.S. Environmental Protection Agency (EPA) Method 1669 to collect samples for low-level mercury analysis, as required by EPA analytical Method 1631.

The SAP specified that the monitoring wells were to be sampled using low flow-rate sampling techniques that employed a peristaltic pump to collect samples. Peristaltic pumps are incapable of pumping water more than 33.9 feet vertically because they can only exert 1 atmosphere of pressure. Depth to groundwater in wells MW-01 and MW-02 exceeded 45 feet and precluded use of a peristaltic pump to sample these wells. To overcome this limitation, the Navy installed dedicated bladder pumps in each well and used the bladder pumps to collect the samples using low flow-rate techniques. The bladder pumps were QED Model P1150 pumps constructed of Teflon with Teflon-lined polyethylene tubing. The pumps were factory cleaned, soaked overnight in a nitric acid solution, and thoroughly rinsed and purged with deionized water before the pumps were installed in the wells to accommodate the ultra-clean sampling techniques for mercury mentioned previously.

The SAP also specified that the wells were to be sampled during both the wet and dry seasons to assess seasonal variation in water quality. Monitoring wells at Site 31 were sampled on three occasions: April 22, May 22, and July 10, 2003. Samples collected in April and May 2002 were collected during and just after the wet season. Dry season samples were collected during July 2003. Two sets of wet season samples were collected to correct a field error. Although field sampling technicians used low flow-rate sampling techniques specified in the SAP to collect samples from wells MW-01 and MW-02, they filtered the samples in the field. Because groundwater samples collected using low-flow rate techniques should not be filtered, these samples are not considered representative of site conditions and the Navy collected unfiltered samples from the same wells in May 2003.

4.0 ANALYTICAL RESULTS FOR GROUNDWATER

Analytical results for Site 31 groundwater are summarized in Tables 2 and 3; analytical summary sheets reported by the laboratory that show analytical results and detection limits are included as Appendix D. A quality control summary report (QCSR) that evaluates the analytical data quality is included as Appendix E. The QCSR noted that the data are of high overall quality and are suitable for site characterization and risk assessment. Some atrazine results for QC samples were rejected, but atrazine was not detected in any of the site monitoring well samples.

Table 2 presents the results for the filtered and unfiltered wet season samples collected from wells MW-01 and MW-02. The data presented in Table 2 indicate that filtering the samples did not cause appreciable differences in metals concentrations, except for aluminum. Aluminum has very low aqueous solubility and is typically associated almost exclusively with the particulate phase of groundwater samples. Filtering to remove the particulate phase removes essentially all of the aluminum, as shown in Table 2.

Analytical results for the wet and dry season samples that were collected using low flow-rate techniques are presented in Table 3. The Navy considers these samples representative of groundwater conditions at Site 31. The Navy and regulatory agencies have not agreed on appropriate criteria for groundwater at Site 31, but EPA Region 9 tap water preliminary remediation goals (PRG) (EPA 2003a) have been included in Table 3 to serve as a benchmark to evaluate human health concerns, and national recommended water quality criteria (NRWQC) for priority toxic pollutants (EPA 2002) have been included as a benchmark to evaluate potential risks to aquatic receptors. Site concentrations are also shown in comparison with maximum contaminant levels (MCL) for drinking water sources because groundwater is a potential source of drinking water (EPA 2003b).

Analytical results presented in Table 3 indicate that arsenic concentrations in well MW-03 in the northern part of the site are significantly higher than the tap water PRG, NRWQC, and MCL. Although soils in the vicinity of the northern hot spot excavations exhibited elevated arsenic concentrations (up to 287 mg/kg, see Figure 7 [Tetra Tech 2001]), arsenic at the site did not pose an unacceptable risk to ecological receptors, and the TCRA removed soils in the northern hot spots to address wastes contaminated by lead, selenium, and mercury but not to address contamination by arsenic (Tetra Tech 2001).

Mercury concentrations in well MW-03 exceeded the basin plan criterion for nickel of 0.025 micrograms per liter (µg/L) (RWQCB 1995), and selenium concentrations in wells MW-01 and MW-03 exceeded the NWRQC criterion of 5 µg/L. The concentrations of mercury and selenium exceeded the referenced criteria by factors of 2.5 to 3.8 rather than by more than an order of magnitude as in the case of arsenic. Concentrations of other metals in Site 31 wells did not exceed tap water PRGs, MCLs, or NRWQCs.

The wells were also tested for pesticides, herbicides, PCBs, and SVOCs. The herbicide dalapon was the only organic contaminant detected in groundwater at Site 31. Dalapon concentrations were significantly lower than the tap water PRG and MCL; no NRWQC is available for dalapon.

TDS results indicate that the groundwater at Site 31 contains concentrations below 3,000 mg/L and would be considered potentially suitable for municipal or domestic water supply based on TDS criteria in State Water Resources Control Board (SWRCB) Resolution No. 88-63 (SWRCB 1988). CCWD supplies residents in the vicinity of Site 31 with drinking water derived from surface water sources in the Sacramento River Delta. There is no known current use of local groundwater for drinking water supply.

5.0 SITE 31 HYDROGEOLOGY

Lithologic data presented on well logs included in Appendix B show that the subsurface lithology at the southern part of the site consists of 22 to 25 feet of sandy and clayey silt that overlies a medium- to coarse-grained sand or silty sand aquifer that is at least 30 feet thick. Wells MW-01 and MW-02 do not penetrate the entire thickness of the aquifer. Subsurface lithology at the northern part of the site consists of a mixed unit containing clayey sand, gravel,

silty gravel, and silt, which is approximately 22 feet thick at MW-03. The mixed unit overlies a 6-foot thick, fine sand aquifer at MW-03.

Water levels at Site 31 were measured in the three wells that contained water on May 26 and July 10, 2003 (Table 4). The water levels measured on May 26 represent the end of the rainy season, which was unusually long in 2003. The July 10 measurements represent dry season water levels. Water elevations of 3.11 to 3.75 feet above mean sea level were observed in the three wells during the wet and dry seasons of 2003. The suggestion that a perched zone is present in the northern part of the site (Navy 2003) is not supported by site lithologic data or by site water levels.

The water levels show that groundwater flow direction varied between the two occasions when groundwater elevations were measured. The May 26, 2003, measurements show that groundwater flow was directed toward the southwest at the end of the wet season in 2003 (Figure 2). The July 10, 2003, measurements show that groundwater flow was directed east-northeast in the early part of the dry season in 2003 (Figure 3). Hydraulic gradients at Site 31 are low, ranging from 1.5×10^{-4} July 10, 2003, to 5.2×10^{-4} on May 26, 2003. The observed reversal in estimated flow directions is based on a very limited group of measurements, and the July measurements in particular are for a very flat water table; groundwater elevations changed by less than one tenth of a foot over a lateral distance of more than 500 feet. Very small changes in water elevation in a flat water table can cause apparent flow reversals, which may appear significant, yet do not represent major changes in groundwater flow.

Seepage velocity, the average rate at which groundwater moves between two points, was calculated using the following equation (Fetter 1994):

$$\text{seepage velocity} = K i / \theta_e$$

where:

K= hydraulic conductivity (centimeter per second [cm/sec])

i = hydraulic gradient (dimensionless)

θ_e = effective porosity of the material (dimensionless)

Site-specific hydraulic conductivity information is not available for the Site 31 wells. Freeze and Cherry (1979) report typical hydraulic conductivity of 1×10^{-3} cm/sec for silty sand, and de Marsily (1986) reports an effective porosity of 0.28 for silty sand. Using hydraulic gradients of 1.5×10^{-4} on July 10, 2003, to 5.5×10^{-4} on May 26, 2003, estimated groundwater flow velocities at Site 31 range from 17 to 62 centimeters per year (0.55 to 2.0 feet per year).

6.0 RECOMMENDATIONS

The results of the supplemental groundwater sampling investigation described in this document suggest that the Navy should consider the following recommendations to further investigate groundwater contamination at Site 31 in the context of a remedial investigation:

1. Well MW-04 should be properly abandoned, and a deeper replacement well should be installed in the same location. Soil samples have been collected from 9.5 to 10.0 feet bgs and from 11.0 to 11.5 feet bgs at this location. When a deeper well is installed at the same location, a soil sample should be collected from native soils beneath the base of the coarse gravel layer, which may represent the bottom of the spent acid pond. The bottom of the gravel interval occurs at 10 feet bgs in well MW-04.

2. The primary contaminants of concern at Site 31 are metals. Extensive soil sampling and the supplemental groundwater sampling described in this document indicate that organic contaminants are not a significant concern in groundwater or soils. Future sampling at Site 31 should focus on metals; further characterization of groundwater contamination by organic compounds is unnecessary.

3. The groundwater flow regime at Site 31 should be better characterized by measuring groundwater elevation at regular intervals to allow an assessment of overall groundwater flow directions and hydraulic gradients and an evaluation of the persistence of the apparent flow reversal observed between May 26 and July 10, 2003.

4. Arsenic concentrations in surface soil in the northern part of the site should be further investigated to attempt to identify a source for arsenic detected in groundwater at MW-03.

5. Arsenic concentrations in well MW-03 exceed both the tap water PRG and MCL for arsenic by several orders of magnitude. Arsenic concentrations in wells MW-01 and MW-02 are between the PRG and MCL for arsenic. The Navy should consider further delineation of arsenic contamination in groundwater at the site.

7.0 REFERENCES

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FIGURES

N

75 0 75 150

Feet

Tetra Tech EM Inc.

LEGEND:

MONITORING WELL

FORMER BUILDINGS SHOWN ON
1967 AND 1974 AERIAL PHOTOGRAPHS

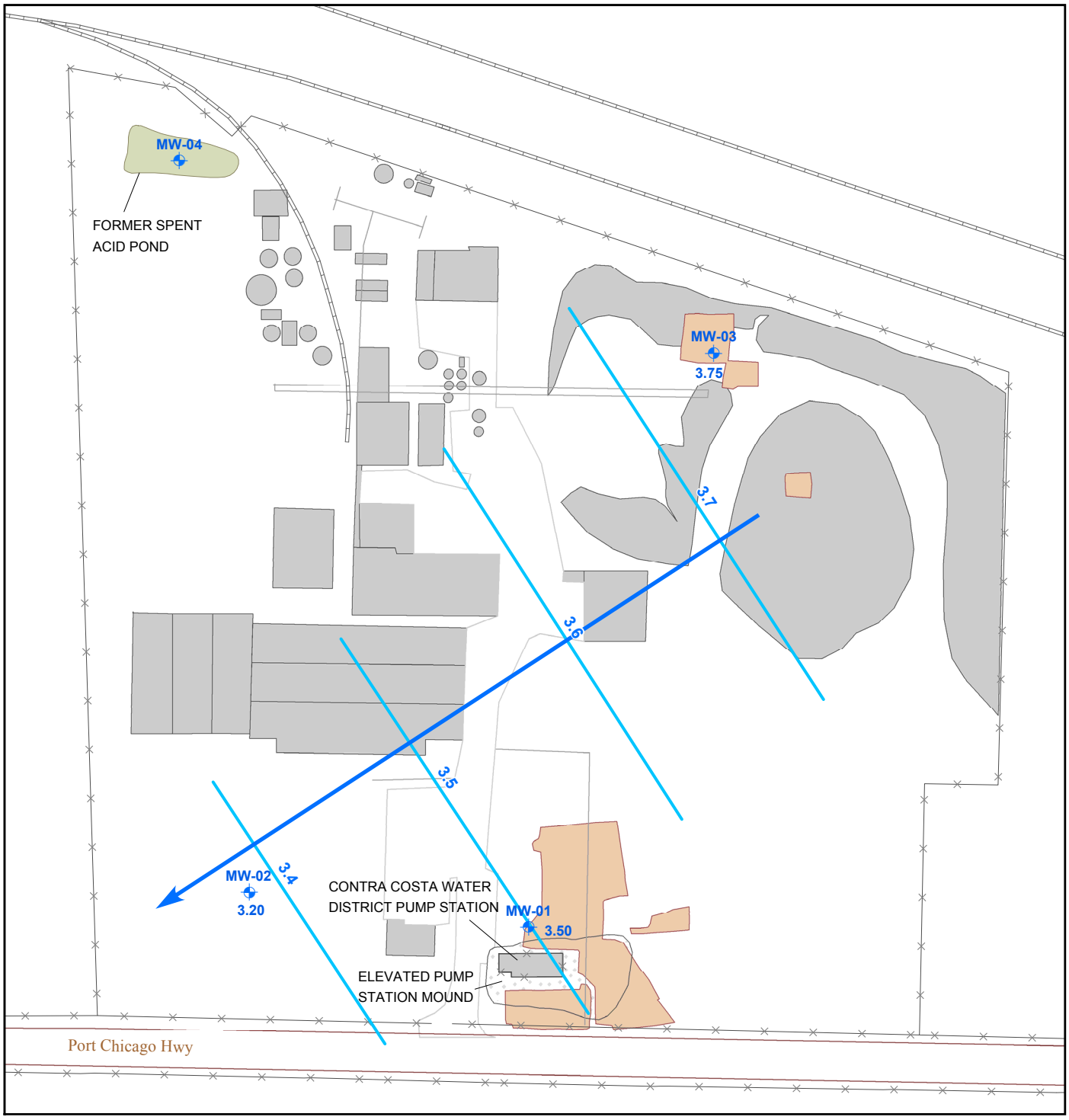
TCRA EXCAVATIONS

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 1

SITE 31
MONITORING WELL LOCATIONS

2003-09-16 v:\concord\projects\aecru\aoc1\gwsum2003\basemap1.mxd TtEMI-SF Aleksandr Zhuk



LEGEND:

- MW-01 / 3.50 — MONITORING WELL WITH ID AND GROUNDWATER ELEVATION (feet MSL)
- GROUNDWATER ELEVATION CONTOUR (feet MSL)
- GROUNDWATER FLOW DIRECTION
- FORMER SITE FEATURES SHOWN ON 1967 AND 1974 AERIAL PHOTOGRAPHS
- TCRA EXCAVATIONS

N

75 0 75 150
Feet

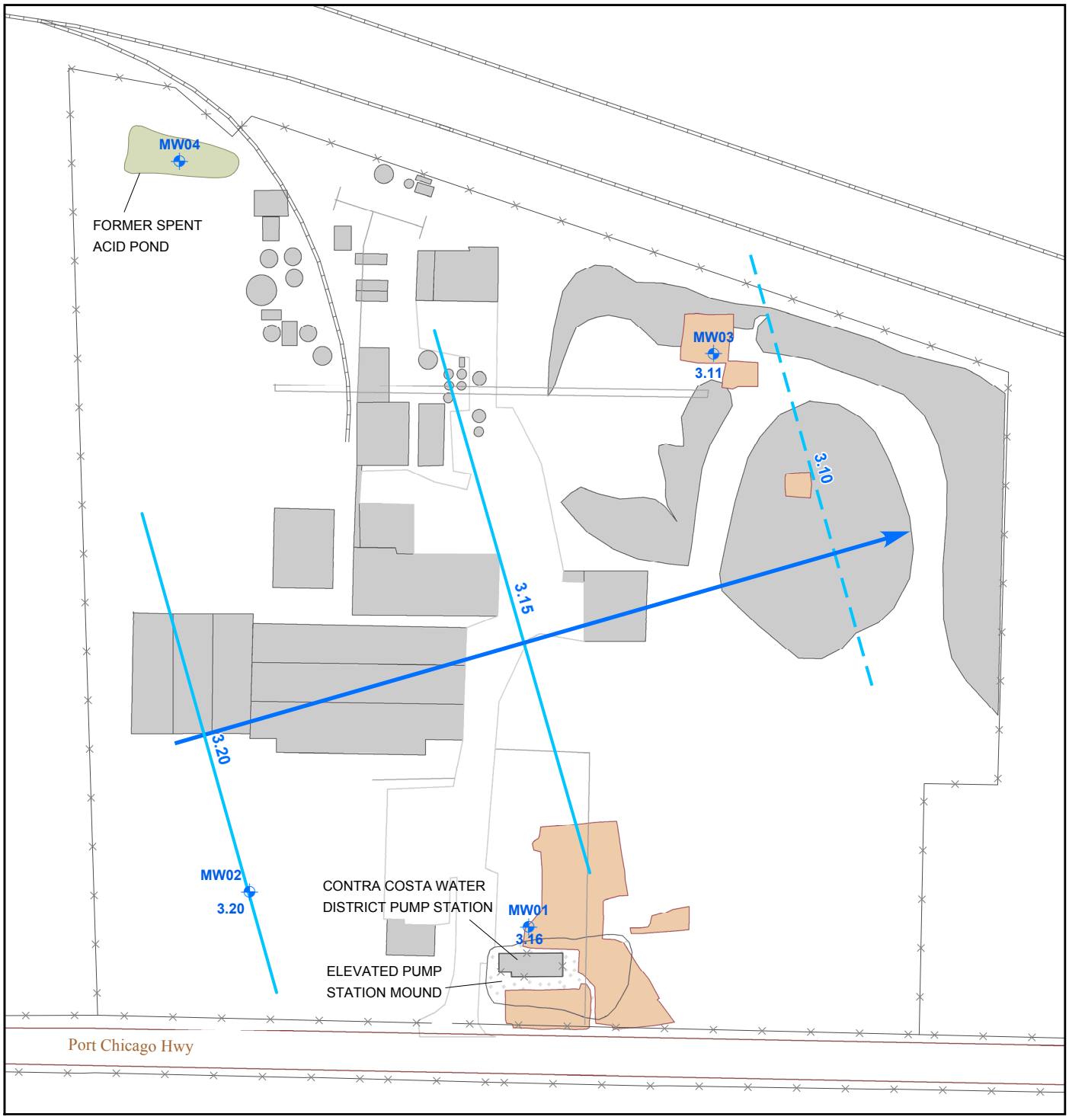
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 2

SITE 31
GROUNDWATER POTENTIOMETRIC SURFACE, MAY 26, 2003

2003-09-16 V:\Concord\Projects\AECRU\AOC1\GWsum2003\GW_May26-2003.mxd TtEMI-SF Aleksandr Zhuk



LEGEND:

- MW-01 / 3.16 — MONITORING WELL WITH ID AND GROUNDWATER ELEVATION (feet MSL)
- GROUNDWATER ELEVATION CONTOUR (feet MSL) (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- FORMER SITE FEATURES SHOWN ON 1967 AND 1974 AERIAL PHOTOGRAPHS
- TCRA EXCAVATIONS

N

75 0 75 150
Feet

Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 3

SITE 31
GROUNDWATER POTENTIOMETRIC SURFACE, JULY 10, 2003

2003-09-17 V:\Concord\Projects\AECRU\AOC1\GWsum2003\GW_Jul10-2003.mxd TtEMI-SF Aleksandr Zhuk

TABLES

TABLE 1: SITE 31 MONITORING WELL CONSTRUCTION DETAILS

Site 31 (Area of Concern 1), Naval Weapons Station Seal Beach, Detachment Concord

Monitoring Well	Northing	Easting	TOC	Diameter	Screen Length (feet)	Screen Interval (feet bgs)	Screen Interval (feet MSL)
MW-01	564713.5	1573160.0	48.47	4 inches	10	41 to 51	7.47 to -2.53
MW-02	564749.2	1572873.7	50.46	4 inches	10	42 to 52	8.46 to -1.54
MW-03	565300.4	1573349.6	25.79	4 inches	10	19 to 29	6.79 to -3.21
MW-04	565497.6	1572801.8	28.28	4 inches	10	5.5 to 15.5	22.78 to 12.78

Notes:

Horizontal Datum: NAD83 Horizontal Feet Coordinates, CCS83 Zone 3 (Epoch Date: 1997-30), based on GPS-RTK observations established from NGS Control Station 941 5144 J Tidal (PID AE7867).

Vertical Datum: NGVD29 Vertical Feet Elevations based on digital level loops, established from NGS Benchmark L-191 (PID JS1850), elev = 9.50 feet.

bgs Below ground surface

MSL Feet above mean sea level

TOC Top of casing elevation (feet above mean sea level)

TABLE 2: ANALYTICAL RESULTS FOR FILTERED AND UNFILTERED SAMPLES FROM WELLS MW-01 AND MW-02

Site 31 (Area of Concern 1), Naval Weapons Station Seal Beach, Detachment Concord

Inorganics (µg/L)	MW-01		MW-02	
	4/22/2003	5/26/2003	4/22/2003	5/26/2003
	Filtered	Total	Filtered	Total
Aluminum	--	80.3	--	74.5
Antimony	3.9	--	--	--
Arsenic	--	--	5.4	--
Barium	73	77.8	97.8	103
Beryllium	--	--	--	--
Cadmium	--	--	--	--
Calcium	204,000	207,000	269,000	271,000
Chromium	18.8	19.3	18.4	18.8
Cobalt	--	--	--	--
Copper	1.1	--	1.2	--
Iron	--	--	--	--
Lead	--	--	--	--
Magnesium	107,000	105,000	248,000	244,000
Manganese	--	--	12.2	--
Mercury	--	--	--	--
Mercury (method 1631)	--	--	--	--
Molybdenum	--	--	--	--
Nickel	3	--	3.1	2.9
Potassium	7,470	7,050	12,100	11,900
Selenium	18.9	19.1	--	2.9
Silver	--	--	--	--
Sodium	149,000	135,000	247,000	176,000
Thallium	--	--	--	--
Vanadium	7.8	7.8	8.2	8.5
Zinc	--	--	--	--
TDS	2,000,000	1,500,000	2,700,000	3,100,000
TSS	2,000	--	--	4,000

Notes:

All concentrations in micrograms per liter (µg/L)

TDS Total dissolved solids

TSS Total suspended solids

-- Not detected. Detection limits for each sample are listed on analytical data summary sheets in Appendix D.

TABLE 3: ANALYTICAL RESULTS FOR SITE 31 GROUNDWATER

Site 31 (Area of Concern 1), Naval Weapons Station Seal Beach, Detachment Concord

	MW-01		MW-02		MW-03		MW-3 DUP	Region 9 Tap Water	NRWQC Freshwater	USEPA
	5/26/2003	7/11/2003	5/26/2003	7/11/2003	5/26/2003	7/11/2003	7/11/2003	PRG	CCC	MCL
Inorganics (µg/L)										
Aluminum	80.3	--	74.5	--	102	--	--	36,499		
Antimony	--	--	--	--	--	--	--	14.6		6
Arsenic	--	**5.1**	--	**7.6**	**1,230**	**1,170**	**1,150**	0.045	150	10
Barium	77.8	74.7	103	108	110	100	95.1	2,555		2,000
Beryllium	--	--	--	--	--	--	--	73		4
Cadmium	--	--	--	--	--	--	--	18.2	0.25	5
Calcium	207,000	201,000	271,000	280,000	157,000	162,000	159,000			
Chromium	19.3	20.2	18.8	19.2	--	--	--	54,747	74	100
Cobalt	--	--	--	--	--	--	--	730		
Copper	--	--	--	1.8	5.4	--	4.5	1,460	9	
Iron	--	--	--	--	74.8	--	--	10,950		
Lead	--	--	--	--	--	--	--	0.0036	2.5	15
Magnesium	105,000	102,000	244,000	252,000	218,000	219,000	215,000	--		
Manganese	--	--	--	3.4	238	254	252	876		
Mercury	--	--	--	--	--	--	--	10.9	0.025*	2
Mercury (method 1631)	--	--	--	--	**0.0683**	**0.0622**	**0.0623**	10.9	0.025*	2
Molybdenum	--	--	--	--	--	--	--	182		
Nickel	--	--	2.9	3.8	19.2	--	19.4	730	52	
Potassium	7,050	6,850	11,900	8,090	16,500	16,100	15,700	--		
Selenium	**19.1**	--	2.9	--	**18.1**	--	--	182	5	50
Silver	--	--	--	--	--	--	--	182		
Sodium	135,000	150,000	176,000	240,000	127,000	141,000	133,000			

TABLE 3: ANALYTICAL RESULTS FOR SITE 31 GROUNDWATER (Continued)

Naval Weapons Station Seal Beach, Detachment Concord

	MW-01		MW-02		MW-03		MW-3 DUP	Region 9 Tap Water	NRWQC Freshwater	USEPA
	5/26/2003	7/11/2003	5/26/2003	7/11/2003	5/26/2003	7/11/2003	7/11/2003	PRG	CCC	MCL
Inorganics (µg/L) (cont'd)										
Thallium	--	--	--	--	--	--	--	2.41		0.5
Vanadium	7.8	7.8	8.5	8.4	162	152	149	255		
Zinc	--	--	--	--	--	--	--	10,950	120	
TDS	1,500,000	1,600,000	3,100,000	2,600,000	1,900,000	1,900,000	2,000,000			
TSS	--	8,000	4,000	8,000	3,000	12,000	16,000			
Herbicides (µg/L)										
Dalapon		0.39			3	7.1	4.7	200		200
No other herbicides detected	--	--	--	--	--	--	--			
PCBs (µg/L)										
None detected	--	--	--	--	--	--	--			
Pesticides (µg/L)										
None detected	--	--	--	--	--	--	--			
SVOCs (µg/L)										
None detected	--	--	--	--	--	--	--			

Notes:

Concentrations shown in bold font exceed MCL, NRWQC CCC, and/or PRG.

-- Not detected. Detection limits for each sample are listed on analytical data summary sheets in Appendix D.

* Basin Plan criterion; The Basin Plan water quality objective for mercury in surface waters with salinities less than 5 parts per thousand is 0.025 µg/L. Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin criteria taken from: http://www.swrcb.ca.gov/rwqcb2/Basin%20Plan/chap_3_bp.pdf.

µg/L Micrograms per liter

CCC Criteria continuous concentrations

MCL Maximum contaminant level (Criteria taken from: http://www.epa.gov/safewater/mcl.html#mcls)

NRWQC National Recommended Water Quality Criteria for Priority Pollutants (Criteria taken from: http://www.epa.gov/waterscience/pc/revcom.pdf)

PRG Preliminary Remediation Goal (Criteria taken from: http://www.epa.gov/region09/waste/sfund/prg/index.htm)

TABLE 4: SITE 31 GROUNDWATER ELEVATIONS

Site 31 (Area of Concern 1), Naval Weapons Station Seal Beach, Detachment Concord

Monitoring Well	Top of Casing Elevation (feet msl)	Depth to Water 5/26/2003 (feet bgs)	Groundwater Elevation 5/26/2003 (feet msl)	Depth to Water 7/10/2003 (feet bgs)	Groundwater Elevation 7/10/2003 (feet msl)
MW-01	48.47	44.97	3.50	45.31	3.16
MW-02	50.46	47.08	3.38	47.26	3.20
MW-03	25.79	22.04	3.75	22.68	3.11
MW-04	28.28	--	--	--	--

Notes:

Groundwater was not present in well MW-04 on May 26 or July 10, 2003

bgs Below ground surface

msl mean sea level

APPENDIX A
SUPPLEMENTAL SOIL SAMPLING SUMMARY REPORT

AECRU CONTRACT NUMBER N68711-00-D-0005
Delivery Order 001

Site 31 (Area of Concern 1)

Supplemental Soil Sampling Summary Report

Naval Weapons Station Seal Beach Detachment Concord

September 26, 2003

Prepared for

DEPARTMENT OF THE NAVY
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CONTENTS

Attachments

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

4-4'-DDT	Dichlorodiphenyltrichloroethane
µg/kg	micrograms per kilogram
AOC 1	Area of concern 1
bgs	Below ground surface
CLP	Contract laboratory program
EPA	U.S. Environmental Protection Agency
HSA	Hollow-stem augers
mg/kg	milligrams per kilogram
Navy	U.S. Department of the Navy
N-P-K	nitrogen-phosphorus-potassium
NWSSBD	Naval Weapons Station Seal Beach Detachment
PA	Preliminary assessment
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PID	Photoionization detector
PRG	USEPA Region 9 Preliminary Remediation Goal
PVC	polyvinyl chloride
RWQCB	Regional Water Quality Control Board
RI	Remedial investigation
SAP	Sampling and Aanalysis Pplan
SVOC	Semi-volatile organic compound
TCRA	Time-critical removal action
Tetra Tech	Tetra Tech EM Inc.
VOC	Volatile organic compound

1.0 INTRODUCTION

Area of concern 1 (AOC 1) (Site 31) is an undeveloped 17.2-acre site on Port Chicago Highway, about one half mile east of the eastern entrance to Naval Weapons Station Seal Beach Detachment (NWSSBD) Concord. The site is the former location of a nitrogen-phosphorus-potassium (N-P-K) fertilizer plant that operated from 1955 to 1976 by Union Oil Company of California. Past industrial activities at the site have resulted in contamination at AOC 1. The U.S. Department of the Navy (Navy) purchased the site in 1983, razed the buildings in 1986, and the site is currently vacant. Site features are illustrated in Figure A-1. The Navy conducted a preliminary assessment (PA) at the site in two phases to assess contamination at AOC 1 (Tetra Tech EM Inc. [Tetra Tech] 2001). Food-chain modeling conducted during the PA established that waste materials present at or near the surface at AOC 1 pose an unacceptable risk to ecological receptors. To address these risks, the Navy conducted a time-critical removal action (TCRA) at AOC 1 during the summer and fall of 2002 to remove the most contaminated soils and wastes from the site. The TCRA is documented in a March 10, 2003, report entitled, "Area of Concern 1 (Site 31) Draft Time-Critical Removal Action Summary Report" (Tetra Tech 2003).

In addition to the TCRA, the Navy and regulatory agencies agreed that supplemental soil and groundwater sampling was required to evaluate potential source areas at the site that were not investigated during the PA. The purpose of the supplemental soil and groundwater sampling at AOC 1 was to obtain additional data about other potential sources not addressed by the TCRA to guide further investigation at AOC 1 in the context of a remedial investigation (RI).

The additional sampling to investigate other potential sources was described in a sampling and analysis plan (SAP) (Tetra Tech 2002). The SAP described four types of sampling at AOC 1: delineation sampling, confirmation sampling, supplemental sampling, and optional sampling. The delineation and confirmation sampling results were reported in the draft TCRA summary report (Tetra Tech 2003). This letter report provides analytical results for the supplemental and optional soil sampling that was conducted at AOC 1 and also describes monitoring well installation. At the time the SAP was written, it was unclear whether the optional sampling would be performed; the Navy subsequently decided to conduct all of the sampling described as optional in the SAP. For brevity, the supplemental and optional sampling described in the SAP are hereafter referred to together as "supplemental sampling."

Muddy conditions at AOC 1 during winter 2003 have restricted site access by heavy machinery and prevented development of the monitoring wells. As a result, groundwater samples have not yet been collected from the site and are not reported in this document. Groundwater samples will be collected as soon as the site dries enough to allow development of the monitoring wells, and results will be reported in a separate letter report.

This document consists of five sections: this introduction (Section 1.0), a description of field activities conducted for the supplemental sampling described in the SAP (Section 2.0), a summary of analytical results for soils (Section 3.0), a description of monitoring well installation

(Section 4.0), and a preliminary analysis of areas that may require further investigation as part of the RI (Section 5.0). References, figures and tables follow the text. A quality control summary report, soil boring lithologic logs, chain-of-custody forms, monitoring well construction logs, and responses to regulatory agency comments on the draft document dated March 21, 2003 are included as Attachments A-1 through A-5.

The data provided in this document are intended to provide a preliminary basis for developing a scope of work for the RI but do not serve as the basis for the entire scope of work for the RI. Instead, this document presents analytical results for soils from potential source areas and identifies whether these potential sources merit further investigation as part of the RI.

2.0 SUPPLEMENTAL SOIL SAMPLING

The objective of the supplemental soil sampling at AOC 1 was to obtain additional data to evaluate whether potential sources identified by the Navy and the regulatory agencies during a series of Remedial Project Manager meetings merit further delineation as part of the RI. Figure A-2 shows the supplemental soil sampling locations; analytical results for all supplemental soil samples are presented as Tables A-1 and A-2. Attachment A-2 includes the soil boring logs, and Attachment A-3 includes chain-of-custody forms for soil samples.

Potential sources that were not sampled during the PA investigation were identified by reviewing historical aerial photographs, facility drawings, and topographic maps that identify the direction of surface water runoff. Potential source areas that were identified include a former laboratory, a former warehouse area, former process tanks east and west of the central roadway, the northern boundary of the site, and a concrete slab of unknown use (Figure A-2). In addition, the Navy advanced borings 100 feet west of PA sampling locations GB27, GB28, GB35, and GB43 to extend the sampling grid that covers the eastern half of the site and collected deeper samples from the spent acid pond area in response to regulatory agencies concerns that existing samples collected during the PA were not collected from deep enough intervals.

As described in the SAP (Tetra Tech 2002), this supplemental soil sampling effort included both discrete and composite samples, depending on the objective of the sample. The types of samples collected from each location are indicated on Table A-3. Samples were collected with direct push (Geoprobe) sampling methods, except the samples from the spent acid pond area, which were collected using hollow-stem augers (HSA) and split spoons while installing a monitoring well at that location. Composite samples were created by mixing equal portions of soil from similar depth intervals in a stainless steel mixing bowl, in accordance with the SAP (Tetra Tech 2002). The individual discrete samples that were combined to make up composite samples were biased to include potential contaminated intervals as indicated by waste, discoloration, or odors. If a soil boring included a waste interval, the waste interval was sampled. If no waste interval was observed, samples were collected at predetermined depths detailed in the SAP. In some cases, composite samples included borings where waste was encountered and borings where waste was absent. In these cases, the shallow interval from each boring was mixed together to create a shallow composite, the middle intervals were mixed together to create a middle composite, and

the deep intervals were mixed together to create a deep composite. The depth intervals reported for composite samples in Tables A-2 and A-3 included the shallowest and deepest depth of the individual samples combined to make up the composite sample. For example, the shallow sample from the east process tanks included one surface sample and a sample from the interval from 2 to 2.5 feet that contained ash material, so the sample interval for the shallow sample from the east process tanks is shown as 0 to 2.5 feet.

All of the volatile organic compound (VOC) samples were discrete samples, because VOCs are not suitable for composite sampling methods. All soil cores were scanned with a photoionization detector (PID) to assess the presence of VOCs as soon as the acetate sample sleeve from the direct push sampler was cut away. Because the PID did not indicate the presence of VOCs in any soil core, a single discrete EnCore sample was collected for VOC analysis from each sample core from the soil interval most likely to be contaminated based on discoloration or other visual or olfactory cues. For composite soil samples, the most discolored interval in any core was chosen as the location for a discrete VOC sample to represent the group of sample cores. The VOC samples from other cores that made up the composite sample were discarded. Absent soil staining or odors, a soil interval was randomly chosen. In this way, the potential for VOC volatilization from the composite samples was minimized.

Samples were analyzed using the following analytical methods, as described in the SAP (Tetra Tech 2002):

- Metals, VOCs, SVOCs, pesticides, and PCBs: contract laboratory program (CLP) low level methods
- Chlorinated herbicides: EPA method 8151A
- Fluoride: EPA Method 300.0
- pH: EPA Method 150.1

At the request of the California Regional Water Quality Control Board (RWQCB), discrete samples for each interval of each composite sample were also collected and sent to an RWQCB-contracted laboratory (Sequoia Analytical [Sequoia] in Petaluma, California) to allow the ability to analyze the individual discrete samples that were combined to make up each composite soil sample, if so directed by RWQCB. Of these discrete samples, only three samples from the former laboratory were analyzed, as discussed below.

Former laboratory: On December 10, 2002, soil borings were advanced from 0 to 6 feet below ground surface (bgs) at three locations in the former laboratory (designated LAB1, LAB2, and LAB3 on Figure A-2). At soil boring LAB1, black gravel (a potential waste material) was encountered from 0.04 to 1.4 feet bgs, and concrete fragments were encountered at 1.3 feet bgs. Soil samples were collected from depths of 1 to 1.5 feet bgs, 1.5 to 2 feet bgs, and 3 to 3.5 feet bgs. At soil borings LAB2 and LAB3, the black gravel was absent, and soil samples were

collected from depths of 0 to 0.5 foot bgs, 3 to 3.5 feet bgs, and 5.5 to 6 feet bgs. A composite sample, composed of equal volumes of soil from the shallow, middle, and deepest interval in each boring, was analyzed for semivolatile organic compounds (SVOC), pesticides and polychlorinated biphenyls (PCB), chlorinated herbicides, metals, fluoride, and pH. Discrete soil samples collected from the deeper two intervals of boring LAB1 were analyzed for VOCs.

After reviewing analytical results from the composite samples, RWQCB directed Sequoia to analyze the three discrete samples that made up the composite sample from the 1.5 to 3.5 feet bgs interval for mercury, and the sample from location LAB1 for arsenic and lead. Analytical data quality for these samples has not been assessed. Analytical results reported by Sequoia are as follows:

- LAB1 (1.5 to 2.0 feet bgs): mercury (8.6 mg/kg), arsenic (6.9 mg/kg), lead (39 mg/kg)
- LAB2 (3.0 to 3.5 feet bgs): mercury (0.023 mg/kg)
- LAB3: (3.0 to 3.5 feet bgs): mercury not detected

Former warehouse area: On December 10, 2002, soil borings were advanced from 0 to 6 feet bgs at four locations in the former warehouse area (designated WA1 through WA4 on Figure A-2). Soil samples were collected from depths of 0 to 0.5 foot bgs, 3 to 3.5 feet bgs, and 5.5 to 6 feet bgs in all four soil borings. A composite sample of all four borings for each depth interval was analyzed for SVOCs, pesticides and PCBs, chlorinated herbicides, metals, and fluoride. Discrete soil samples collected from the deeper two intervals of one randomly selected boring were analyzed for VOCs.

Former process tanks east of central roadway: On December 10, 2002, soil borings were advanced from 0 to 6 feet bgs at four locations in the former east process tanks (designated EPT1 through EPT4 on Figure A-2). At soil boring EPT1, a white material, possibly gypsum or ash, was present in the silt from approximately 0.5 to 1.0 foot bgs. At soil boring EPT2, ash-like material was encountered at 1.1 to 1.6 feet bgs. At soil boring EPT3, no staining or odor was observed, and samples were collected from 0 to 0.5 foot bgs, 3 to 3.5 feet bgs, and 5.5 to 6 feet bgs. At soil boring EPT4, gypsum material and fine gravel were observed. In each boring where waste was encountered, a sample of the waste, the soil immediately beneath it, and the soil 2 feet beneath the base of the waste were collected. A composite sample for the shallow, middle, and deep interval from each boring was analyzed for SVOCs, pesticides and PCBs, chlorinated herbicides, metals, and fluoride. In addition, a discrete sample from each interval of EPT4 was analyzed for VOCs.

Former process tanks west of central roadway: On December 11, 2002, soil borings were advanced at four locations in the former west process tanks (designated WPT1 through WPT4 on Figure A-2). Concrete was encountered at all locations. At WPT1, the soil boring was not able to pass through the concrete at 1 feet bgs. At WPT2, concrete was encountered at 2 feet bgs, but

the concrete was penetrated on December 12, 2002, and the boring was advanced from 0 to 6 feet bgs. Gypsum and fine gravel were encountered, and soil samples were collected from 1.5 to 2 feet bgs, 2 to 2.5 feet bgs, and 4 to 4.5 feet bgs. At WPT3 and WPT4, the soil borings were not able to pass through the concrete at 0.5-foot bgs. A composite sample from the shallow interval of all four borings (above the concrete) and discrete samples from the two deeper intervals of WPT2, the only boring to penetrate the concrete, were analyzed for VOCs, SVOCs, pesticides and PCBs, chlorinated herbicides, metals, and fluoride.

Northern boundary of the site: On December 11, 2002, the Navy combined soils from the 0 to 0.5 feet bgs depth interval at four locations along the northern boundary of the site (designated NB1 through NB4 on Figure A-2) to create a composite shallow soil sample. Because the sample from the northern boundary of the site was collected to assess the potential that surface runoff carried contaminated materials from the site, the sample was collected from the 0 to 0.5-foot interval only. Sample NB2 was located on the former railroad track, but no staining or odor was observed in any of the samples. One composite sample was analyzed for SVOCs, pesticides and PCBs, chlorinated herbicides, metals, and fluoride.

100 feet west of PA sampling locations GB28, GB35, GB36, and GB43: On December 10, 2002, soil borings were advanced from 0 to 6 feet bgs from locations approximately 100 feet west of sampling locations GB28, GB35, GB36, and GB43 (designated WG1 through WG4 on Figure A-2). A possible waste interval of silty gravel with angular fragments was detected in the interval from 0.5 to 1 foot bgs in boring WG3, and soil samples were collected from the possible waste interval, immediately beneath it (1 to 1.5 feet bgs) and 2 feet beneath it (3 to 3.5 feet bgs). No waste or other contamination was observed at locations WG1, WG2, and WG4, and samples were collected from 0 to 0.5 foot bgs, 3 to 3.5 feet bgs, and 5.5 to 6 feet bgs. Discrete samples from each interval of each boring were analyzed for VOCs, SVOCs, pesticides and PCBs, chlorinated herbicides, metals, and fluoride.

Concrete slab: At the concrete slab, four borings were advanced (one on each side of the slab), designated CS1 through CS4 on Figure A-2. The concrete slab is still present, so each boring was located about 1 foot from the edge of the slab in the soil, near the mid-point of the slab. The borings were advanced from 0 to 2 feet bgs. At soil boring CS1, a possible waste interval was encountered, and a sample was collected from 1.5 to 2 feet bgs. A discrete sample from this interval was analyzed for VOCs and moisture. At locations CS2 through CS4, a sample was collected from 0 to 0.5 foot bgs. A composite sample from all four borings was analyzed for metals, pesticides and PCBs, chlorinated herbicides, SVOCs, fluoride, and pH.

Additional soil boring through spent acid pond: At the spent acid pond, one boring (designated SAP on Figure A-2) was advanced to 20 feet bgs on January 9, 2003 using an HSA drill rig. The boring was logged continuously. Although no stained or discolored soil interval or clay liner that may correspond with the bottom of the acid pond was observed, tightly cemented, fine sand was observed in the interval from 8 to 10 feet bgs. Discrete samples were collected from 9 to 9.5 feet, 12 to 12.5 feet, and 15 to 15.5 feet bgs. These soil samples were analyzed for metals, VOCs, SVOCs, and pesticides and PCBs, and pH.

3.0 ANALYTICAL RESULTS

Analytical results for the supplemental soil samples are presented in Tables A-1 (VOCs) and A-2 (other analytes). Samples were analyzed using analytical methods described in the SAP (Tetra Tech 2002). A review of analytical data quality is included as Attachment A-1.

Results presented in the tables are consistent with results from the PA sampling. VOCs were detected in two of the 23 samples analyzed for VOCs (samples WPT2 and WG1) at low concentrations (Table A-1). Detected VOCs include carbon disulfide (4 micrograms per kilogram [µg/kg], estimated), 4-methyl-2-pentanone (8 µg/kg, estimated), xylenes (3 µg/kg, estimated), and the common laboratory contaminant methylene chloride (5 µg/kg).

With the exception of arsenic, metals concentrations in the potential source areas did not exceed U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRG) for industrial soils (industrial PRGs) (EPA 2003). Almost all of the arsenic concentrations exceeded the industrial PRG for the cancer endpoint (1.6 milligrams per kilogram [mg/kg]), but none of them exceeded the industrial PRG for the noncancer endpoint (260 mg./kg). Lead, selenium, and mercury were the main constituents of concern that motivated the TCRA that the Navy conducted from June through March 2003. Lead, selenium, and mercury concentrations in the supplemental samples were generally low, indicating that the potential source areas assessed by the supplemental sampling are not likely sources of the lead, selenium, and mercury addressed by the TCRA.

No SVOCs were detected in 25 of the 31 samples analyzed for SVOCs. The polycyclic aromatic hydrocarbon (PAH) benzo(a)pyrene was detected at concentrations above the industrial PRG at the northern boundary of the site and in the east process tank area. The PAHs benzo(a)anthracene and benzo(b)fluoranthene were detected at concentrations slightly above the industrial PRG in the east process tank area.

The compound dichlorodiphenyltrichloroethane (4,4'-DDT) was detected at low concentrations (up to 0.015 mg/kg) in about one-third of the samples. Concentrations of 4,4'-DDT were well below the industrial PRG of 7.02 mg/kg. Other pesticides, including aldrin, dieldrin, heptachlor epoxide, and methoxychlor, were detected at low concentrations (up to 0.055 mg/kg) in several other samples.
The herbicide dalapon was detected in about half of the samples at concentrations up to 0.16 mg/kg, well below the industrial PRG of 18,000 mg/kg. The PCB Aroclor 1248 was detected in five samples at concentrations up to 0.29 mg/kg, below the industrial PRG of 0.74 mg/kg.

Soils were tested for pH in samples collected from the spent acid pond and the concrete slab; pH in these areas ranged from moderately acidic to neutral (4.7 to 7.1).

Although some qualifiers were added to the data, a final review of the data set with respect to EPA data quality parameters indicated that the data are of high overall quality. Based on the overall assessment of the sampling program, quality assurance and quality control data, data review, and data validation results, the data obtained between June 2002 and January 2003 are of acceptable quality with respect to precision, accuracy, representativeness, completeness, and comparability (PARRC) parameters, as described in EPA (1997) guidance for quality assurance project plans. Except for three rejected acetone results, these data, therefore, are usable for risk assessment and site characterization. Supporting documentation and data are available on request, including cursory and full validation reports and the database that holds all sample results.

4.0 MONITORING WELL INSTALLATION

Gregg Drilling, Inc., of Signal Hill, California, installed four monitoring wells at AOC 1 in January 2003 in the manner described in the SAP (Tetra Tech 2002) under the direction of Tetra Tech's field geologist. Locations for the monitoring wells were agreed on with regulatory agencies during a remedial project manager's meeting on October 1, 2002, and were modified slightly based on subsequent discussions with RWQCB on October 2 and 3, 2002. Monitoring well locations are shown on Figure A-3.

The wells were installed with a HSA drill rig using 8-1/4-inch hollow stem augers. The borings were sampled continuously with split-spoon samplers for lithologic logging. Lithologic logs for the wells are included as Attachment A-4. The monitoring wells are constructed of 4-inch polyvinyl chloride (PVC) riser pipe equipped with 10-foot 0.010-inch (10 slot) PVC well screens. The monitoring well screens intersected the water table at the time of drilling with about 2 feet of the 10-foot well screen in the unsaturated zone.

Based on wells in remedial action subsite RASS (RASS) 4, immediately east of AOC 1, groundwater was expected at about 20 feet bgs. The two monitoring wells in the south part of the site (MW01 and MW02) encountered water at about 43 to 45 feet bgs. The wells in the north part of the site-encountered water at much more shallow depths (21 feet at MW03 and 6.5 feet at MW04). The difference in water levels between wells in the south part of the site and those 600 feet to the north and in RASS 4 is the result of a difference in surface elevation between the three locations.

During well drilling, the site conditions were very muddy due to rainfall, and site access was difficult. The original drill rig became mired in mud and was replaced with a track-mounted rig, which also became mired. A separate vehicle was required to extricate both rigs from the mud. As a result, well development was postponed until site conditions become dry enough to allow heavy equipment mobility near the wells.

The wells in the southern part of the site were developed using a surge block and pump technique on February 11, 2003. Monitoring well MW04 could not be developed on February 11 because the well was dry; the significance of this loss of water during the 1-month

period between when the well was drilled and when well development was first attempted is uncertain. The water level in well MW04 will be reassessed when the site is next visited. Monitoring well MW03 could not be developed on February 11 because of muddy conditions that limited access to the well. The Navy has considered developing the well manually with a surge block, but the bottom of the well is almost 30 feet bgs, and the formation around the well screen at MW03 contains a significant proportion of fine particles, which indicate that developing the well manually will be difficult and that a mechanical technique using a drill rig will produce better results. The Navy expects that the well will be developed during late March or early April of 2003.

5.0 RECOMMENDATIONS

The data provided in this document are intended to provide a basis for developing a scope of work for the RI, but do not serve as recommendations for the entire scope of work for the RI. This document presents analytical results for soils from potential source areas and identifies whether these potential sources merit further investigation as part of the RI.

Based on the analytical results presented in Tables A-1 and A-2, the Navy feels that most of the potential sources at AOC 1 that were investigated by the supplemental sampling described in this report do not require further delineation in the context of an RI. Based on these analytical results, the following specific recommendations are made for further investigation in the context of an RI:

- Widespread arsenic concentrations that exceed the industrial PRG for the noncancer endpoint (EPA 2003) are an issue that should be addressed by the RI.

- Further delineation of PAHs detected at the northern boundary of the site and near the east process tanks may be required to address potential human health concerns. The industrial PRGs, however, do not reflect actual human exposure at the site, and a sample that exceeded an industrial PRG does not necessarily correspond to a human health risk.

- Based on the detection of metals, SVOCs, herbicides, pesticides and PCBs in potential source areas, groundwater samples from the four new monitoring wells should be analyzed for these compounds. Groundwater samples will be collected as soon as conditions become dry enough to develop monitoring well MW03.

- Further assessment of ecological and human health risks is needed to evaluate whether contaminants at the site pose unacceptable risks to human or ecological receptors. Assessment of ecological and human health risks is an inherent part of a RI.

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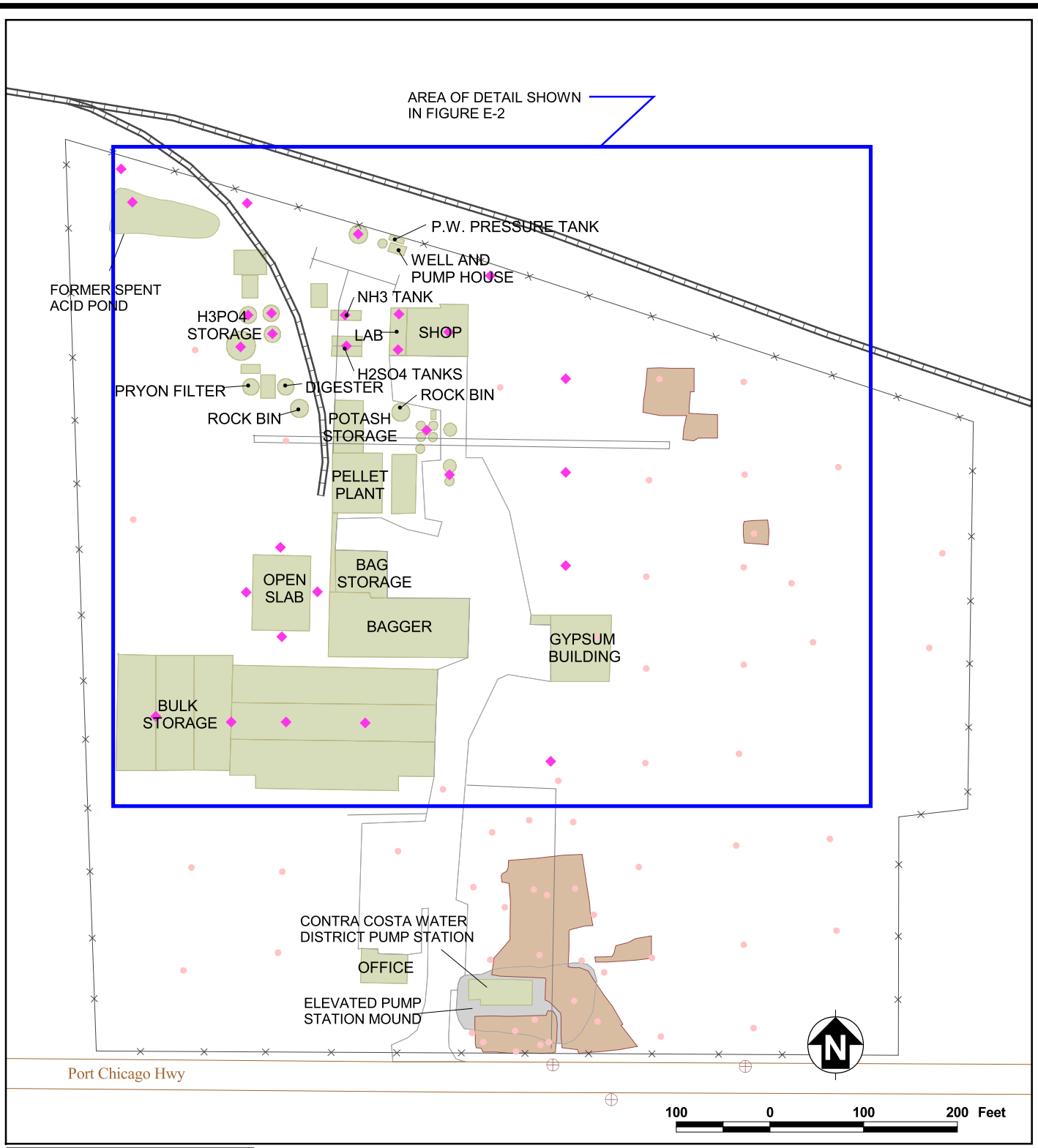
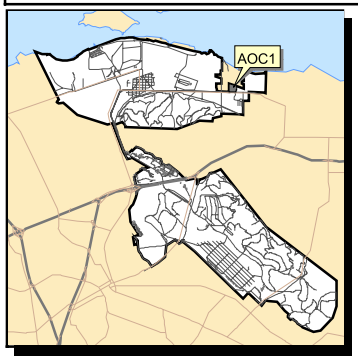
FIGURES





LEGEND:

- FORMER SITE FEATURES SHOWN ON 1974 AERIAL PHOTOGRAPH
- EXCAVATIONS
- SUPPLEMENTAL SAMPLE LOCATION
- EXISTING SAMPLE LOCATION
- TELEPHONE POLES

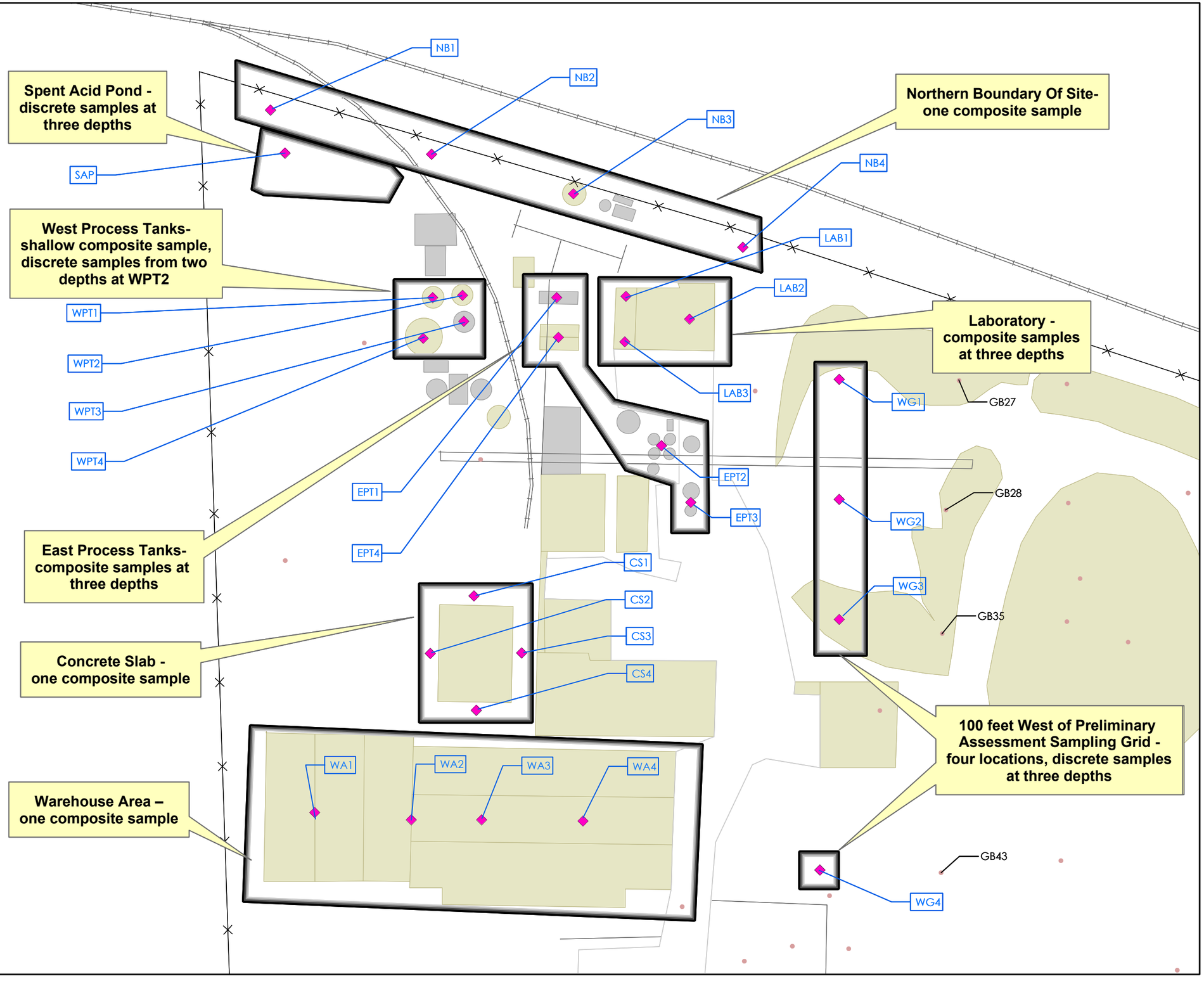
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE A-1

AREA OF CONCERN 1
SITE FEATURES MAP

03-21-2003 v:\concord\projects\aecru\aoc1\aoc1_map.apr TtEMI-SF kevin.ernst



LEGEND:

- FEATURES SHOWN ONLY IN 1967 MAP
- FEATURES SHOWN IN 1974 AERIAL PHOTOGRAPH
- EXISTING SAMPLE LOCATION
- SUPPLEMENTAL SAMPLE LOCATION
- LAB1 SAMPLE LOCATION POINT ID

Note: Concrete in west process tanks area caused Geoprobe refusal at three of four locations, discrete samples taken beneath concrete at location WPT2

N

100 0 100
Feet

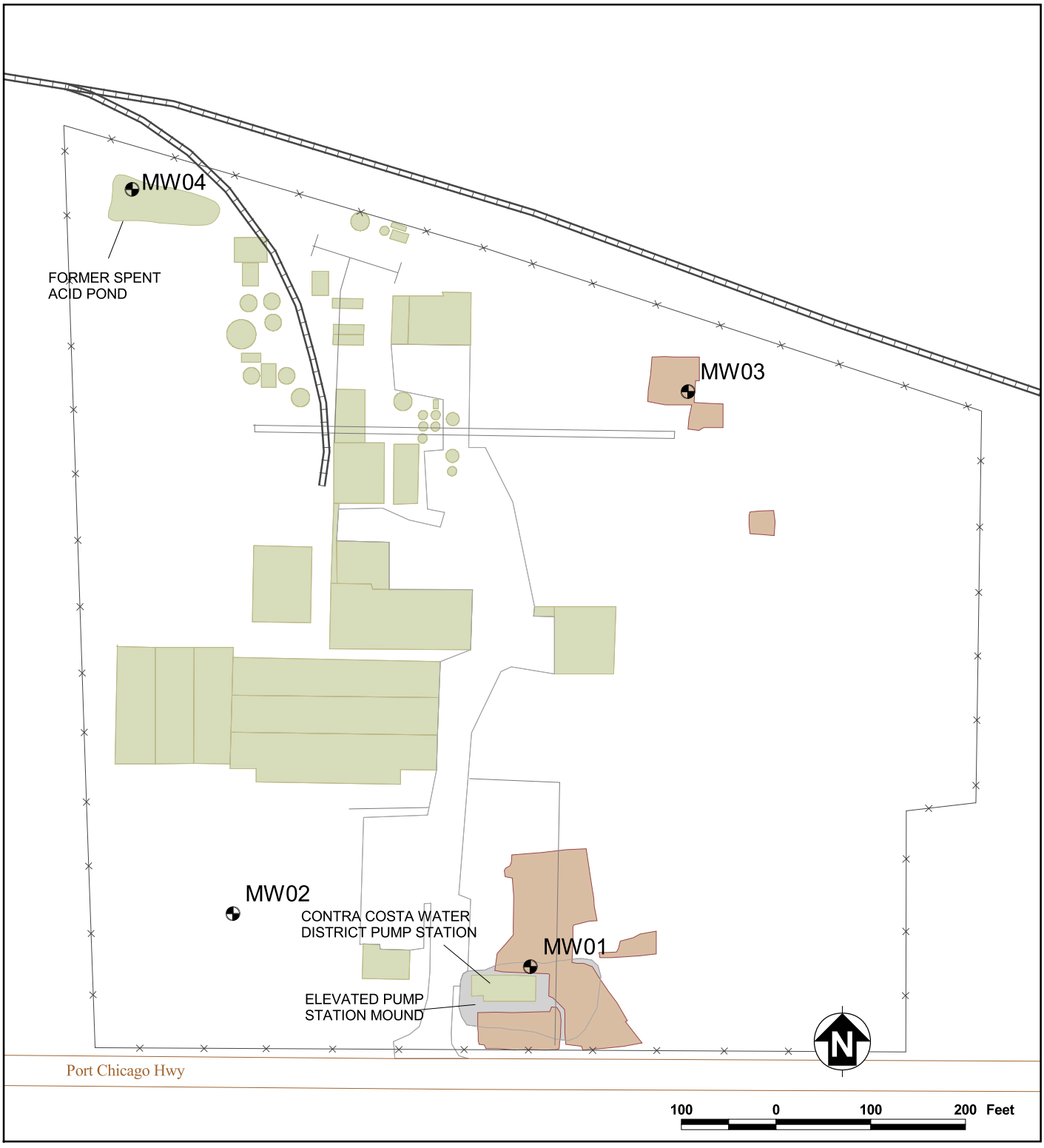
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE A-2

SAMPLING LOCATIONS IN POTENTIAL SOURCE AREAS

05/15/02 V:/CONCORD/PROJECTS/CTO267/Additional_Samples_zoom.mxd AZ



Tetra Tech EM Inc.

LEGEND:

MONITORING WELL

FORMER BUILDINGS SHOWN
ON 1974 AERIAL PHOTOGRAPH

EXCAVATIONS

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE A-3

AREA OF CONCERN 1 MONITORING
WELL LOCATIONS

03-19-2003 v:\concord\projects\aecru\aoc1\aoc1_map.apr TtEMI-SF kevin.ernst

TABLES

TABLE A-1: ANALYTICAL RESULTS FOR SUPPLEMENTAL SOIL SAMPLES - VOLATILE ORGANIC COMPOUNDS

Area of Concern 1, NWS SBD Concord

Sample Location	USEPA Region 9	CS1	LAB1	LAB1	LAB1	EPT4	EPT4
Sample ID	PRG	001AOC1GB108	001AOC1GB081	001AOC1GB082	001AOC1GB083	001AOC1GB181	001AOC1GB182
Sample type	Industrial Soils[1]	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Depth		1.5 - 2.0	1.0 - 1.5	1.5 - 2.0	3.0 - 3.5	3.0 - 3.5	3.5 - 4.0
Date		12/11/2002	12/10/2002	12/10/2002	12/10/2002	12/10/2002	12/10/2002
VOCs (micrograms per kilogran							
4-METHYL-2-PENTANONE	NA	--	--	--	--	--	--
CARBON DISULFIDE	720,000	--	--	--	--	--	--
METHYLENE CHLORIDE	20,527	--	--	--	--	--	--
XYLENE (TOTAL)	420,000	--	--	--	--	--	--

Sample Location	USEPA Region 9	EPT4	WPT2	WPT2	WPT2	WA	WA
Sample ID	PRG	001AOC1GB183	001AOC1GB087	001AOC1GB088	001AOC1GB089	001AOC1GB104	001AOC1GB103
Sample type	Industrial Soils[1]	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Depth		5.0 - 5.5	1.5 - 2.0	2.0 - 2.5	4.0 - 4.5	5.5 - 6.0	3.0 - 3.5
Date		37600	37602	37602	37602	37600	37600
VOCs (micrograms per kilogran							
4-METHYL-2-PENTANONE	NA	--	8 J	--	--	--	--
CARBON DISULFIDE	720,000	--	4 J	--	--	--	--
METHYLENE CHLORIDE	20,527	--	--	--	--	--	--
XYLENE (TOTAL)	420,000	--	3 J	--	--	--	--

Sample Location	USEPA Region 9	WG1	WG1	WG2	WG2	WG3	WG3
Sample ID	PRG	001AOC1GB094	001AOC1GB095	001AOC1GB097	001AOC1GB098	001AOC1GB100	001AOC1GB101
Sample type	Industrial Soils[1]	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Depth		3.0 - 3.5	5.5 - 6.0	3.0 - 3.5	5.5 - 6.0	1.1 - 1.6	3.1 - 3.6
Date		12/10/2002	12/10/2002	12/10/2002	12/10/2002	12/10/2002	12/10/2002
VOCs (micrograms per kilogran							
4-METHYL-2-PENTANONE	NA	--	--	--	--	--	--
CARBON DISULFIDE	720,000	--	--	--	--	--	--
METHYLENE CHLORIDE	20,527	5	--	--	--	--	--
XYLENE (TOTAL)	420,000	--	--	--	--	--	--

Sample Location	USEPA Region 9	WG4	WG4	SAP1	SAP1	SAP1
Sample ID	PRG	001AOC1GB111	001AOC1GB112	001AOCGB105	001AOCGB106	001AOCGB107
Sample type	Industrial Soils[1]	Discrete	Discrete	Discrete	Discrete	Discrete
Depth		3.0 - 3.5	5.5 - 6.0	9.0 - 9.5	12.0 - 12.5	15 .0 - 15.5
Date		12/10/2002	12/10/2002	1/9/2003	1/9/2003	1/9/2003
VOCs (micrograms per kilogran						
4-METHYL-2-PENTANONE	NA	--	--	--	--	--
CARBON DISULFIDE	720,000	--	--	--	--	--
METHYLENE CHLORIDE	20,527	--	--	--	--	--
XYLENE (TOTAL)	420,000	--	--	--	--	--

Notes:

-- not detected
CS concrete slab
EPT process tanks east of central roadway
J estimated concentration
LAB laboratory
PRG preliminary remediation goal
SAP spent acid pond
WA Warehouse area
WG1 - 4 borings to extend the sample grid 100 feet to the west
WPT process tanks west of central roadway

[1]EPA. 2002. EPA Region 9 PRGs Table. October 1. On-Line Address: http://www.epa.gov/region09/waste/sfund/prg/files/02table.pdf. Accessed on March 18, 2003.

TABLE A-2: ANALYTICAL RESULTS FOR SUPPLEMENTAL SOIL SAMPLING - OTHER ANALYTES
AREA OF CONCERN 1, NWS SBD CONCORD

Sample Location Sample ID Type Depth Date	USEPA Region 9 PRG Industrial Soils[1]	LAB 001AOC1SS081 Composite 0 - 1.5 12/10/02		LAB 001AOC1GB082 Composite 1.5 - 3.5 12/10/02		LAB 001AOC1GB083 Composite 3.0 - 6.0 12/10/02		WA 001AOC1SS102 Composite 0 - 0.5 12/10/02		WA 001AOC1GB103 Composite 3.0 - 3.5 12/11/02		WA 001AOC1GB104 Composite 5.0 - 6.0 12/10/02		EPT 001AOC1SS084 Composite 0 - 2.5 12/10/02		EPT 001AOC1GB085 Composite 1.0 - 3.5 12/10/02		EPT 001AOC1GB086 Composite 3.0 - 4.5 12/10/02		WPT 001AOC1SS087 Composite 0 - 2.0 12/11/02		WPT2 001AOC1GB088 Discrete 2.0 - 2.5 12/12/02		WPT2 001AOC1GBO89 Discrete 4.0 - 4.5 12/12/02	
Metals (mg/kg)																									
Aluminum	100,000	--		15,400	J	18,000	J	15,300	J	17,900	J	17,600	J	17,800	J	--		18,400	J	18,500		14,200	J	24,300	J
Arsenic (cancer endpoint)	1.6	--		**15.2**		**4.8**		**6**		**6.4**		**4.4**		**12**		--		**4**		**33.2**		**33.7**		**29.2**	
Arsenic (noncancer endpoint)	260	--		15.2		4.8		6		6.4		4.4		13		--		4		33.2		33.7		29.2	
Barium	67,000	--		195		222		188		212		229		135		--		175		179		127		155	
Beryllium	1,900	--		0.38	J	0.43	J	0.38	J	0.4	J	0.52	J	0.35	J	--		0.49	J	0.66	J	0.34	J	0.51	J
Cadmium	450	--		--		--		--		--		--		4		--		--		9.8		7.6		--	
Calcium	NA	192,000		5,610		2,780		4,090		7,680		3,880		--		19,200		4,020		47,200		10,600		8,800	
Chromium	450	--		32.5	J	33.3	J	29.2	J	33.1	J	29.9	J	96.9	J	--		30.6	J	158	J	26.5	J	35.1	J
Cobalt	1,900	--		9	J	16.7		10.7		11.4		10.6		8.9	J	--		12		7.2	J	18.5		35.9	
Copper	41,000	--		20.8		17.7		18.8		17.7		18		35.2		--		15.9		73.3		25.2		15.6	
Fluoride (leached)	36,938	41		8.7		4.3		4.9		29		4.2		--		9.2		22		68		6.6		2.5	
Iron	100,000	--		16,800		21,600		17,800		20,400		22,600		31,500		--		22,200		21,500		16,200		25,200	
Lead	750	--		24.7		8.1		10.7		10.2		7.3		67.5		--		6.8		63.6		14.2		7.6	
Magnesium	NA	1,760		2,140		5,270		2,890		4,270		6,170		--		4,520		6,450		3,110		2,100		3,800	
Manganese	1,900	--		415		969		352		432		425		270		--		390		213		820		1,680	
Mercury	310	--		4.1	J	--		0.15	J	0.069	J	0.028	J	0.31	J	--		0.17	J	0.22	J	0.064	J	0.035	J
Nickel	20,000	--		21.1		51.8		22.3		38.4		34.8		29.9		--		39.4		21.7		60		76.1	
Potassium	NA	4,440	J	1,960	J	1,580	J	1,450	J	1,150	J	1,450	J	--		--		1,450	J	3,870		1,570	J	1,360	J
Selenium	5,100	--		1.1		1.5		1.1		1		0.8	J	1.8		--		0.8	J	2.9		1.0	J	2.1	
Silver	5,100	--		--		--		--		--		--		--		--		--		0.9	J	--		--	
Sodium	NA	4,730	J	--		--		--		--		--		--		--		--		945		--		--	
Thallium	67	--		--		--		--		--		--		--		--		--		--		--		--	
Vanadium	7,200	--		50.4		56.2		47.9		53.1		54.2		108		--		52.9		165		43.5		56.8	
Zinc	100,000	--		49.8	J	37.3	J	41.5	J	36.8	J	38.6	J	175	J	--		37	J	209	J	273	J	33.9	J
SVOCs (mg/kg)																									
1,1'-Biphenyl	350	--		--		--		--		--		--		--		0.08	J	--		--		--		--	
2-Methylnaphthalene	NA	--		--		--		--		--		--		--		6.00		--		--		--		--	
Acenaphthene	29,219	--		--		--		--		--		--		0.75		0.34	J	--		--		--		--	
Anthracene	100,000	--		--		--		--		--		--		0.63		0.16	J	--		--		--		--	
Benzo(a)anthracene	2.11	--		--		--		--		--		--		**2.80**		0.65		--		0.16	J	--		--	
Benzo(a)pyrene	0.21	--		--		--		--		--		--		**1.60**		**0.35**	**J**	--		0.12	J	--		--	
Benzo(b)fluoranthene	2.11	--		--		--		--		--		--		**2.50**		0.57		--		0.15	J	--		--	
Benzo(k)fluoranthene	21.1	--		--		--		--		--		--		0.95		0.21	J	--		0.14	J	--		--	
Benzo(g,h,I)perylene	NA	--		--		--		--		--		--		--		0.17	J	--		--		--		--	
Bis(2-ethylhexyl)phthalate	123.1	--		--		--		--		--		--		--		--		--		--		--		--	
Carbazole	86.2	--		--		--		--		--		--		0.82		0.15	J	--		--		--		--	
Chrysene	210.96	--		--		--		--		--		--		2.70		0.60		--		0.22	J	--		--	
Dibenz(a,h)anthracene	0.21	--		--		--		--		--		--		0.20	J	--		--		--		--		--	
Dibenzofuran	3,127	--		--		--		--		--		--		0.35	J	0.15	J	--		0.00		--		--	
Fluoranthene	22,000	--		--		--		--		--		--		7.50		1.70		--		0.44		--		--	
Fluorene	26,281	--		--		--		--		--		--		0.42		0.26	J	--		--		--		--	
Indeno(1,2,3-cd)pyrene	2.11	--		--		--		--		--		--		0.66		0.17	J	--		--		--		--	
Naphthalene	188	--		--		--		--		--		--		0.56		0.83		--		--		--		--	
Phenanthrene	NA	0.18	J	--		--		--		--		--		--		1.20		--		0.26	J	--		--	
Phenol	100,000	--		--		--		--		--		--		--		--		0.18	J	--		--		--	
Pyrene	29,126	--		--		--		--		--		--		5.80		1.70		--		0.40		--		--	
Pesticides (mg/kg)																									
4,4'-DDT	7.02	--		0.013		--		--		--		--		--		--		--		0.015		--		--	
Aldrin	0.10	--		--		--		--		--		--		--		--		--		0.055		--		--	
Dieldrin	0.11	--		0.016		--		--		--		--		0.029	J	--		--		--		--		--	
Heptachlor epoxide	0.19	--		--		--		--		--		--		--		--		--		--		--		--	
Methoxychlor	3,078	--		--		--		--		--		--		0.039		--		--		--		--		--	
Herbicides (mg/kg)																									
2,4-D	7,683	--		0.0077	J	--		--		--		--		--		--		--		--		--		--	
Dalapon	18,000	--		--		0.01	J	0.14	J	0.0034	J	0.0064	J	--		0.014		--		--		--		--	
PCBs (mg/kg)																									
Aroclor-1248	0.74	--		--		--		--		--		--		0.22		--		--		0.17		--		--	
pH																									
pH (EPA 150.1)	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

TABLE A-2: ANALYTICAL RESULTS FOR SUPPLEMENTAL SOIL SAMPLING - OTHER ANALYTES (Continued)
AREA OF CONCERN 1, NWS SBD CONCORD

Sample Location Sample ID Type Depth Date	USEPA Region 9 PRG Industrial Soils[1]	NB 001AOC1SS090 Composite 0 - 0.5 12/11/02		WG1 001AOC1SS093 Discrete 0 - 0.5 12/10/02		WG1 001AOC1GB094A Discrete 3.0 - 3.5 12/10/02		WG1 001AOC1GB095A Discrete 5.5 - 6.0 12/10/02		WG2 001AOC1SS96 Discrete 0 - 0.5 12/10/02		WG2 001AOC1GB97A Discrete 3.0 - 3.5 12/10/02		WG2 001AOC1GB98A Discrete 5.5 - 6.0 12/10/02		WG3 001AOC1SS099 Discrete 0.3 - 0.8 12/10/02		WG3 001AOC1GB100 Discrete 0.8 - 1.3 12/10/02		WG3 001AOC1GB101 Discrete 3.1 - 3.6 12/10/02		WG4 001AOC1SS110 Discrete 0 - 0.5 12/10/02		WG4 001AOC1GB111 Discrete 3.0 - 3.5 12/10/02	
Metals (mg/kg)																									
Aluminum	100,000	16,800	J	25,800	J	35,200	J	20,100	J	15,900	J	22,700	J	24,000	J	30,200		17,100		22,700	J	18,700	J	21,100	J
Arsenic (cancer endpoint)	1.6	**37.4**		**102**	**J**	**239**	**J**	**196**	**J**	**179**	**J**	**120**	**J**	**57.2**	**J**	**191**		**114**		**4.3**		**59.1**		**4.5**	
Arsenic (noncancer endpoint)	260	37.4		102	J	239	J	196	J	179	J	120	J	57.2	J	191		114		4.3		59.1		4.5	
Barium	67,000	154		178		161		186		127		407		249		28.6		130		150		155		299	
Beryllium	1,900	0.42	J	0.46	J	0.69	J	0.45	J	0.46	J	0.53	J	0.51	J	0.17		0.35		0.64	J	0.39	J	0.48	J
Cadmium	450	3.2		5.8	J	--		--		12.5	J	--		--		44.7		1.7		--		9.9		--	
Calcium	NA	18,800		29,600		3,690		5,400		2,790		3,110		3,690		36,600		7,400		2,910		2,800		5,890	
Chromium	450	53.5	J	56.7	J	49.4	J	31.9	J	33.9	J	38	J	36.7	J	49.2		31.9		37.4	J	34	J	36.9	J
Cobalt	1,900	10.6		7.3	J	12.4	J	10.9	J	9.1	J	12.8	J	11.5	J	30.7		10.7		10.5	J	9.5	J	10.6	
Copper	41,000	172		41.6		16.8		12.9		53.6		15.8		21.8		213		26.7		14.3		30.5		16.5	
Fluoride (leached)	36,938	76		180		23		26		10		3.8		3.9		17		6.9		4.4		44		6.5	
Iron	100,000	23,800		20,200		29,100		20,800		14,000		23,800		27,100		49,600		16,900		23,800		18,000		24,300	
Lead	750	120		80.5		7.3		5.7		22.5		4.1		8.1		7.3		15.2		7.3		15.2		6.9	
Magnesium	NA	2,760		2,540		4,830		5,320		1,480		6,290		8,530		16,600		2,900		6,110		1,730		5,930	
Manganese	1,900	188		184		555		597		245		535		448		518		274		409		292		337	
Mercury	310	0.26	J	0.61		--		--		0.074	J	--		--		0.49		0.086		0.035	J	0.034	J	--	
Nickel	20,000	36.3		30		59.2		48.9		30.5		60.2		30.1		31.1		26.2		55.1		27.4		39.2	
Potassium	NA	1,690		2,470	J	1,670	J	1,390	J	1,530	J	1,100		2,010	J	1,800		1,400	J	965	J	1,820	J	1,250	J
Selenium	5,100	3.1		5		1.5		0.9	J	0.78	J	1.4		1.5		1.5		1.8		1.1	J	1.3		0.67	J
Silver	5,100	--		--		--		--		--		--		--		--		--		--		--		--	
Sodium	NA	--		507	J	1,780	J	1,180	J	--		778		1,180	J	1,700		--		626	J	--		--	
Thallium	67	--		--		--		--		--		--		--		--		--		--		--		--	
Vanadium	7,200	77.9		77.2	J	67.3	J	50	J	53.2	J	55.8	J	63.2	J	165		52.1		53.4		55.1		60.1	
Zinc	100,000	390	J	157	J	75.7	J	31.3	J	230	J	34.8	J	46.8	J	461		44.4		32.8	J	157	J	36.6	J
SVOCs (mg/kg)																									
1,1'-Biphenyl	350	--		--		--		--		--		--		--		--		--		--		--		--	
2-Methylnaphthalene	NA	--		--		--		--		--		--		--		--		--		--		--		--	
Acenaphthene	29,219	--		--		--		--		--		--		--		--		--		--		--		--	
Anthracene	100,000	0.09	J	--		--		--		--		--		--		--		--		--		--		--	
Benzo(a)anthracene	2.11	1.2		0.11	J	--		--		--		--		--		--		--		--		--		--	
Benzo(a)pyrene	0.21	**0.72**		--		--		--		--		--		--		--		--		--		--		--	
Benzo(b)fluoranthene	2.11	1.3		0.11	J	--		--		--		--		--		--		--		--		--		--	
Benzo(k)fluoranthene	21.1	0.41		--		--		--		--		--		--		--		--		--		--		--	
Benzo(g,h,I)perylene	NA	0.3		--		--		--		--		--		--		--		--		--		--		--	
Bis(2-ethylhexyl)phthalate	123.1	0.69		--		--		--		--		--		--		--		--		--		--		--	
Carbazole	86.2	0.14	J	--		--		--		--		--		--		--		--		--		--		--	
Chrysene	210.96	1.4		0.13	J	--		--		--		--		--		--		--		--		--		--	
Dibenz(a,h)anthracene	0.21	0.11	J	--		--		--		--		--		--		--		--		--		--		--	
Dibenzofuran	3,127	--		0		--		--		--		--		--		--		--		--		--		--	
Fluoranthene	22,000	2.8		0.37	J	--		--		--		--		--		--		--		--		--		--	
Fluorene	26,281	--		--		--		--		--		--		--		--		--		--		--		--	
Indeno(1,2,3-cd)pyrene	2.11	0.31	J	0		--		--		--		--		--		--		--		--		--		--	
Naphthalene	188	--		0		--		--		--		--		--		--		--		--		--		--	
Phenanthrene	NA	0.67		0.13	J	--		--		--		--		--		--		--		--		--		--	
Phenol	100,000	--		--		--		--		--		--		--		--		--		--		--		--	
Pyrene	29,126	3.1		0.28	J	--		--		--		--		--		--		--		--		--		--	
Pesticides (mg/kg)																									
4,4'-DDT	7.02	0.013		0.012		--		--		--		--		--		--		0.0047		--		0.004		--	
Aldrin	0.10	--		--		--		--		--		--		--		--		--		--		--		--	
Dieldrin	0.11	--		0.016		--		--		--		--		--		--		--		--		--		--	
Heptachlor epoxide	0.19	--		--		--		--		--		--		--		--		--		--		--		--	
Methoxychlor	3,078	0.05	J	--		--		--		--		--		--		--		--		--		--		--	
Herbicides (mg/kg)																									
2,4-D	7,683	--		--		--		--		--		--		--		--		--		--		--		--	
Dalapon	18,000	--		0.011	J	0.0069		--		--		0.008	J	--		0.0079		--		0.0089	J	0.16	J	0.0071	J
PCBs (mg/kg)																									
Aroclor-1248	0.74	0.14		0.1		--		--		--		--		--		--		--		--		--		--	
pH																									
pH (EPA 150.1)	NA	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	

TABLE A-2: ANALYTICAL RESULTS FOR SUPPLEMENTAL SOIL SAMPLING - OTHER ANALYTES (Continued)
AREA OF CONCERN 1, NWS SBD CONCORD

Sample Location Sample ID Type Depth Date	USEPA Region 9 PRG Industrial Soils[1]	WG4 001AOC1GB112 Discrete 5.5 - 6.0 12/10/02		CS 001AOC1SS108 Composite 0 - 2.0 12/11/02		SAP 001AOC1GB105 Discrete 9.0 - 9.5 01/09/03		SAP 001AOC1GB106 Discrete 12.0 - 12.5 01/09/03		SAP 001AOC1GB107 Discrete 15.0 - 15.5 01/09/03	
Metals (mg/kg)											
Aluminum	100,000	21,400	J	15,900	J	28,700		20,700		27,700	
Arsenic (cancer endpoint)	1.6	**4.7**		**8.3**		**8.7**		**5.4**		**8**	
Arsenic (noncancer endpoint)	260	4.7		8.3		8.7		5.4		8	
Barium	67,000	195		171		187		242		411	
Beryllium	1,900	0.5	J	0.38	J	1.4	J	0.39	J	0.61	J
Cadmium	450	--		--		10		52.7		2.1	J
Calcium	NA	3,790		5,620		4,890	J			11,700	J
Chromium	450	36.1	J	34.5	J	54.6		36.6		50.1	
Cobalt	1,900	10.7		6.9	J	14.8	J	23.3	J	16.3	J
Copper	41,000	18.9		16.9		28.9		17.2		27.1	
Fluoride (leached)	36,938	4.4		14		--		--		--	
Iron	100,000	25,000		18,300		26,000		22,000		28,700	
Lead	750	7.2		10.7		8.2		7.8		9.6	
Magnesium	NA	6,070		2,690		4,670		--		8,720	
Manganese	1,900	403		228		281	J	620	J	1,040	J
Mercury	310	--		0.046	J	0.043	J	0.021	J	0.046	J
Nickel	20,000	37.6		21.6		26.6		36.1		92.5	
Potassium	NA	1,530	J	1,530	J	2,100	J	--		2,610	J
Selenium	5,100	0.66	J	1.3		--		1.4	J	--	
Silver	5,100	--		--		--		--		--	
Sodium	NA	--		--		--		--		--	
Thallium	67	--		--		4.9	J	--		--	
Vanadium	7,200	58.8		51.2		113		49.2		73.2	
Zinc	100,000	41.3	J	71.5	J	215		355		73.2	
SVOCs (mg/kg)											
1,1'-Biphenyl	350	--		--		--		--		--	
2-Methylnaphthalene	NA	--		--		--		--		--	
Acenaphthene	29,219	--		--		--		--		--	
Anthracene	100,000	--		--		--		--		--	
Benzo(a)anthracene	2.11	--		--		--		--		--	
Benzo(a)pyrene	0.21	--		--		--		--		--	
Benzo(b)fluoranthene	2.11	--		--		--		--		--	
Benzo(k)fluoranthene	21.1	--		--		--		--		--	
Benzo(g,h,I)perylene	NA	--		--		--		--		--	
Bis(2-ethylhexyl)phthalate	123.1	--		--		--		--		--	
Carbazole	86.2	--		--		--		--		--	
Chrysene	210.96	--		--		--		--		--	
Dibenz(a,h)anthracene	0.21	--		--		--		--		--	
Dibenzofuran	3,127	--		--		--		--		--	
Fluoranthene	22,000	--		--		--		--		--	
Fluorene	26,281	--		--		--		--		--	
Indeno(1,2,3-cd)pyrene	2.11	--		--		--		--		--	
Naphthalene	188	--		--		--		--		--	
Phenanthrene	NA	--		--		--		--		--	
Phenol	100,000	--		--		--		--		--	
Pyrene	29,126	--		--		--		--		--	
Pesticides (mg/kg)											
4,4'-DDT	7.02	--		0.0062		--		--		--	
Aldrin	0.10	--		0.0022		--		--		--	
Dieldrin	0.11	--		0.054		--		--		--	
Heptachlor epoxide	0.19	--		0.0054		--		--		--	
Methoxychlor	3,078	--		--		--		--		--	
Herbicides (mg/kg)											
2,4-D	7,683	--		--		--		--		--	
Dalapon	18,000	0.0061	J	--		--		--		--	
PCBs (mg/kg)											
Aroclor-1248	0.74	--		0.29		--		--		--	
pH											
pH (EPA 150.1)	NA	NA		5.4		4.7		6.3		7.1	

Notes:

Bold, highlighted results exceeded industrial PRGs.
Metals, VOCs, SVOCs, pesticides, and PCBs were analyzed by contract laboratory program (CLP) low level methods
Chlorinated herbicides were analyzed by EPA method 8151A
Fluoride was analyzed by EPA Method 300.0
pH was analyzed by EPA Method 150.1
[1] = EPA. 2002. EPA Region 9 PRGs Table. October 1. On-Line Address: http://www.epa.gov/region09/waste/sfund/prg/files/02table.pdf. Accessed on March 18, 2003.

--	not detected
CS	concrete slab
EPT	process tanks east of central roadway
J	estimated concentration
LAB	laboratory
mg/kg	milligrams per kilogram
NA	not analyzed
PCB	polychlorinated biphenyl
PRG	USEPA Region 9 preliminary remediation goal
SAP	spent acid pond
SVOC	semivolatile organic compound
VOC	volatile organic compound
WA	Warehouse area
WG1 - 4	borings to extend the sample grid 100 feet to the west
WPT	process tanks west of central roadway

TABLE A-3: SUMMARY OF SOIL SAMPLES BY SAMPLE TYPE AND LOCATION

AREA OF CONCERN 1, NWS SBD CONCORD

Investigation Area	Sample Location	Sample Type	Sample Depth (feet bgs)	Analytes					
				Metals	SVOC	Pesticides /PCBs	VOCs	Herbicides	pH
Laboratory	LAB 1, LAB 2, LAB 3	composite	0 - 1.5	1	1	1		1	
			1.5 - 3.5	1	1	1		1	
			3.0 - 6.0	1	1	1		1	
	LAB 1	discrete	1.0 - 1.5				1		
			1.5 - 2.0				1		
			3.0 - 3.5				1		
Warehouse Area	WA 1, WA2, WA3, WA4	composite	0 - 0.5	1	1	1		1	
			3.0 - 3.5	1	1	1		1	
			5.0 - 6.0	1	1	1		1	
	WA 1	discrete	3.0 - 3.5				1		
			5.5 - 6.0				1		
East Process Tanks	EPT1, EPT2, EPT3, EPT4	composite	0 - 2.5	1	1	1		1	
			1.0 - 3.5	1	1	1		1	
			3.0 - 4.5	1	1	1		1	
	EPT4	discrete	3.0 - 3.5				1		
			3.5 - 4.0				1		
			5.0 - 5.5				1		
West Process Tanks	WPT1, WPT2, WPT3, WPT4	composite	0 - 2.0	1	1	1		1	
	WPT2	discrete	1.5 - 2.0				1		
			2.0 - 2.5	1	1	1	1	1	
			4.0 - 4.5	1	1	1	1	1	
Northern Boundary	NB1, NB2, NB3, NB4	composite	0 - 0.5	1	1	1		1	
Western Grid	WG1	discrete	0 - 0.5	1	1	1		1	
			3.0 - 3.5	1	1	1	1	1	
			5.5 - 6.0	1	1	1	1	1	
	WG2	discrete	0 - 0.5	1	1	1		1	
			3.0 - 3.5	1	1	1	1	1	
			5.5 - 6.0	1	1	1	1	1	
	WG3	discrete	0.3 - 0.8	1	1	1		1	
			0.8 - 1.3	1	1	1	1	1	
			3.1 - 3.6	1	1	1	1	1	
	WG4	discrete	0 - 0.5	1	1	1		1	
			3.0 - 3.5	1	1	1	1	1	
			5.5 - 6.0	1	1	1	1	1	
Concrete Slab	CS1, CS2, CS3, CS4	composite	0 - 2.0	1	1	1		1	1
	CS1	discrete	1.5 - 2.0				1		
Spent Acid Pond	SAP	discrete	9.0 - 9.5	1	1	1	1	1	1
			12.0 - 12.5	1	1	1	1	1	1
			15.0 - 15.5	1	1	1	1	1	1
Totals:				**29**	**29**	**29**	**23**	**5**	**4**

Notes:

ft. bgs	Feet below ground surface
PCB	Polychlorinated biphenyl
SVOC	Semivolatile organic compound
VOC	Volatile organic compound

ATTACHMENT A-1
QUALITY CONTROL SUMMARY REPORT

ENCLOSURE

AREA OF CONCERN 1 (SITE 31) SUPPLEMENTAL SOIL SAMPLING SUMMARY REPORT NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD MARCH 21, 2003

CONTENTS

ABBREVIATIONS AND ACRONYMS

%D	Percent difference
%R	Percent recovery
%RSD	Percent relative standard deviation
AOC 1	Area of Concern 1
CC	Continuing calibration
CCV	Continuing calibration verification
40 CFR	Title 40 of the *Code of Federal Regulations*
CLP	Contract Laboratory Program
CRDL	Contract-required detection limit
CRQL	Contract-required quantitation limit
EPA	U.S. Environmental Protection Agency
GPC	Gel permeation chromatography
ICPES	Inductively coupled plasma emission spectrometer
IC	Initial calibration
ICV	Initial calibration verification
LCS	Laboratory control sample
MS	Matrix spike
MSD	Matrix spike duplicate
NWSSBD	Naval Weapons Station Seal Beach Detachment
PARCC	Precision, accuracy, representativeness, completeness, and comparability
PCB	Polychlorinated biphenyl
PQL	Practical quantitation limit
QA/QC	Quality assurance and quality control
QCSR	Quality control summary report
r	Correlation coefficient
RPD	Relative percent difference
RRF	Relative response factor
RT	Retention time
SAP	Sampling and analysis plan
SVOC	Semivolatile organic compound

ABBREVIATIONS AND ACRONYMS (Continued)

TIC	Tentatively identified compound
TCX	Tetrachloro-m-xylenes
Tetra Tech	Tetra Tech EM Inc.
VOC	Volatile organic compound

1.0 INTRODUCTION

This quality control summary report (QCSR) discusses a review of analytical data quality for samples from eight sample delivery groups (CONC1, CONC2, and CONC4 through CONC9) collected by Tetra Tech EM Inc. (Tetra Tech) from Area of Concern 1 (AOC 1) at Naval Weapons Station Seal Beach Detachment Concord, Concord, California (NWSSBD Concord), between June 2002 and January 2003. This QCSR presents methodologies, results, and conclusions of both cursory and full quality assurance and quality control (QA/QC) reviews of chemical data gathered during this investigation.

2.0 VALIDATION METHODOLOGY

Data validation is a systematic process for reviewing and qualifying data against a set of criteria to verify whether they are adequate for their intended use. Laboratory analytical data were validated according to procedures outlined in the following documents:

- U.S. Environmental Protection Agency (EPA) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (EPA 1999)
- "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (EPA 1994a)
- "Draft Final Sampling and Analysis Plan (Field Sampling Plan/Quality Assurance Project Plan) Time-critical Removal Action and Supplemental Sampling Activities, Site 31 (Area of Concern 1), NWSSBD Concord, California" (hereinafter referred to as the SAP) (Tetra Tech 2002)

Data were validated in two stages: (1) a cursory review of analytical reports and QA/QC information for 100 percent of the chemical data and (2) a full review of analytical reports, QA/QC information, and associated raw data for a minimum of 10 percent of the chemical data. The cursory review evaluated QA/QC information such as holding times, calibration requirements, and spiking accuracy. During the full review, additional QA/QC criteria were evaluated, and the raw data were used to check calculations and analyte identifications. At both stages of validation, qualifiers were assigned to the results in the electronic database in accordance with EPA guidelines, the SAP (Tetra Tech 2002), and associated analytical methods.

The overall objective of data validation was to determine whether the quality of the chemical data set was adequate for its intended purpose, as defined by precision, accuracy, representativeness, completeness,

and comparability (PARCC) parameters in EPA guidance (EPA 1997). By completing the following tasks, PARCC parameters were assessed:

- Reviewing precision and accuracy of laboratory QC data
- Reviewing precision and accuracy of field QC data
- Reviewing the overall analytical process, including holding times, calibrations, analytical or matrix performance, and analyte identification and quantitation
- Assigning qualifiers to data affected when QA/QC criteria were not achieved
- Reviewing and summarizing the implications of the frequency and severity of qualifiers in validated data

Between June 2002 and January 2003, 113 soil samples were collected and analyzed from NWSSBD Concord. In addition, 6 QC samples were collected and analyzed, including 4 equipment rinsate blanks and 2 equipment rinsate blanks.

3.0 CURSORY REVIEW

Cursory review of analytical reports for Contract Laboratory Program (CLP) organic, CLP inorganic, and non-CLP methods included evaluating the following parameters, as applicable: holding times, initial and continuing calibrations, laboratory and field blanks, accuracy, laboratory precision, analytical or matrix performance, and overall assessment of the data. Cursory review components and the results of each specific review are discussed in Sections 3.1 through 3.6 of this appendix. Section 3.7 discusses results that were reported below the contract-required quantitation limit (CRQL), the contract-required detection limit (CRDL), and the practical quantitation limit (PQL).

3.1 HOLDING TIMES

Technical holding times were defined as the maximum time allowable between sample collection and, as applicable, sample extraction, preparation, and analysis. The Clean Water Act authorized EPA to establish technical requirements for water holding times and preservation set forth in Title 40 of the *Code of Federal Regulations* (40 CFR) 136. For methods not covered by 40 CFR 136, holding times used for validation purposes either were recommended in specific analytical methods, such as CLP, or were specified in the SAP (Tetra Tech 2002).

For analytical methods with required holding times longer than 1 week, samples extracted, prepared, or analyzed outside of specified holding times were qualified as "Jh," indicating that the results were estimated values (EPA 1994a, 1994b). When these holding times were grossly exceeded (more than double the specified holding time), nondetected results were qualified as "Rh," indicating that the results were rejected, and detected results were qualified as estimated (Jh). No sample results required qualification as estimated or rejected.

3.2 CALIBRATION

Requirements for laboratory instrument calibration were established to help ensure that analytical instruments produce acceptable qualitative and quantitative data for target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an analytical run by producing a linear curve. Continuing calibration demonstrates that the instrument is capable of repeating the performance established in the initial calibration (EPA 1994a, 1994b).

3.2.1 Organic Analysis

Initial calibration review for organic analysis included evaluating percent relative standard deviation (%RSD), relative response factors (RRF), and retention times (RT). The %RSD indicates the analytical system's linearity over an established concentration range. The RRF indicates the sensitivity of the analytical system to a particular target analyte. RT reflects the analytical system's stability. The review of continuing calibration included an evaluation of percent difference (%D) in lieu of %RSD. The %D measures the analytical system's precision and was calculated by comparing the daily RRF with the RRF established in the initial calibration.

Samples analyzed when calibration requirements were not met were qualified as "Jc," indicating that the results were estimated (EPA 1994b). Samples for volatile organic compound (VOC) and semivolatile organic compound (SVOC) analyses with nondetected results, analyzed when RRF requirements were not met, were qualified as "Rc," indicating that the results were rejected. Detected results were estimated (Jc) (EPA 1994b). Of the organic analytical data, 3.18 percent was qualified as estimated, and 0.70 percent was qualified as rejected as a result of calibration violations. The rejected results were due to calibration problems with acetone, which is known to exhibit poor performance.

3.2.2 Inorganic Analysis

Review of initial calibration for inorganic analysis included evaluating criteria for the curve's correlation coefficient (r) and initial calibration verification (ICV) percent recoveries (%R). The ICV %R verifies that the analytical system is operating within established calibration criteria at the beginning of an analytical run. Metals are analyzed using an inductively coupled plasma emission spectrometer (ICPES), which is inherently linear over a wide concentration range; therefore, it does not require multiple initial calibration standards, which are mandatory for most other methods. The continuing calibration review included an evaluation of the criteria for continuing calibration verification (CCV) %Rs. The CCV %R verifies that the analytical system is operating within the established calibration throughout the analytical run.

Samples analyzed when calibration requirements were not met were qualified as "Jc," indicating that the results were estimated (EPA 1994a). In general, inorganic data are not rejected when calibration requirements are exceeded, except based on the professional judgment of the data reviewer. Of the inorganic analytical data, no data were estimated or rejected because of calibration violations.

3.3 LABORATORY AND FIELD BLANKS

Laboratory and field blank samples were analyzed to evaluate the existence and magnitude of contamination resulting from sample collection or laboratory activities (EPA 1994a, 1994b). Blanks prepared and analyzed in the laboratory consisted of calibration, method, and preparation blanks. Field blanks consisted of equipment rinsate and trip blanks. If a problem with any blank existed, all associated data were carefully evaluated to assess whether sample data were affected. The following table summarizes the purpose of each laboratory and field blank:

Blank Type	Purpose of Blank
Calibration	Evaluate analytical instruments for possible laboratory contamination.
Method and Preparation	Evaluate extraction or preparation procedures for possible laboratory contamination.
Equipment Rinsate	Evaluate decontamination procedures as a possible route for field contamination.
Trip	Evaluate whether cross-contamination from other samples or the shipping containers occurs during shipping of samples for analysis of VOCs

At a minimum, a calibration or a method and preparation blank was analyzed once every analytical period for each instrument. Method and preparation blanks were extracted (or prepared) at a frequency of one per extraction or preparation batch per matrix or per 20 samples, whichever frequency was greater (EPA 1994b, 1995, 1996). Because each sampling task employed different sample collection devices, equipment rinsate blanks for a specified set of sample analyses were collected weekly for each sampling task. Equipment rinsate blanks were analyzed for the same analytes of concern as samples collected with the sampling equipment. Trip blanks were shipped with coolers containing samples for VOC analysis.

When laboratory blank contamination was identified, sample results were compared with an action level of 5 times the highest level detected in the associated laboratory blank. Detected results less than the action level for the laboratory blank contaminant were considered nondetected, either at the level of the original result or at the CRQL (organic samples only), whichever was higher (EPA 1994a, 1994b). The data were qualified as "UJb," indicating that the results were nondetected, and reflected a detection or quantitation limit that may have been raised as a result of low-level laboratory blank contamination.

EPA (1994b) has identified some compounds, including acetone, methylene chloride, and phthalates, as common laboratory contaminants. These compounds were qualified as "UJb," indicating that the result is considered to be nondetected in samples that contained reported concentrations of less than 5 times the reporting limit for those compounds (EPA 1994b).

After laboratory blank contamination was assessed, equipment rinsate and trip blanks were evaluated. Where field blank contamination was identified, sample results were compared with an action level. For most compounds, the action level was set at 5 times the highest concentration detected in the associated equipment rinsate or trip blank. For common laboratory contaminants, the action level was set at 10 times the highest concentration detected in the associated equipment rinsate or trip blank. Detected results that were less than an action level based on field blank contaminants were considered to be

nondetected either at the action level or at the CRQL (organic samples only), whichever was higher (EPA 1994a, 1994b). Data were qualified as "UJf," indicating that the results were considered to be nondetected and reflected a detection or quantitation limit that may have been raised by low-level equipment rinsate or trip blank contamination.

Of the analytical data obtained between June 2002 and January 2003, 2.30 percent was qualified as nondetected as a result of laboratory contamination, and only 0.19 percent was qualified as nondetected as a result of field contamination. The field blank contamination consisted of low-level selenium contamination. Based on the low percentage of qualified data, the quality of analytical data was not compromised significantly by laboratory or field contamination.

3.4 ACCURACY

One objective of data validation was to assess the accuracy of the chemical data set. Laboratory accuracy was evaluated using recoveries of surrogate spikes, matrix spikes (MS), and laboratory control samples (LCS) or blank spikes. For organic analyses using surrogate spikes, laboratory accuracy could be evaluated for individual samples; however, matrix effects frequently present unique problems in evaluating laboratory accuracy for organic analysis (EPA 1994b). In some cases, professional judgment was used in qualifying data. Any such decisions were clearly identified and documented in data validation reports.

Organic data affected by surrogate recoveries outside of QC limits were qualified as "Ja," indicating that the results were estimated, or in severe cases "Ra," indicating that the results were rejected (EPA 1994b). Organic data affected by MS or blank spike problems were qualified "Je," indicating that the results were estimated, or "Re," indicating severe matrix problems that resulted in rejected data. For inorganic analyses, laboratory accuracy was evaluated using LCS spike and MS recoveries. In general, data affected by LCS or MS recoveries outside of QC limits were qualified as "Je," indicating that the results were estimated. In a few isolated cases where LCS or MS recoveries were very low (less than 50 and 30 percent, respectively), affected, nondetected data were qualified as "Re," indicating that the results were rejected (EPA 1994b). Of the analytical data obtained between June 2002 and January 2003, 1.10 percent was qualified as estimated, and no data were rejected as a result of surrogate spike criteria violations. This very low frequency of accuracy criteria violations is evidence of the high technical quality of organic data.

Of the analytical data, 3.85 percent was qualified as estimated, and no data was rejected as a result of accuracy criteria violations. Most of the estimated qualifications were assigned because of LCS recovery problems in the metals MS recoveries outside of QC limits. This type of accuracy problem reflects matrix interference and not analytical performance issues.

3.5 PRECISION

Laboratory precision was evaluated by the relative percent differences (RPD) of MS and matrix spike duplicates (MSD) in organic analyses and by RPDs of sample and sample duplicates in inorganic analyses. For organic analyses, RPDs were used to evaluate overall precision and were not used specifically to qualify data. Precision goals for organic analyses are identified in the SAP (Tetra Tech 2002). For inorganic analyses, sample and sample duplicate RPDs were used to indicate the laboratory's analytical precision within a sample delivery group. Inorganic sample and sample duplicates were reviewed according to the following criteria (EPA 1994a):

- An RPD criterion of plus or minus 20 percent was used for aqueous sample values greater than 5 times the CRDL.
- An absolute difference of plus or minus the CRDL was used for aqueous sample values less than 5 times the CRDL.

Inorganic data affected by sample and sample duplicate RPDs outside of QC limits were qualified as "Jd," indicating that the results were estimated (EPA 1994a). No data were rejected as a result of precision criteria violations. Of the analytical data obtained between June 2002 and January 2003, only 1.36 percent was qualified as estimated as a result of precision criteria violations. The data qualified as estimated was attributed to problems with precision criteria with lead, manganese, mercury, and selenium.

3.6 ANALYTICAL AND MATRIX PERFORMANCE

In addition to data quality requirements identified and discussed in previous text, further laboratory QA/QC criteria were evaluated in the cursory review. These additional criteria were concerned primarily with analytical and matrix performance including internal standard recovery and instrument performance check samples and ICPES serial dilutions.

For VOC and SVOC analyses, internal standard performance was evaluated. Internal standard performance criteria evaluate whether gas chromatography and mass spectrometry sensitivity and response are stable during every analytical run. Because matrix effects may affect internal standard

performance, they may present unique problems in evaluating analytical performance. Internal standard area counts in the sample must be within 50 to 150 percent of the counts found in the associated daily calibration standard. Internal standard retention times must not vary by more than plus or minus 30 seconds from the internal standard in the associated daily calibration standard (EPA 1994b).

Organic data affected by internal standard criteria violations were qualified as "Ji," indicating that the results were estimated. Organic data with any internal standard areas less than 10 percent of the internal standard's area in the associated daily standard were qualified as "Ri" or "Ji." "Ri" indicates that nondetected results were rejected, and "Ji" indicates that detected results were estimated. Of the analytical data obtained between June 2002 and January 2003, no data were qualified as estimated or rejected as a result of analytical or matrix performance violations.

In addition to analytical or matrix performance criteria discussed in the following text, some of the data were qualified with the general qualifiers (Jj or UJj) for other minor analytical or matrix problems encountered. These sample results were qualified during data validation, based on the professional judgment of the reviewer, and are well documented in validation reports. These sample results include some sample concentrations reported slightly above the highest calibration standard. These results should be considered qualitatively and quantitatively reliable, even though laboratory protocol requires sample dilution for results reported over the calibration range. Organic data affected by any of the criteria violations discussed previously were qualified as "Jj," indicating that the results were estimated. Of the analytical data for organic compounds obtained between June 2002 and January 2003, 1.49 percent was qualified as estimated, and no data were rejected based on analytical or matrix performance violations.

3.7 RESULTS BELOW THE CONTRACT-REQUIRED QUANTITATION, THE CONTRACT-REQUIRED DETECTION LIMIT, AND THE PRACTICAL QUANTITATION LIMIT

For organic analyses, analytical instruments can make reliable, qualitative identification of compounds at concentrations below the CRQL for off-site analysis and below the PQL for on-site analysis. For CLP metals analysis, the ICPES can make reliable qualitative identification of analytes above the instrument detection limit but below the CRDL. Detected results below the CRQL, CRDL, and PQL are considered to be quantitatively uncertain. Sample results below the CRQL and CRDL were reported by the laboratory with a "J" qualifier (organic data) or a "B" qualifier (inorganic data) and were subsequently qualified in data validation as "Jg," indicating that the results were estimated. Of the analytical data obtained between June 2002 and January 2003, 0.88 percent of the data was qualified as estimated

because detected results were reported below the CRQL or CRDL. Nine percent of the metals results was reported below the CRDL but above the instrument detection limit. As noted previously, the ICPES can make reliable qualitative identification of analytes above the instrument detection limit but below the CRDL.

Tentatively identified compounds (TIC) are chromatographic peaks in volatile and semivolatile fraction analyses that were not target analytes, surrogates, or internal standards. TICs must be identified qualitatively by a National Institute of Standards and Technology mass spectral library search. The data reviewer assessed the identifications. All TICs were found to be artifacts, common blank contamination, or compounds identified in another fraction.

4.0 FULL REVIEW

A full review was conducted on a random 10 percent of the chemical data. Full review includes the elements of a cursory review, plus the following additional items, as applicable:

- Method compliance
- Instrument performance check samples
- Cleanup performance check samples
- System performance
- ICPES interference check samples
- Target analyte identification
- Analyte quantitation
- Detection and quantitation limit verification
- Overall assessment of the data

Criteria for data qualification during the full review are described in EPA guidelines (EPA 1994a, 1999), the SAP (Tetra Tech 2002), and associated analytical methods. Sections 4.1 through 4.4 discuss the full review components and the results of each specific assessment.

4.1 ADDITIONAL ANALYTICAL AND MATRIX PERFORMANCE

In addition to the cursory review of data quality requirements discussed in Section 3.0, full review includes additional verification against established QA/QC criteria. Additional full review requirements are concerned primarily with analytical and matrix performance. For organic analysis, the following requirements were evaluated: instrument performance check samples and cleanup performance check samples for florisil cartridges and gel permeation chromatography (GPC) (as applicable to SVOCs and polychlorinated biphenyls [PCB]). For VOC and SVOC analysis, gas chromatography and mass

spectrometry instrument performance check samples were analyzed to ensure mass resolution, identification, and to some degree, sensitivity. Specifically, minimum and maximum ion abundance requirements must be met for bromofluorobenzene and decafluorotriphenylphosphine. Gas chromatography and electron capture detector instrument performance check samples (for PCBs) were analyzed to ensure adequate resolution and instrument sensitivity (EPA 1994b).

For SVOCs and PCB analyses, cleanup check samples were analyzed to verify the recovery of target analytes through cleanup processes. The GPC cleanup process removes matrix interferences from sample extracts before analysis. By running a blank spike through the GPC column and calculating the %R, these processes are checked. GPC is checked weekly (EPA 1994b).

For inorganic analyses, ICPES interference check samples were evaluated. The ICPES interference check sample verifies the validity of the laboratory's interelement and background correction factors. High concentrations of the elements aluminum, iron, calcium, and magnesium can affect sample results if the interelement and background correction factors have not been optimized. Incorrect correction factors may result in false positives, false negatives, or biased results. In general, data affected by any of the criteria violations discussed previously were qualified as "Jj," indicating that the results were estimated. The additional analytical and matrix performance requirements resulted in only a small amount of estimated data and no rejected data.

4.2 ANALYTE IDENTIFICATION

Qualitative criteria have been established to minimize erroneous identification of compounds. An erroneous identification can be either a false positive (reporting a compound present when it is not) or a false negative (not reporting a compound that is present). By comparing the sample's mass spectra and retention time with the standard's mass spectra and retention time, analytes were identified for CLP volatile and semivolatile analysis. For positive identification, the compound's mass spectra must meet the following criteria: contain all of the standard's ions with relative intensities greater than 10 percent, agree within plus or minus 20 percent of the standard ion's relative intensities, and not contain any unaccounted ions with relative intensities greater than 10 percent. In addition, the retention time must be within plus or minus 0.06 relative retention time unit of the standard component's retention time (EPA 1994b).

PCBs were positively identified when a peak fell within the specified retention time "windows" on two dissimilar columns. Surrogates and MS/MSDs also were evaluated strictly to identify any retention time shifts by generating an RPD value. Single peak results were checked for quantitative agreement between

the two columns. Detected results with RPDs greater than 50 percent and less than 100 percent were qualified as "Jj," indicating that the results were estimated. Because matrix effects frequently present unique problems in analyte identification, results with RPDs greater than 100 percent were sometimes considered to be misidentified and qualified as "UJj," indicating that the results were nondetected (EPA 1994b). Misidentified results below the CRQL were raised to the quantitation limit and considered to be nondetected. In some cases, professional judgment was used in qualifying the result as estimated (Jj) or nondetected (UJj). Any such decisions were clearly identified and documented in data validation reports.

Metals and other analyses were identified positively when the instrument registered a measurable response while operating under method-specified analytical parameters. In these cases, the instrument's accuracy in analyte identification is verified indirectly by assessing the instrument's performance. No organic or inorganic data were qualified or rejected because analytical and matrix performances were exceeded or as a result of analyte identification violations.

4.3 ANALYTE QUANTITATION

Applicable raw data were reviewed to verify positive results and reported detection or quantitation limits. Approximately 10 percent of the calculations was evaluated and recalculated for reproducibility. Raw data reviewed included, as applicable, the following sources: extraction and preparation logbooks, cleanup logbooks, spike and standard preparation logbooks, instrument printouts, strip chart recordings, chromatograms, and quantitation reports. The following data sources were also evaluated, as applicable: sample dilutions, concentrations, analytical split samples, cleanup activities, and percent moisture. Review of the raw data showed that the chemical analytical results obtained between June 2002 and January 2003 were quantitated properly.

4.4 ANALYTE REPORTING LIMITS

Analyte reporting limits are affected directly by dilutions. Detection or quantitation limits for water samples were raised by the dilution factor when samples required dilution for analysis. Sample dilution was necessary when high concentrations of an analyte were detected or when matrix problems occurred during sample extraction or analysis.

5.0 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS, AND COMPARABILITY EVALUATION SUMMARY

The following paragraphs discuss overall data quality, including PARCC parameters, as determined during data validation.

5.1 PRECISION

Precision is a measure of the reproducibility of an experimental value without regard to the true or reference value. Primary indicators of data precision were the RPD of the MS/MSD in organic analyses and the RPD of the sample and sample duplicate in inorganic analyses. The following list summarizes data precision:

- For metals, over 98 percent of the sample and sample duplicate RPDs were within QA/QC criteria.
- For organic analyses, the MS/MSD RPDs were within QA/QC criteria.

5.2 ACCURACY

Accuracy assesses the closeness of an experimental value to the true or reference value. Primary accuracy indicators were the recoveries of surrogate spikes, MS, and LCS spikes. The following list summarizes the accuracy of the data:

- For VOCs, SVOCs, Pesticides, PCBs, and herbicides, over 97 percent of the surrogate spike, MS, and LCS spike recoveries were within QA/QC criteria.
- For metals, over 80 percent of the LCS spike and MS recoveries were within QA/QC criteria.

5.3 REPRESENTATIVENESS

Representativeness refers to the ability of sample data to reflect true environmental conditions. Factors that affect representativeness include sampling locations, frequency, collection procedures, and possible compromises to sample integrity (such as cross-contamination) that can occur during collection, transport, and analysis. Selection of representative sampling sites is important to ensure that the medium sampled is typical of the site. Correct sample collection, transport, and analytical procedures are important to ensure that samples closely resemble the medium sampled and to minimize contamination.

5.4 COMPLETENESS

Completeness is defined as the percentage of analytical results considered valid. Valid data are identified as acceptable or qualified as estimated (J) during the data validation process. Data qualified as rejected (R) are considered to be unusable and not valid.

Rejected and unusable data were qualified during the cursory review for the following reasons: exceeded holding time, calibration problems, low surrogate spike recovery, low LCS or MS recovery, or low internal standard areas. The full review of 10 percent of the data did not yield any additional rejected data.

The assessment of completeness consisted of comparing the amount of acceptable and usable results with the total number of expected results. For the data evaluated in this QCSR, completeness exceeding 99 percent was achieved. The SAP (Tetra Tech 2002) set a completeness goal of 90 percent for field samples and laboratory samples, which was exceeded. Over ninety-nine percent of analytical data obtained between June 2002 and January 2003 are valid and usable for site characterization, human health risk assessment, and ecological risk assessment purposes.

5.5 COMPARABILITY

Comparability is a qualitative assessment of how well one data set compares with another. Important determinants of comparability include uniformity of sampling activities, analytical procedures, data reporting, and data validation. The use of CLP protocol, specific and well-documented American Society for Testing and Materials, and other EPA analytical methods; approved laboratories; and the standardized process of data review and validation give the data a high degree of analytical comparability. The use of well-established analytical protocols ensures that the data are comparable with that collected during previous rounds of groundwater sampling.

6.0 CONCLUSIONS FOR DATA QUALITY AND DATA USABILITY

Although some qualifiers were added to the data, a final review of the data set with respect to EPA data quality parameters discussed in Section 5.0 indicated that the data are of high overall quality. Based on the overall assessment of the sampling program, QA/QC data, data review, and data validation results summarized in Sections 3.0 and 4.0, the data obtained between June 2002 and January 2003 are of acceptable PARCC parameters, as described in EPA (1997) guidance for quality assurance project plans. Except for the three rejected acetone results, therefore, these data are usable for risk assessment and site

characterization. Supporting documentation and data are available on request, including cursory and full validation reports and the database that holds all sample results.

REFERENCES

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ATTACHMENT A-2
SOIL BORING LITHOLOGIC LOGS

Tetra Tech EM Inc.

Log of Boring: CS1

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 3.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		32							Top Soil
1									SAND: medium brown
1				001AOC1GB108					SILTY SAND: yellowish, 20-30% silt, loose, fine grained
2									Concrete fragments and dust
2									SILT: medium brown, 20% clay, 15% sand, stiff, no observed odor or staining
3									Total depth of boring = 3 feet
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: CS2

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 3.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		32		001AOC1GB108					Top Soil SILT: medium brown, dry, medium stiff, trace gravel, 20% clay, 15% sand
2									Increase of clay with depth and decrease of sand, no observed staining or odor
3									Total depth of boring = 3 feet

Tetra Tech EM Inc.

Log of Boring: CS3

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 2.50
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		30		001AOC1GB108					Top Soil
1									SILT: dark brown, dry, stiff, organic matter, base rock at 1 foot
2									CLAYEY SILT: yellowish brown, dry, stiff, trace gravel, 20% clay, 15% ultra fine yellow sand
									Base rock, 75% angular, descrease in sand at 2.5 feet
									No observed staining or odor
3									Total depth of boring = 2.5 feet
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: CS4

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 3.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
		36		001AOC1GB108					Top Soil
1									SANDY SILT: medium brown, dry, stiff, trace gravel, 20% yellow sand
2									
3									SILT: dark brown, dry, stiff, 15-20% clay No observed staining or odor Total depth of boring = 3 feet
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: EPT1

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		30							Top Soil
				001AOC1SS084					
1				001AOC1GB085					SILT: medium gray to dark gray brown, dry, medium soft, trace gravel, 10 to 15% clay, 5 to 10% sand, very fine sand
2									Becomes sandy with silt, light yellowish brown, moist at 4 feet, 60% silt, 40% sand
3				001AOC1GB086					
4		24							
5									
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: EPT2

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		48							Top Soil
1									GRAVELLY SILTY SAND: trace gravel, 20-30% silts, 10% gravel, well graded interval
2									silts and ash looking material
3									GRAVELLY SILT: light olive grey to light olive brown, well graded, fine angular gravels, 40-50% silts, dry, loose
4		24							
5									
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: EPT3

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		48							Top Soil Fine angular gravel, well graded becomes poorly graded with depth SILTY SAND: dark grey brown, increase in silt content with depth, 30-40% silt SANDY SILT: yellowish brown, dry, medium loose, very fine to fine sand, 40% to 50% sand, 30% to 45% silt, no observed staining or odor
4		24							
6									Total depth of boring = 6 feet

Log of Boring: EPT4

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
									Top Soil
1		30							SILT: dark brown, dry, stiff, 15% clay, 15% sand, trace angular gravel
									Gypsum material, white, changes to olive to yellowish red, fine gravel, no odor
2				001AOC1GB181					
				001AOC1GB182					
3									SILT: medium brown, dry, stiff, 25% to 10% sand
4		24		001AOC1GB183					
5									
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: LAB1

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		48							Top Soil
1				001AOC1GB081					SANDY SILT: dark gray brown, dry, very stiff, 20% sand
				001AOC1GB082					
2									Sand becomes yellowish, black fine concrete fragments for 16 inches
3				001AOC1GB083					Increase in sand and gravel content with depth, concrete fragments at 17 to 21 inches.
4		24							CLAYEY SILT: reddish brown, dry, medium stiff, 20% clay, 20% to 15% sand
5									
6									Sand content increases with depth
									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: LAB2

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		48		001AOC1SS081					SILT: medium brown, dry, soft, 15% clay, 10% sand
1									
2									Increase in clay, stiffness, plasticity increases with depth
3				001AOC1GB082					
4		24							Increase in percentage of sand
5				001AOC1GB083					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: LAB3

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
									Ground Surface
0		48		001AOC1SS081					Top Soil
1									SILT: dark brown, stiff, dry, organic matter
2									SILT: light brown, dry, soft low plasticity
3				001AOC1GB082					Increase in clay and sand content with depth
4		24							
5				001AOC1GB083					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: NB1

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method: HAND AUGER
Boring Started:
Completed:
Boring Depth (feet bgs): 0.50
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
				001AOC1SS090					SILTS: medium brown, dry, 20% clay, 5-10% sand, trace gravel, organics. No observed staining or odor.
									Total depth of boring = 0.5 feet
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: NB2

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method: HAND AUGER
Boring Started:
Completed:
Boring Depth (feet bgs): 0.50
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0				001AOC1SS090					Ground Surface
									SILT: dark brown, dry, 20% clay, 5-10% sand, gravel organics. No observed staining or odor. Sample location is on the former R&R track.
1									Total depth of boring = 0.5 feet
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: NB3

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method: HAND AUGER
Boring Started:
Completed:
Boring Depth (feet bgs): 0.50
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0				001AOC1SS090					Ground Surface
									SILT: dark brown, dry, 20% clay, 5-10% sand, organic trace gravel. No observed staining or odor.
1									Total depth of boring = 0.5 feet
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: NB4

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method: HAND AUGER
Boring Started:
Completed:
Boring Depth (feet bgs): 0.50
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
				001AOC1SS090					SILT: medium brown, dry, 20% clay, 5-10% sand. No observed staining or odor.
									Total depth of boring = 0.5 feet
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WA1

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		48		001AOC1SS102					Top Soil
1									SILT: organic and non-organic matter
1									Gravelley sand, well graded, fine, 15% sand
2									SILT: medium yellow brown, dry, stiff, 20% clay, 10% sand, trace gravel
3				001AOC1GB103					
4		24							SANDY SILT: medium brown, dry, soft, 20% clay, 20% sand, trace gravel
5				001AOC1GB104					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WA2

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		36		001AOC1SS102					Top Soil
1									SILT: dark brown, dry, very stiff
2									CLAYEY SILTS: medium brown, dry, stiff, increase of sand and clay
3				001AOC1GB103					
4		24							SANDY SILT: yellowish brown, dry, soft, increase in sand to 20%
5				001AOC1GB104					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WA3

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
									Ground Surface
0		42		001AOC1SS102					Top Soil
1									SANDY SILT: medium brown, dry, medium stiff, trace gravel, 20% clay, 10-15% sand
2									Increase in sand content with depth
3				001AOC1GB103					
4		24							
5				001AOC1GB104					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WA4

Logged By: DOUGLAS STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		36		001AOC1SS102					Top Soil
1									Concrete for 3 inches
1									SILT: medium brown, dry, stiff, trace gravel, 20% clay, 15% sand
2									
3				001AOC1GB103					Increase of sand to 40% with depth
4		24							
5				001AOC1GB104					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WG1

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		30		001AOC1SS093					Top Soil
1									Trace gravel lens
1									SILT: medium to dark brown, dry, soft, trace fine gravel, 20% clay, 10% sand
2									
3				001AOC1GB094 001AOC1GB094A					Increase in clay to dark brown, hard, dry
4		24							CLAYEY SILTS: yellowish brown, dry, soft, increase of clay with depth. Pockets of white sand deposits, 20% clay, 15-20% sand
5				001AOC1GB095 001AOC1GB095A					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WG2

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
				001AOC1SS096					Top Soil
1									SILT: medium brown, dry, stiff, trace gravel, 20-15% sand
2									
3				001AOC1GB097 001AOC1GB097A					CLAYEY SILT: medium yellow brown, dry, very, stiff, clay increases with depth to 4.5 feet, 20% clay
4									
5									SANDY SILT: yellow brown, dry, 20% sand, loose, trace fine gravel.
6				001AOC1GB098 001AOC1GB098A					Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WG3

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		48		001AOC1SS099					Top Soil
1				001AOC1GB100					SILTY GRAVEL: light yellowish green to light olive, dry, soft, angular half inch gravel, fragments below topsoil
1									SANDY SILT: medium brown, trace gravel, 20% clay, 15% sand
2									Increase in clay content at 4 feet to 30%, light reddish brown
3				001AOC1GB101					
4		24							SANDY SILT: yellowish brown, dry, medium stiff, trace gravel, sand content increases to 20%
6									Total depth of boring = 6 feet

Tetra Tech EM Inc.

Log of Boring: WG4

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		48		001AOC1SS110					Top Soil
1									SILT: dark brown, dry, medium stiff, 20% clay with sand
2									SANDY SILT: yellowish brown, dry, medium stiff, trace gravel, 25% sand
3				001AOC1GB111					Sand content increases with depth
4		24							No observed waste or contamination.
5				001AOC1GB112					
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WPT1

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 2.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
				001AOC1SS087					CLAYEY SILT: yellowish brown to medium brown, dry, stiff, organic matter, 20% clay, 15% sand
1									CONCRETE: unable to go through. No observed staining or odor.
2									No observed staining or odor
									Total depth of boring = 2 feet
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WPT2

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 6.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
0		24							TOPSOIL.
1									SANDY SILT: medium brown, stiff, trace of fine gravel
				001AOC1GB087					
2				001AOC1GB088 001AOC1GB088A					GYPSUM: light gray, 16 to 19 inches, fine flour
									GYPSUM: medium gray, 19 to 22 inches, fine flour
3									SILTY SAND: dark gray brown, moist at 3 feet
4		24		001AOC1GB089 001AOC1GB089A					CLAYED SILT: olive brown, dry, very stiff, 25% clay
5									
6									Total depth of boring = 6 feet
7									
8									
9									
10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WPT3

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 2.00
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0									Ground Surface
				001AOC1SS087					Top Soil
1									Fine angular gravel
									SILT: medium brown, concrete fragments and flour
2									Unable to pass through concrete. No observed staining or odor
									Total depth of boring = 2 feet
3									
4									
5									
6									
7									
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10									
11									
12									
13									
14									
15									

Tetra Tech EM Inc.

Log of Boring: WPT4

Logged By: DOUG STERLING
Logging Consultant:
Drilling Company:

Project: REMEDIAL INVESTIGATION
Project No: AECRU
Location: UNK
Ground Surface Elevation (feet MSL):

Drilling Method:
Boring Started:
Completed:
Boring Depth (feet bgs): 0.70
Boring Diameter (inches):

DEPTH (FEET)	DRIVE INTERVAL	RECOVERY (IN)	BLOW COUNTS	SAMPLE ID	OVM (PPM)	WATER LEVEL	GRAPHIC LOG	USCS SOIL TYPE	DESCRIPTION
0				001AOC1SS087					Ground Surface
									Top Soil
1									Silty gravel
									Unable to pass through concrete at 6 inches. No observed staining or odor
2									Total depth of boring = 0.7 feet
3									
4									
5									
6									
7									
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10									
11									
12									
13									
14									
15									

ATTACHMENT A-3
CHAIN OF CUSTODY FORMS

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Chain of Custody Record No. 3724

Page 1 of 1

3724

Lab PO#:	Lab: Laucks
Project name: TCEA & Sup. Sampling	TtEMI technical contact: Sera Wadley
Project (CTO) number: G901600104.0102049	TtEMI project manager: Rik Lau
	Field samplers: Tad Sterling
	Field samplers' signatures:

Sample ID	Sample Location (Pt. ID)		Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Encore	VOA VOC	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Magnitude
001AOC1TB002	Trip Blank		12/11	0700	H2O		3						X						
001AOC1GB108	CS1		12/10	0800	Soil						1	3	X						X
001AOC1GB121	EPT 4	T	12/10	1330							1	3	X						X
001AOC1GB182	EPT 4	M									1	3	X						X
001AOC1GB183	EPT 4	B									1	3	X						X
001AOC1GB031	LAB1	T		1450		X					1	3	X						X
001AOC1GB032	LAB1	M									1	3	X						X
001AOC1GB033	LAB1	B				X					1	3	X						X

Preservative Added

Analysis Required

No./Container Types

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling	T+E	12/11/02	1600
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

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Chain of Custody Record No. 3726

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3726

Lab PO#:	
Lab:	Laucks
Project name:	TI RA & Sup. Sampling
TtEMI technical contact:	Sava Wadey
Field samplers:	Douglas Sterling & Eric Martin
Project (CTO) number:	G9016001040102049I
TtEMI project manager:	Rik Lantz
Field samplers' signatures:	[signature]

No./Container Types; Preservative Added; Analysis Required

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS/MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	VOA	SVOA	Pest/PCBs	Metals ~~(1)~~	TPH Purgeables	TPH Extractables	~~Pb, Se, Hg &~~	SbA Metals, Antimony	Chlorinated Herbicides	Floride	Pb, Se, Hg
QQ1AOCISSQ23	F9	12/9/02	0930	soil						1								X			X
QQ1AOCISSQ24	F10	↓	1230	↓						1								X			X
QQ1AOCISSQ25	F11	↓	1345	↓						1								X			X
QQ1AOCISSQ26	D11	↓	1545	↓						1								X			X
QQ1AOCISSQ27	E11	↓	1445	↓						1								X			X
QQ1AOCISS73	WG1 (T)	12/10/02	0815	soil						1		X	X	X					X	X	
QQ1AOCIGB74	WG1 (m)	↓	0815	↓						1		X	X	X					X	X	
QQ1AOCIGB75	WG1 (B)	↓	0815	↓						1		X	X	X					X	X	
QQ1AOCISS76	WG2 (T)	↓	0805	↓						1		X	X	X					X	X	
QQ1AOCIGB77	WG2 (m)	↓	0805	↓						1		X	X	X					X	X	
QQ1AOCIGB78	WG2 (B)	↓	0805	↓						1		X	X	X					X	X	

		Name (print)	Company Name	Date	Time
Relinquished by:	[signature]	Douglas Sterling	TtEMI	12/11/02	1600
Received by:					
Relinquished by:					
Received by:					
Relinquished by:					
Received by:					

Turnaround time/remarks:

Fed Ex #: 8385 1213 1358

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Chain of Custody Record No. 3727

Page ____ of ____

Project name: TCRA Sup Sampling	**Lab PO#:**	**Lab:** Lauck's	**3727**
Project (CTO) number: G901600104010204911	**TtEMI technical contact:** Sara Wooley	**Field samplers:** Doug Sterling / Eric Markham	**No./Container Types**
	TtEMI project manager: Kit Lantz	**Field samplers' signatures:**	**Analysis Required**

Sample ID	Sample Location (Pt. ID)		Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Preservative Added	VOA	SVOA	Pest/PCBs	Metals 2 filt.	TPH Purgeables	TPH Extractables	Herbicide Furan
001AOC1SS99	WG3	(T)	12/10/02	0840	Soil						1		X	X	X			X	X
001AOC1GP100	WG3	(M)	12/10/02	0840	Soil						1		X	X	X			X	X
001AOC1GP101	WG3	(B)	12/10/02	0840	Soil						1		X	X	X			X	X
001AOC1SS110	WG4	(T)		0935							2		X	X	X			X	X
001AOC1GB111	WG4	(M)		0935							2		X	X	X			X	X
001AOC1GB112	WG4	(B)		0935							2		X	X	X			X	X
001AOC1SS102	WA	(T)	12/10/02	0940	Soil						2		X	X	X			X	X
001AOC1GB103	WA	(M)									2		X	X	X			X	X
001AOC1GB104	WA	(B)									2		X	X	X			X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling		12/13/02	1600
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #:

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Chain of Custody Record No. 3728

Page ___ of ___

Project name: ICRA & Sup Sampling	Lab PO#:	Lab: Lancks
Project (CTO) number: 69016001040102049I	TtEMI technical contact: Sara Woolley	Field samplers: Doug Stelly
	TtEMI project manager: Rita Lantz	Field samplers' signature:

3728

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Encore	Preservative Added	Analysis Required: VOA VOC	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables
01AOC1TB003		12/12/02	0800	H_2O		3							X					
01AOC1GB87	WP12 (T)	1	1400	soil							3		X					
01AOC1GB88	WP12 (M)	1	1	1							3		X					
01AOC1GB89	WP12 (B)										3		X					

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Stelly	Ttemi	12/13/02	1600
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 820335544280

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Chain of Custody Record No. 3729

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3729

Project name: TCRA & Sup. Sampling	TtEMI technical contact: Sam Usselley	Lab: Lacks	Field samplers: Doug Sterling & Eli Monschewski
Project (CTO) number: G901600104010204911	TtEMI project manager: Rik Lantz		Field samplers' signatures:

Sample ID	Sample Location (Pt. ID)		Date	Time	Matrix	MS / MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Encore	Preservative Added	Analysis Required: VOA VOC	SVOA	Pest/PCBs	Metals 7 Hg	TPH Purgeables	TPH Extractables	Herbicides Florisil	pH
001AOC155990	NB1,2,3,4	0-.5	12/4/02	1400	soil						2				XX	X			XX		
001AOC1552.7	WPT	0- T		1400							2				XX	X			XX		
001AOC1GB88		m									2				XX	X			XX		
001AOC1GB891		B									2				XX	X			XX		
~~001AOC1GB87~~	~~WPT3~~	T									3			X							
~~001AOC1GB88~~	~~WPT2~~	m									3			X							
~~001AOC1GB89~~	~~WPT3~~	B									3			X							
001AOC155984	EPT	T	12/10/02	1215							2				XX	X			XX		
001AOC1GB985	EPT	m		1215							2				XX	X			XX		
001AOC1GB986	EPT	B		1215							2				XX	X			XX		

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling	Ttemi	12/13/02	1600
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

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Chain of Custody Record — No. 3731

Page ___ of ___

Lab PO#:	**Lab:** Laucks	**3731**
Project name: TCRA 4 wet. Sampling	**TtEMI technical contact:**	**Field samplers:** Douglas Sterling
Project (CTO) number: G9016/001/0401/02491	**TtEMI project manager:** Rik Lantz	**Field samplers' signatures:**

No./Container Types | **Analysis Required** | **Preservative Added**

Sample ID	Sample Location (Pt. ID)		Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Encore	VOA VOC	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	
001AOC1TB001			12/10/02	0800	water		3						X						
001AOC1GB94	WG1	3-3.5 (m)		0815	soil							3	X						
001AOC1GB95	WG1	5-5.6 (B)		↓								3	X						
001AOC1GB97	WG2	3-3.5 (m)		0805								3	X						
001AOC1GB98	WG2	5-5-6 (B)		↓								3	X						
001AOC1GB100	WG3	13"-19" (m)		0840								3	X						
001AOC1GB101	WG3	37"-41" (B)		↓								3	X						
001AOC1GB111	WG4	3-3.5 (m)		0855								3	X						
001AOC1GB112	WG-4	5.5-6 (B)		↓								3	X						
001AOC1GB104	WA	5.5-6 (B)	12/10/02	0940	soil							3	X						
001AOC1GB103	WA	3-3.5 (m)	↓	↓	↓							3	X						

	Name (print)	Company Name	Date	Time
Relinquished by:	Douglas Sterling	Ttemi	12/10/02	1600
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 8385-1213-1233

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Chain of Custody Record

Page 1 of 1

PO# 022288

Lab: Laucks Testing

Project name: Concord NWS AOC-1

Project number: 9016001 04501 0204 91

TtEMI technical contact: Sarah Woody

TtEMI project manager: Rick Lantz

Field samplers: Greg Mason

Field samplers' signatures:

Sample ID	Sample Description/Notes			Date	Time	Matrix	No./Container Types: 40 ml VOA	1 Liter Amber	1 Liter Poly	Brass Tube	Glass Jar	Preservative Added: NA	Analysis Required: CLP VOA – low	CLP SVOA – low	CLP Pest/PCBs – low	CLP Metals	TPH Purgeables	TPH Extractables	pH
~~001AOC1GB105~~																			
~~MW-04-9-9½~~ 001AOC1GB105	SAP 1	9-9.5'		1/9/03	11:45	SOIL					2		X	X	X	X			X
~~MW-04-12-12½~~ 001AOC1GB106	SAP 1	12-12.5'		1/9/03	12:00	SOIL					2		X	X	X	X			X
~~MW-04-15-15½~~ 001AOC1GB107	SAP 1	15-15.5'		1/9/03	12:15	SOIL					2		X	X	X	X			X

1/10/03

	Name (print)	Company Name	Date	Time
Relinquished by:	Greg Mason	TTEMI	1/10/03	12:30
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

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Chain of Custody Record No. 5913

Page ____ of ____

5913

Project name: TCRA 4 Sup. Sampling	Lab PO#:	Lab: Lancks
Project (CTO) number: G901600104010204911	TtEMI technical contact:	Field samplers: Doug Sterling
	TtEMI project manager: Rik Luntz	Field samplers' signatures:

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Analysis Required: VOA VOC	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Preservative Added: Fluoride	pH	Chl Hxb
1601AOCITB0004	Trip	12/13	0900	water		3					Y								
1601AOCIERQP2	Equip Rinsate	↓	0900	↓		3	6	3		1	X	X	X	X			X	X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling	Tetra Tech	12/13/02	1600
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 233955 1213 1358

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco. CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 5915

5915

Page —— of ——

Lab PO#:	Lab: Lcuck

Project name: TCRA / Sup. Sampling	TtEMI technical contact: Sara Woolley	Field samplers: Douglas Sterling & Eric Monichein
Project (CTO) number: G9Ø16ØØ1Ø4Ø1Ø2Ø491	TtEMI project manager: Rik Lantz	Field samplers' signatures:

Preservative Added

Sample ID	Sample Location (Pt. ID)		Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	VOA	SVOA	Pest/PCBs	Metals Hg	TPH Purgeable	TPH Extractables	Chl Herbs	[illegible]	Fluoride	pH
ØØ1AOCISS1Ø8	CS	T	12/11/02	0745	Soil	X				2	5		X	X	X			X	X	X	X
ØØ1AOCISSØ81	LAB	T	12/10/02	1450	|	X				2	5		X	X	X			X	X	X	
ØØ1AOCIGBØ82	LAB	M	|	|	|					2			X	X	X			X	X	X	
ØØ1AOCIGBØ83	LAB	B	|	|	|					2			X	X	X			X		X	

	Name (print)	Company Name	Date	Time
Relinquished by: [signature]	Doug Sterling	Ttemi	12/13/02	1600
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 8385 1213 1369

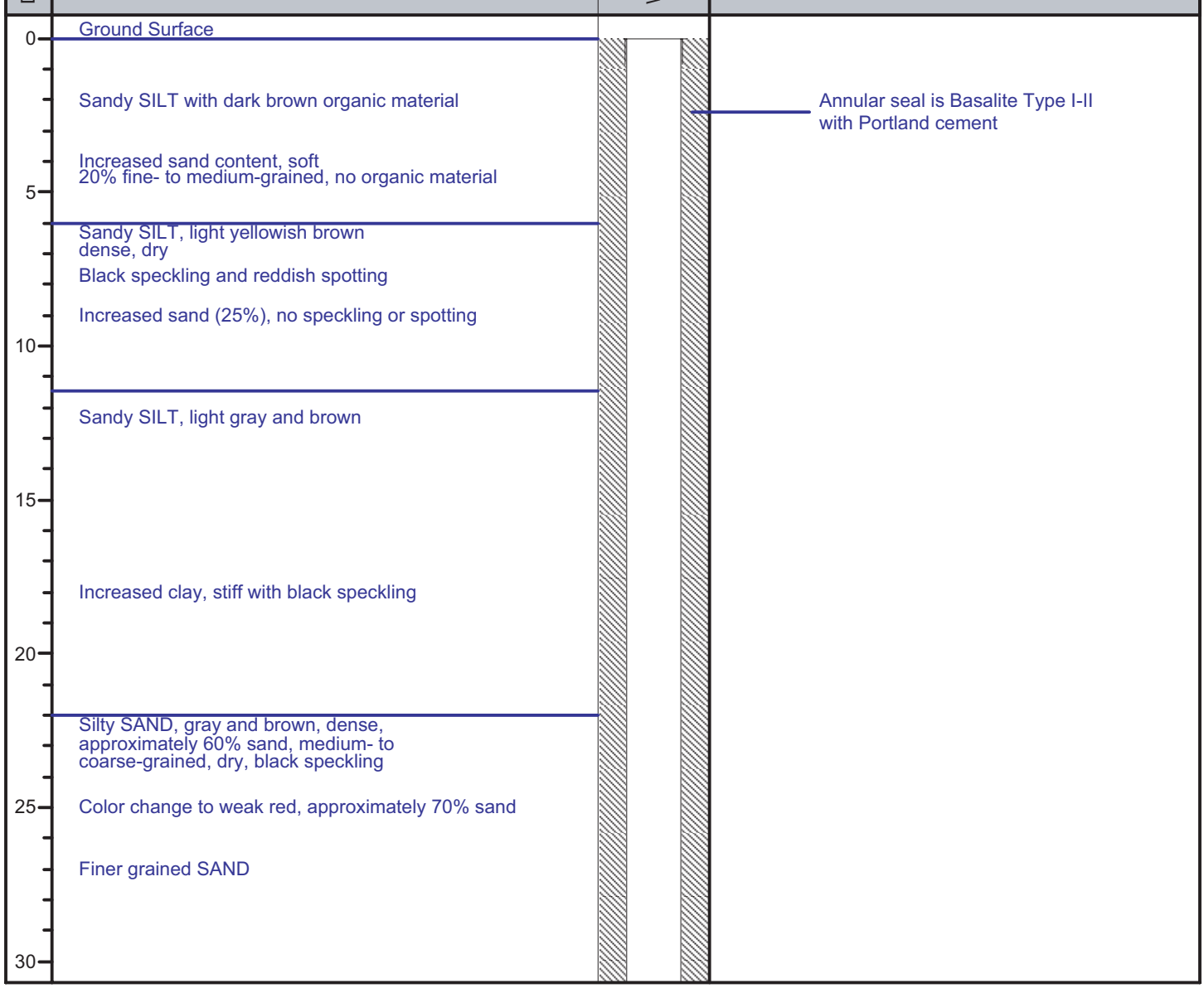
WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

ATTACHMENT A-4
MONITORING WELL CONSTRUCTION AND LITHOLOGY LOGS

Well ID: MW-01

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

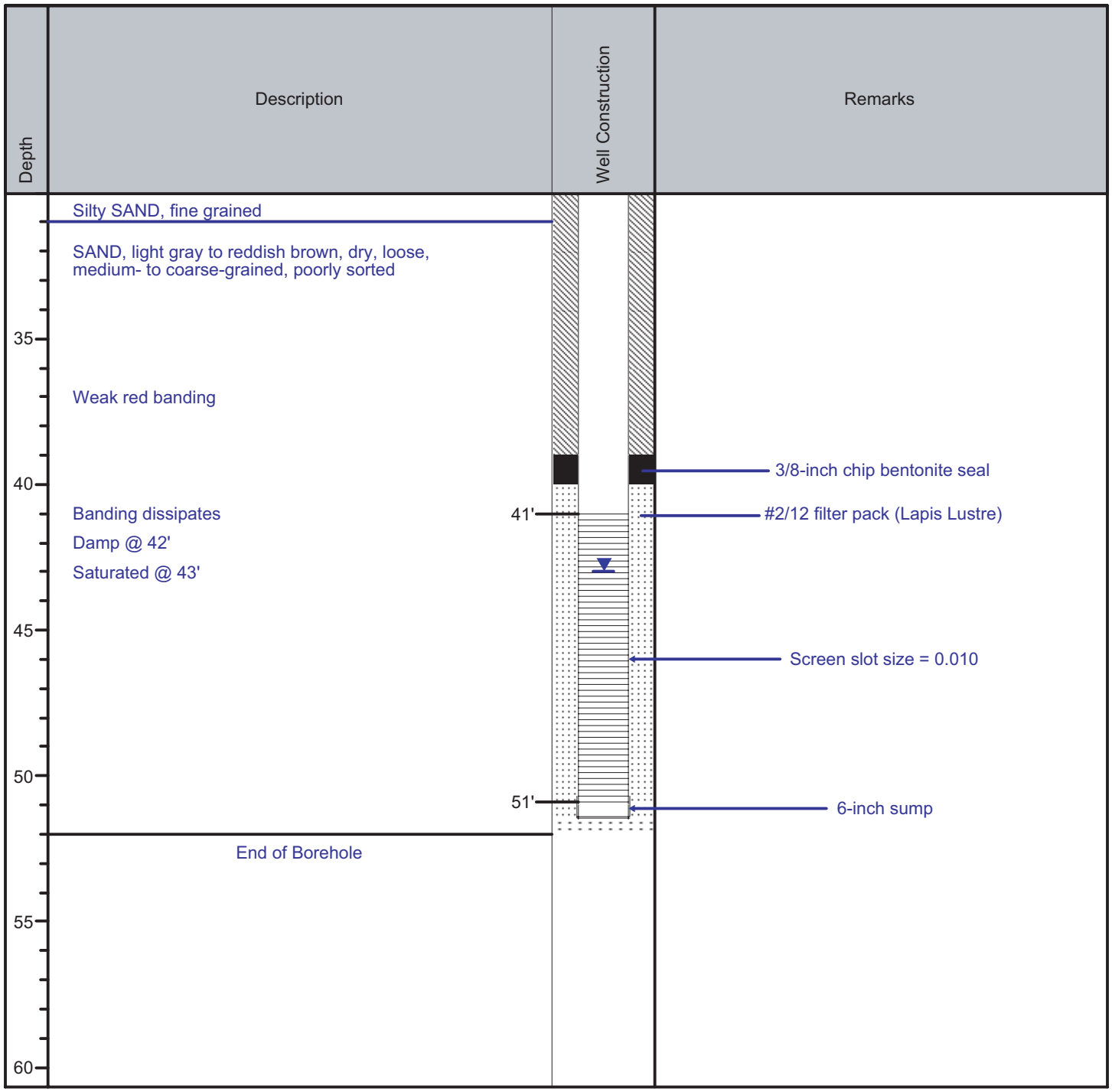
Drill Method: Hollow-stem auger

Drill Date: 1-8-03

Well ID: MW-01

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

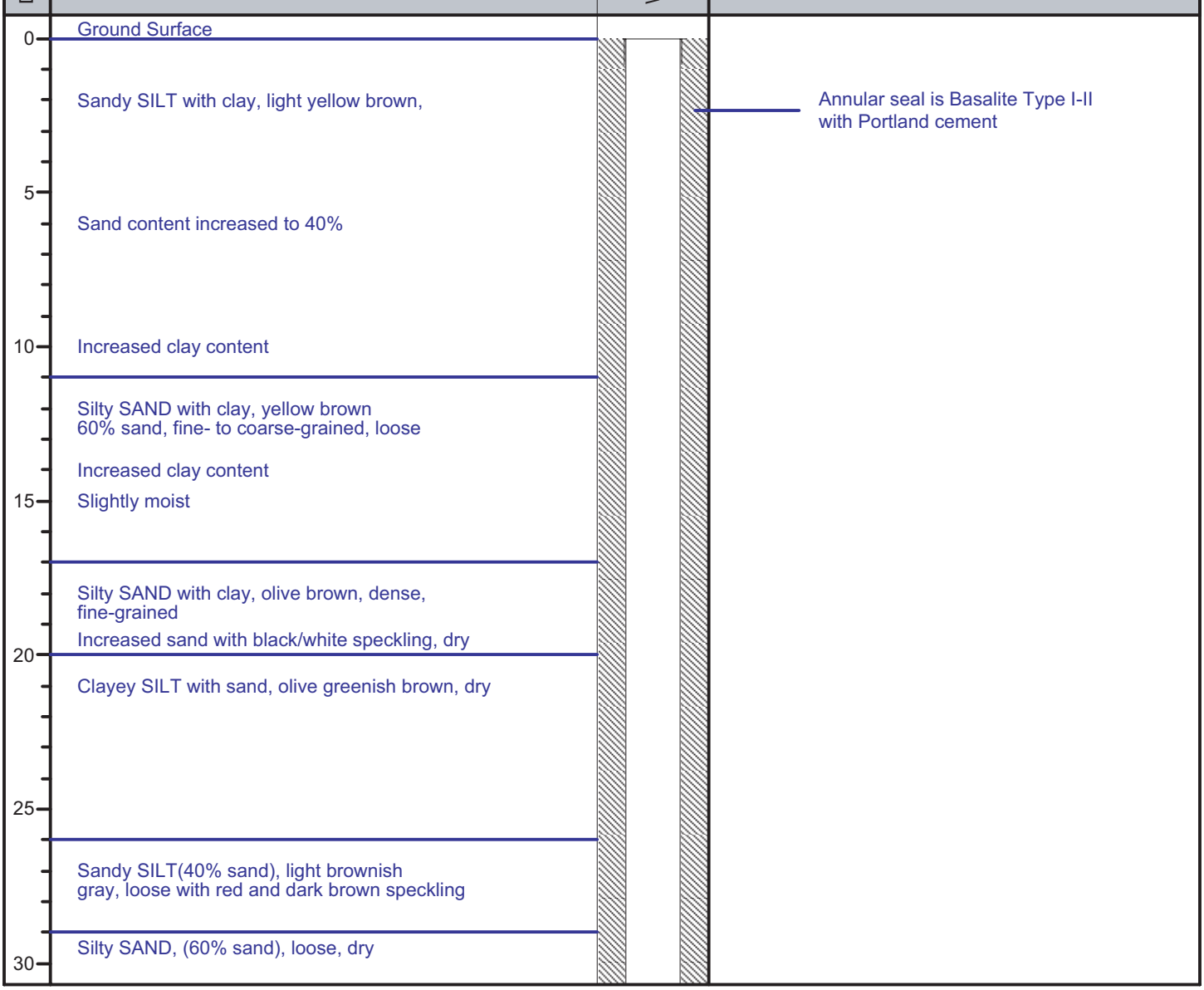
Drill Date: 1-8-03

Sheet: 2 of 2

Well ID: MW-02

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

Drill Date: 1-7-03

Sheet: 1 of 2

Well ID: MW-02

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy

Depth	Description	Well Construction	Remarks
	Silty SAND w/ clay, (60% sand), loose, dry		
	Mica flakes @ 34'		
35			
	Increased sand content (85%), dry, medium- to coarse-grained, loose, poorly sorted		
40	Sandy SILT, 40% sand, loose, dry, fine- to medium-grained with weak red banding		Medium Pure Gold chip bentonite seal
	Color change to medium brown, loose, dry	42'	#2/12 filter pack (Lapis Lustre)
	Damp @ 43'		
	6-inch saturated perch zone		
45	dense CLAY w/ mica flakes		
	Sandy SILT saturated (40% sand)		Screen slot size = 0.010
50		52'	6-inch sump
	End of Borehole		
55			
60			

Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

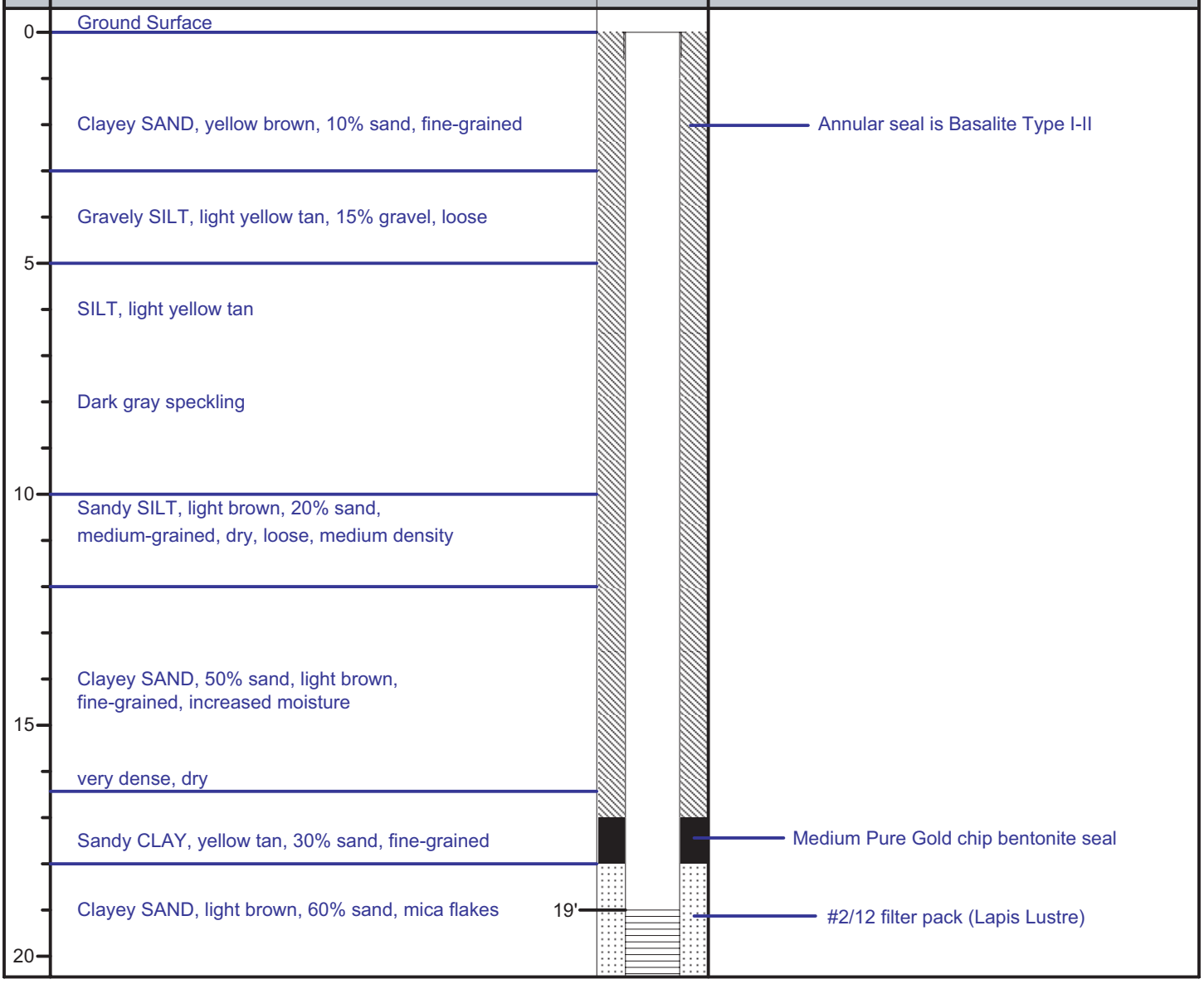
Drill Date: 1-7-03

Sheet: 2 of 2

Well ID: MW-03

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

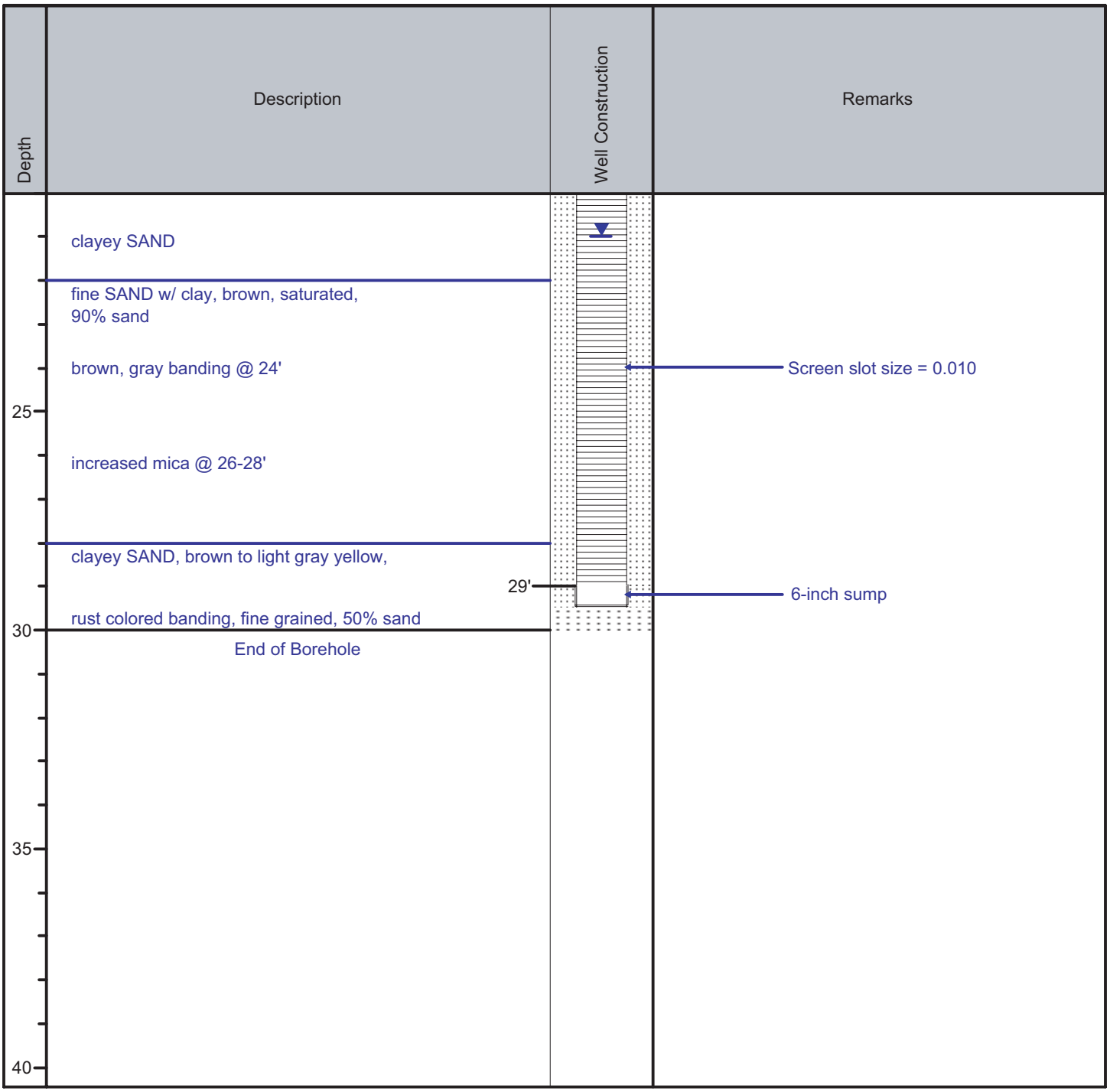
Drill Date: 1-9-03

Sheet: 1 of 2

Well ID: MW-03

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

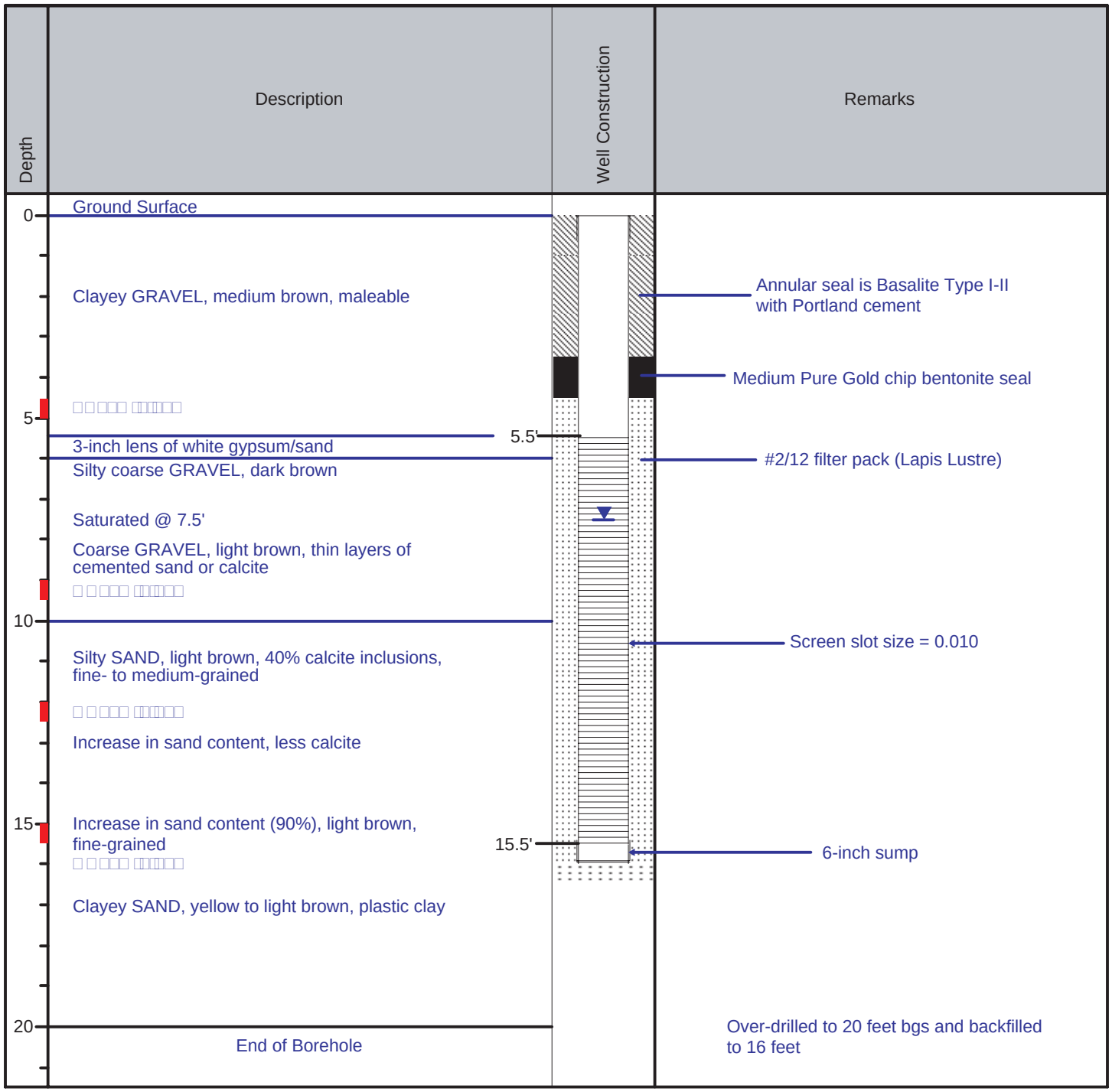
Drill Date: 1-9-03

Sheet: 2 of 2

Well ID: MW-04

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

Drill Date: 1-9-03

Sheet: 1 of 1

ATTACHMENT A-5
RESPONSES TO REGULATORY AGENCY COMMENTS

RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT AREA OF CONCERN 1 (SITE 31) TIME-CRITICAL REMOVAL ACTION CLOSE-OUT REPORT, NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CONCORD CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, and the U.S. Environmental Protection Agency (EPA) on the "Draft Area of Concern 1 (Site 31) Time-Critical Removal Action Close-Out Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord California," dated March 10, 2003. The comments addressed in the following text were submitted by EPA on May 21, 2003, and by RWQCB on May 19, 2003

RESPONSES TO EPA COMMENTS

General Comments

1. Comment: The TCRA Report does not include a Quality Assurance/Quality Control (QA/QC) section which presents methodologies, results, and conclusions of the cursory and full QA/QC reviews of chemical data gathered as part of the delineation, confirmation, and QC sampling activities. Please include a QA/QC section in the TCRA Report to describe the data quality of the analytical results and include the data validation report.

Response: A quality control summary report (QCSR) was prepared to that lists the methodologies, results, and conclusions of the cursory and full QA/QC reviews for the supplemental soil sampling and sampling conducted as part of the time-critical removal action (TCRA). The QCSR was submitted to the regulatory agencies as Attachment E-1 to the supplemental soil sampling summary report (Navy 2003). The QCSR has been included as Appendix B of the TCRA summary report, and Section 2.2 has been modified to note that the data are of high quality and suitable for making remedial decisions about the site.

2. Comment: The TCRA Report contains many statements regarding the acceptability of ecological risk, and the Navy's efforts to clean up the eastern side of AOC-1 to concentrations protective of ecological receptors. However, U.S. EPA has issued multiple comments in the past indicating that we do not concur with the Navy's approach for evaluating ecological risk. Specifically, U.S. EPA does not agree with: 1) the use of a bioavailability factor for metals, 2) the selection of receptors of concern, and 3) the methodology used to derive exposure point concentrations for a screening-level evaluation (see U.S. EPA correspondence dated November 28, 2001- review of September 2001 Draft PA Addendum and May 1, 2002 - review of PA Addendum response to agency comments and Action Memorandum). Although

U.S. EPA does not necessarily support the Navy's determinations regarding the acceptability of ecological risk, it is our understanding that the Navy plans to perform an RI/FS for AOC-1 which will presumably include additional efforts to assess ecological and human health risks. Therefore, while U.S. EPA does not concur with the statements in the TCRA Report, comments regarding ecological risk assessment and the acceptability of risk will be reserved until the RI.

Response: The Navy intends to evaluate ecological risks as part of the remedial investigation (RI) and feasibility study at Site 31 using EPA-recommended risk assessment methodology and intends to measure site-specific tissue concentrations to reduce uncertainties associated with bioavailability factors for metals. The Navy will coordinate with regulatory agencies to select acceptable receptors of concern and to develop an appropriate methodology to derive exposure point concentrations for the ecological risk assessment.

3. Comment: **At many of the boring locations within the northern "Hot Spot" delineation/removal area, the GeoProbe sampler could not penetrate a concrete-like unknown material that was encountered at a depth of 1 - foot below ground surface or greater. At some of these locations, samples were not collected from the ash or gypsum sand layer, but rather from a shallower strata. Step-out results where a composite sample has excluded the unknown waste material will be regarded as suspect. The cement-like material needs to be better assessed in terms of its physical characteristics, distribution, and chemistry. U.S. EPA noted to the Navy on May 6, 2003, that a small sample of the cement-like material observed did not contain any aggregate gravel, typical of building concrete. The northeast portion of AOC-1 where drilling refusal occurs has not been explained and needs further investigation.**

Response: The composite samples from each site included any horizon that contained waste. At locations where the Geoprobe sampler was unable to penetrate a shallow layer of cement-like material, samples of shallow soils were collected above the cement-like material. The Navy wishes to note that presence of an ash or gypsum sand layer beneath the cement-like material is speculative because the sampler was unable to penetrate beneath the cement-like material. Accordingly, the idea presented in the comment (that shallow soils were sampled instead of deeper waste materials) may be inaccurate. The Navy acknowledges that the material should not be referred to as “concrete” because of the lack of sand or gravel aggregate. A more accurate term for the material would be “cement-like material.” The report has been modified to correct this error and to note that the term “cement-like material” does not necessarily refer to a commercial product. The text explains that the material may in fact be a combination of ash and

other materials that have naturally solidified to form a substance similar in nature and appearance to cement.

4. **Comment:** **The Sampling and Analysis Plan, Time-Critical Removal Action and Supplemental Sampling Activities, dated May 24, 2002, states that if groundwater is encountered during excavation, the Navy will sample the free-standing groundwater and submit the sample to be analyzed for metals. While U.S. EPA does not believe any free-standing groundwater was encountered during the excavation, please clarify per the work plan whether groundwater was encountered in any of the excavations and whether it was sampled.**

   Response: The water table at Site 31 ranges from approximately 15 feet below ground surface (bgs) in the northern part of the site to 45 feet bgs at the southern part of the site. The excavations did not extend beneath the water table, and no water seeped into or gathered in the excavations. Groundwater from the excavations was not sampled because none was present. Section 2.3 of the TCRA summary report has been revised to note that groundwater did not accumulate in the excavation.

Specific Comments

1. **Comment:** **Section 2.4, Confirmation Sampling, page 12: The TCRA Report states that no samples exceeded the industrial Preliminary Remediation Goal (PRG) for mercury chloride (310 mg/kg). However, based on the data presented, no bottom sample exceeded the industrial PRG for mercury, while perimeter samples did exceed the industrial PRG for mercury chloride. Please correct this error. Also, please explain whether perimeter samples are excavation sidewall samples. If they are not sidewall samples, please explain why no sidewall samples were collected.**

   Response: The TCRA summary report has been modified to note that no excavation bottom samples exceeded the industrial PRG for mercury. The reference to a PRG of 0.0 for elemental mercury has been removed, and the reference to "mercuric chloride" has been replaced with "mercury and compounds," as suggested in a clarification issued by EPA Region 9 to correct minor errors in the 2002 PRG table (EPA 2003). The perimeter samples were collected from the sidewalls of the excavation in the manner described in Section 2.4 of the TCRA summary report.

2. **Comment:** **Figure 4, Hot Spot Delineation Sampling Locations, Figure 5, Lateral Limits of Cinder Excavation, and Figure 8, Lateral Limits of Hot Spot Excavation: U.S. EPA recommends combining key data values from tabulated data (i.e., Tables 2, 5, and 6) with the respective figures for**

improved data presentation and interpretation. Please see Enclosure C for an example of how "Hot Spot" delineation data from Table 2 could be integrated into Figure 4.

Response: Figures 9 through 14 have been added to the report to illustrate the distribution of lead, selenium, and mercury in the vicinity of the cinder excavation and the hot spots. The suggested format provided by EPA was not used because of the complexity of the resulting figures; the information is instead presented in separate figures for each contaminant. The Navy believes that this presentation clearly illustrates contaminant distribution in remaining soils around the cinder excavation and hot spots.

3. Comment: Figure 5, Lateral Limits of Cinder Excavation: The following comments pertain to Figure 5:

a. Please clarify how the lateral and vertical extent of contamination was determined for the isolated 60-feet by 25-feet removal area that is approximately 100-feet northeast of the pump station. There are no base or perimeter confirmation samples presented for this subarea.

b. As U.S. EPA understands that cinders were visible on the excavation sidewall on the north face of the pumping station, please modify the figure to accurately illustrate where visible waste were observed in the excavation.

c. It would be helpful to the reader if sample locations were highlighted when lead, selenium, and/or mercury exceed the industrial PRGs.

d. The Navy should include a geological cross-section of this removal area, to show original grade, base of excavation, and depth of "cinder" waste layer.

Response: a. As noted in Section 2.3 of the draft TCRA summary report, the removal contractor mistakenly excavated and removed the 25-foot by 60-foot area northeast of the pump station. Because the Navy did not intend to remove soils from this area, no confirmation samples were collected from the excavation sidewalls or base.

b. Figure 5 has been modified to indicate that cinders are present in the sidewall of the excavation along the north side of the pumping station.

c. Figures 5 and 8 have been modified to highlight the locations where confirmation samples exceeded industrial PRGs.

d. The available information about the original grade, base of the excavation, and the depth of the cinder layer are insufficient to support a detailed cross section. Both the pre-excavation and post-excavation topographic contour maps are drawn on a scale of 1-inch equals 120 feet, and the entire area of the excavation is represented on a 1-inch by 2-inch area of the available topographic maps. Also, the depth of the cinder layer is not fully documented. The removal contractor was instructed to excavate to the deeper of 2 feet below grade or 6 inches beneath the bottom of the cinder layer, but the contractor was not asked to document the depth of the cinder layer relative to original ground surface. Because critical information for the requested cross section is unavailable, a cross section has not been constructed.

4. **Comment:** **Figure 8, Lateral Limits of Hot Spot Excavation: As shown in the figure, grid D9 was not entirely excavated to the east. In addition, the lead concentration measured in the perimeter sample of this grid (NSNP4) slightly exceeded the industrial PRG (852 mg/kg vs. 750 mg/kg). Please explain why grid D9 was not entirely excavated. Also, it would be helpful if sample locations were highlighted when lead, selenium, and/or mercury exceed the industrial PRGs.**

Response: The limits of hot spot excavations did not exactly coincide with the grids used to define the hot spots because the removal contractor did not determine the precise locations of the grid boundaries in the field. As noted in Section 2.3 of the draft TCRA summary report, the removal contractor inadvertently neglected to remove grid square C9 and the eastern half of grid square E10. Grid squares C9 and D10 were excavated and removed in March 2003. The narrow strip along the eastern edge of grid square D9 was not excavated and removed. Locations where confirmation samples exceeded industrial PRGs have been highlighted in Figure 8.

5. **Comment:** **Figure 8, Lateral Limits of Hot Spot Excavation: Please verify sample location HSNP6, which is shown at the center of grid E10 and not at the eastern perimeter.**

Response: As noted in Section 2.3 of the draft TCRA summary report, the removal contractor inadvertently neglected to remove the eastern half of grid square E10. Sample HSNP6 was collected from the edge of the excavation in September 2002. The excavation was subsequently extended to encompass all of grid square E10 in March 2003, but no new excavation sidewall samples were collected. With seven excavation sidewall samples in an excavation with a perimeter of approximately 350 feet, the Navy exceeded the target sidewall sample density of one sample per 100 feet of excavation sidewall set in the final sampling and analysis plan (SAP) (Tetra Tech 2002). The Navy did not collect

additional sidewall samples after the limits of the excavation were extended in March 2003.

RESPONSES TO RWQCB COMMENTS

General Comments

1. **Comment:** **The Navy should clarify how the current report will be completed to include analysis and discussion of the supplemental groundwater samplings results. Assessment of the impact to groundwater quality is essential to a thorough understanding of the site's toxicity. Board Staff is looking forward to reviewing the analysis and associated discussion.**

   Response: The work conducted at Site 31 included a TCRA to address wastes at the site, supplemental soil sampling, and groundwater sampling. The groundwater sampling portion of the project includes wet season and dry season samples. Because the wet season samples had not yet been collected at the time the TCRA summary report was prepared and because the dry season samples have still not been collected, analytical results for groundwater were not presented in the report. Instead, these analytical results will be presented as a separate letter report, currently scheduled for delivery on September 26, 2003. Preliminary unvalidated results for the wet season sampling conducted on April 22, 2003, were forwarded to RWQCB via e-mail on May 22, 2003.

2. **Comment:** **Board Staff suggests updating the Site 31 Spatial Analysis and Decision Assistance (SADA) layers with the collected soil data presented in this report. This update should include a three dimensional revision of contaminant distribution at the site integrating newly acquired field data. This effort is recommended as an additional decision tool to delineating areas with remaining human/ ecological risks generated from contaminant exposures.**

   Response: Although automated contouring software can be appropriate in some cases, The Navy does not believe that automated contouring is appropriate at this time for use at Site 31. As discussed during the May 6, 2003, remedial project manager (RPM) meeting and subsequent e-mail correspondence, automated contouring programs are not appropriate for Site 31 for three reasons. First, automated contouring programs do not account for site history or physical features. Second, buildings and warehouses west of the central roadway would restrict disposal of wastes in these areas. Third, more reliable information can be generated by collecting of site-specific samples. For example, previous SADA modeling performed by RWQCB in February 2002 predicted arsenic

concentrations of approximately 50 to 60 micrograms per kilogram (mg/kg) in the concrete slab and warehouse area. These results were roughly an order of magnitude higher than analytical results of 6 to 8 mg/kg obtained by actual sampling in these areas.

3. **Comment:** **The Navy should include a discussion pertaining to Site 31 soil sampling results forwarded by the SFBRWQCB Staff. This discussion needs to outline the analysis rationale and results. These analytical results were generated from discrete soil samples collected at the former Site 31 laboratory (Samples No 001-AOC-1-GB-082 LAB 1, 2 &3). Copies of the laboratory analytical reports were sent to the Navy in January 2003.**

Response: Based on a request by RWQCB, the Navy collected and submitted discrete samples to RWQCB's analytical laboratory (Sequoia Analytical Services in Petaluma, California) for RWQCB analysis. These discrete samples were submitted in addition to the composite samples collected and analyzed by the Navy from the site based on the final SAP (Tetra Tech 2002). The results for the RWQCB samples are presented along with the results of the Navy samples in Section 2.0 of the supplemental soil sampling summary report (Navy 2003), which was submitted to RWQCB on March 21, 2003. Because the samples were not collected as part of the TCRA but as part of an effort to help scope the planned RI for the site, they are not appropriate for inclusion in the TCRA summary report.

4. **Comment:** **The Navy should send a copy of this reviewed report to the owners and operators of the Contra Costa Water District Pump Station. It is important to note that in the event of pump failure, accidental release of large amounts of water might mobilize contaminant left in place below and around the pump structure. The pump station owners/ operators and the Navy need to draft an emergency plan addressing this contingency to minimize contaminants releases to the environment.**

Response: The Navy has communicated with the Contra Costa Water District (CCWD) about contamination issues at Site 31 on many occasions since the Navy first became aware of the contaminants when CCWD installed a pump station at the site in 1998. The Navy will forward a copy of the final TCRA summary report and the agency comments on the report to Mr. Dave Omoto, Environmental Coordinator for CCWD. RWQCB should contact CCWD directly regarding the need for an emergency plan.

5. **Comment:** **Please determine if windborne dusts are a human health threat to neighboring properties.**

Response: As discussed during the May 6, 2003, RPM meeting, the Navy intends to perform a human health risk assessment to evaluate windborne dusts as part of the upcoming RI at Site 31.

6. Comment: The Navy needs to clarify why Arsenic a metalloid exceeding industrial PRGs (Preliminary Remedial Goals) at the site was not included in the risk analysis for both cinders and ash removals actions. Board Staff recommends reporting arsenic concentrations and risk analysis factors in all tables included in this report.

Response: Section 2.2 of the TCRA summary report notes that the TCRA was conducted to address ecological risks and explains that only selenium and mercury were associated with unacceptable ecological risk. The preliminary assessment (PA) addendum (Tetra Tech 2001), however, noted that lead, selenium, and mercury concentrations are strongly correlated in the two wastes addressed by the TCRA. Accordingly, the Navy delineated the hot spots by sampling for lead, selenium, and mercury only and did not assess ecological risks for other compounds. The Navy's intentions to sample lead, selenium, and mercury only in the area around the hot spots and the cinders was noted in Section 1.2.2.1 and in Table 7 of the final SAP (Tetra Tech 2002), which RWQCB reviewed and commented on in July 2002 (RWQCB 2002) and again in August 2002. The Navy is planning an RI for the site, which will assess ecological and human health risk from all contaminants detected at the site, including arsenic. The draft RI work plan is due to the regulatory agencies in April 2004.

7. Comment: Please provide mineralogical (color, hardness, grain size, sorting), chemical (water content, inorganics, organics, metals, metalloids), leachability characteristics of cinders and ash wastes at the site.

Response: The TCRA report summarizes work that has already been performed at Site 31 to remove wastes described previously from the site. Because the RWQCB did not request the above analyses when reviewing and commenting on the draft SAP (RWQCB 2002), the requested analyses were not performed or reported in the TCRA summary report. Chemical data indicating the water content and concentrations of metals and organic compounds in cinders and ash waste are, however, presented in Tables 1 and 2 of the PA addendum (Tetra Tech 2001). Leachability characteristics of wastes that were disposed of by the removal contractor are reported in Appendix D of the project close-out report prepared by the removal contractor, Mendelian Construction Inc. (Mendelian). The project close-out report is included as Appendix H to the draft TCRA summary report (Tetra Tech 2003). The Navy has added a description of the texture of the cinder and ash-like material to Section 1.0 of the TCRA summary report.

Specific Comments

1. **Comment:** **Section 2.2, Hot Spot Delineation, p 7: The Navy should clarify if technological attempts were made by the field team in driving the Geoprobe through what is describe in the text as "concrete like material". For example, greater depth can be achieved using the combined effect of the vehicle weight and hydraulic hammer percussion. Percussion is often required when probing near the ground surface to penetrate dense soil, gravel zones, or pavement. Furthermore, this refusal layer might be discontinuous enabling characterization at adjacent locations. Finally, the Navy should report the mineralogical and chemical makeup of the "concrete-like material" encountered. Board Staff has conducted a routine check of this material with a hand lens at a Remedial Project Manager meeting on May 6th, 2003. The sample did not appear being "concrete like material" due to its low sand content, density and friable nature. Board Staff suspects this material might be solidified ash or a combination of cement and ash.**

   Response: The GeoProbe sampling method used to collect subsurface samples during the TCRA delineation sampling uses a hydraulically driven percussion hammer to advance a sampling device into the subsurface. If the Geoprobe sampler met with refusal while attempting to advance a sampler at a particular location, the Geoprobe operator was instructed to attempt to penetrate the subsurface at two other locations within a few feet of the originally selected sampling location. If the sampler met with refusal at three separate, closely spaced locations, the material was deemed impenetrable by the Geoprobe sampler. During the field effort, the Geoprobe contractor made conscientious attempts to penetrate the material. For example, the contractor spent almost an entire day making persistent attempts to penetrate the material at the east process tanks location. In fact, the material at this location was so tough that the Geoprobe sampler broke off in the borehole and had to be removed and discarded. The Navy agrees that the material should not be referred to as "concrete" because of the lack of sand or gravel aggregate. A more accurate term is "cement-like material." The report has been modified to correct this error. The text also explains that the term "cement-like material" does not necessarily refer to a commercial product, but may in fact be a combination of ash and other materials that have naturally solidified to form a substance that is similar in nature and appearance to cement.

2. **Comment:** **Section 2.3, Excavation and Removal of Wastes, p 10: The Navy needs to tabulate the volume of remaining cinders materials left in place due to the impediment of structural features. This table should discretize volume estimates based on locations (under the pump station, along**

the southern property fence line and adjacent to the pipeline). It is essential that the Navy further investigate the probable function, dimensions and contamination associated with the vertical concrete pipes uncovered at the site. Board Staff is concerned that preferential pathways such as stormwater pipes, abandoned utility lines, industrial process ducts might have been left below ground surface. Due to the presence of abandoned surficially detected concrete features, Board Staff recommends a geophysical survey at the site. This study should include magnetometer and ground penetrating radar deployments.

Response: The previous comment consists of three independent issues: the volume of cinder material left in place, the concrete pipes discovered north of the pump station, and a suggested geophysical survey to evaluate the presence of subsurface utilities. Each of these issues is addressed as follows:

Volume of cinders left in place: The cinder material extends beneath the pump station, through a protective buffer zone at the edge of the pump station to maintain the structural stability of the station, and almost all of the way to the western edge of the pump station (based on cinder excavation sidewalls). Based on dimensions of the excavation on figures provided by Mendelian, the area where cinders are present beneath the pump station is a trapezoid with dimensions of approximately 60 feet at the top, 75 feet at the bottom, and 4 feet in height (Mendelian No date), or about 2,700 square feet. Assuming that the cinders are present in a continuous layer approximately 0.25 foot thick throughout this area, the volume of cinders still present beneath the pump station is about 675 cubic feet, or 25 cubic yards. The assumed cinder layer thickness of 0.25 foot is the average of reported cinder thicknesses for eight borings around the station reported in Figure 2 of the PA addendum (Tetra Tech 2001).

The volume of cinders present in the area beneath the southern fence line of the site is not known because the cinders extend beneath the fence and an unknown distance south from the Navy's property.

Cinders remain beneath about 90 linear feet of the pipelines leading to the pump station. The unexcavated area adjacent to the pipelines is approximately 7 feet wide according to dimensions on figures provided by Mendelian (Mendelian No date). Assuming that the cinders are present throughout this area with an average thickness of 0.5 foot, the volume of cinders that remain beneath the pipelines is approximately 315 cubic feet, or 11.67 cubic yards.

Concrete pipes: As discussed at the May 6, 2003, RPM meeting, the Navy intends to further evaluate the referenced concrete pipes as part of the upcoming RI at Site 31.

Geophysical Survey: The suggested geophysical survey techniques will not resolve the presence or orientation of storm water pipes, abandoned

utility lines, or industrial process ducts at Site 31. Surface debris, wire, metal fragments, and cement-like material are present in discontinuous clusters throughout the site. The suggested ground-penetrating radar survey will be fatally compromised by the abundant surface debris, which will obscure the presence of subsurface features. Magnetometer survey techniques will be affected by the abundant presence of metal debris on the surface of the site, which will obscure the magnetic signal from any underlying utility features, but will not be affected by the presence of concrete pipes. For these reasons, a geophysical survey is not planned at this time.

3. **Comment:** **Section 2.4, Confirmation Sampling, p 12: There appear to be a contradiction in methodology, p 11 the Navy states "all of the cinders and a buffer zone of 5 lateral feet of soil was excavated.", yet p 12 it is stated that "the [confirmation] samples were collected from lithologic intervals that contained waste or exhibited visual evidence of contamination." Please resolve this approach inconsistency. It is unclear why the cinder excavation was not extended to the east of sample location CEP-15 whose lead and mercury results exceed the industrial PRG.**

Response: Section 2.3 of the TCRA summary report notes that "*In areas where the dimensions of the cinder excavation were not limited by the presence of physical features*, all of the cinders and a buffer zone of lateral feet of soil were excavated" (emphasis added). Some cinders remain in areas where the pump station, piping, or the fence along the property line limited the dimensions of the excavation, and sidewall confirmation samples in these areas were intentionally biased to include samples of the waste. As noted in the planning documents, the criterion for determining the edge of the excavation was not lead and mercury concentrations, but rather the presence of cinders, which have a distinctive reddish-purple appearance and are easily visually assessed in the field. As shown in Figure 5, cinders were not present at location CEP-15; therefore, the excavation was not extended beyond that location.

4. **Comment:** **Section 2.5, Site Restoration, p 14: Please clarify the locations from where the clean fill was imported.**

Response: The Navy did not specify a location where clean fill material should be obtained. The Navy did specify criteria that would be used to determine whether the fill was suitable for use as backfill. The Navy does not know the exact location of the fill source, but analytical results that document contaminant concentrations of the fill presented in Figure 9 indicate that the fill was soil from a location in Contra Costa County.

5. **Comment:** **Section 4, Summary, p 17: The Navy should specify the volumes of contaminated soils sent to Class I RCRA/ Class II non hazardous wastes disposal facilities.**

Response: Based on waste manifests presented in the Mendelian report (Mendelian No date), the Navy determined that 1,515 tons of Class I waste, 915 tons of class II waste, and 1,550 tons of Resource Conservation and Recovery Act waste were removed from the site and disposed of at waste disposal facilities. Section 4.0 of the final TCRA summary report has been revised to include this information.

6. **Comment:** **Tables 3 and 4, Pre and Post Removal UCL95 Soil Concentrations Ecological Risk Hazard Quotients, p 9 & 10: The title for these tables should specify that the reported calculations include only the hot spot areas. The number of data points, range of sampling depths, included within these calculations is missing from the report. Please indicate the industrial PRGs for the contaminants reported. The Navy needs to consistently report the sampling date for all characterization effort tabulated. Finally, it is unknown to Board Staff why Arsenic is not reported in these tables. Similar tables for the cinder removal areas should be included in the report.**

Response: Section 2.2 of the TCRA summary report describes the data set used to derive the 95th percentile upper confidence limit on the arithmetic mean (UCL_{95}) soil concentrations to evaluate the lateral limits of the hot spot excavations. Section 2.2 (page 7) lists the number of samples in the data set (83) and notes that all available data from the site were used to calculate UCL_{95} soil concentrations, not just the data from the hot spot areas, as suggested in this comment. The data used to calculate the UCL_{95} soil concentrations, including the sampling depths, are presented in Appendix E. Arsenic is not reported in these tables because the TCRA was conducted to address unacceptable ecological risks, and arsenic did not pose an unacceptable risk to ecological receptors. Arsenic at Site 31 will be further evaluated during the planned RI.

Editorial Comments

1. **Comment:** **Section 1.0, Introduction, p 2: The Navy should indicate that the EPA's PRG referenced in this section assumes an industrial site use.**

Response: The text in section 2 has been modified to note that the referenced PRGs are for industrial soils.

2. **Comment:** **Section 2.2, Hot Spot Delineation, p 6: The Navy should indicate that the sample compositing occurred on a horizontal axis.**

Response: Section 2.2 of the TCRA summary report states that the 25- by 25-foot grid squares were divided into four equal areas and explains that an equal volume of soil from each of the four areas was combined to create a single composite sample. The text has been modified to clarify the compositing technique.

3. **Comment:** **Section 2.4, Confirmation Sampling, p 14: Please correct the sample number to 4 for HSNP 5 exceeding the industrial lead PRG. The Navy should also elucidate why ash excavations were not laterally extended to grid square D-10 and at depth for location D-9.**

Response: The sampling locations where concentrations exceeded the industrial PRG for lead have been corrected to HSNP 2 and HSNP 4. The process used to delineate the lateral extent of the hot spot excavations is discussed in detail in Section 2.2 of the TCRA summary report (Tetra Tech 2003) and in the final SAP (Tetra Tech 2002) that was developed, reviewed, and approved in coordination with the regulatory agencies.

4. **Comment:** **Table 1, AOC 1 Radiological Screening Survey Results, p 5: Please include the national and Concord Naval Weapons Station background radioactive radiation values in the table.**

Response: The U.S. Nuclear Regulatory Commission and the Naval Weapons Station Concord have not formally defined background radiation levels; therefore, these values are not listed in Table 1.

5. **Comment:** **Table 2, Hot Spot Delineation Analytical Results, p 8: Please include a map outlining collocated contaminant distribution for As, Hg, Pb and Se. The Navy should add industrial preliminary remedial goals and calculated hazard quotients for these contaminant types in the table.**

Response: Figures 12, 13, and 14 have been added to the report to illustrate the distribution of lead, mercury, and selenium in the hot spot area. A figure has not been added to illustrate the distribution of arsenic because the delineation samples were not analyzed for arsenic, in accordance with the final SAP (Tetra Tech 2002), which was developed, reviewed, and approved in coordination with the regulatory agencies. Industrial PRGs have been added to Table 2, and calculated hazard quotients are presented in Table 4.

6. **Comment:** **Table 5, Confirmation Sample Results for Cinder Excavations, p 13: The Navy needs to flag samples that are confirmatory from the ones originating from areas subsequently excavated.**

Response: Analytical results from samples that were subsequently excavated are flagged with a "b" superscript on Table 5 in the draft TCRA summary report.

7. Comment: Tables 5 and 6, Confirmation Sample Results for Cinder/ Hot Spot Excavations, p 13 & 15: Please indicate the sampling depths in these tables.

Response: Sample depths are not presented in the tables because exact depths relative to the current ground surface are not known. The samples denoted with a "B" (for example CEB01 and HSNB01) refer to samples collected at the base of the excavations. These samples were collected from the bottom of the excavation, which was subsequently filled with at least 2 feet of clean fill material, thus the samples are more than 2 feet deep. In the deeper parts of the excavations, such as the areas beneath the elevated pump station mound, the basal confirmation samples are from deeper intervals below the current ground surface. Sample depths for the confirmation samples collected at the perimeter of the excavation were not recorded.

8. Comment: Figures 5 and 8, Lateral Limits of Cinder/ Hot Spot Excavations: Please indicate on these figures that the sampling locations outlined are for confirmation samples performed post removal action.

Response: The term "removal action" refers to both the excavation and subsequent backfilling of the excavations. The following note has been added to Figures 5 and 8: "Note: Confirmation samples were collected from the base and perimeter of the excavations after soil removal and before backfilling. Samples from the base of the excavation are denoted with a "B" in the sample ID, and samples from the sidewall of the excavation's perimeter are denoted with a "P" in the sample ID. "

References

California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2002. Letter Regarding Comments on the Time-Critical Removal Action and Supplemental Sampling Activities Site 31 (Area of Concern 1) Naval Weapons Station, Seal Beach Detachment, Concord, CA. From Laurent M. Meillier, Remedial Project Manager. To Mr. Gilbert Rivera, Navy Remedial Program Manager. July 2.

Mendelian Construction, Inc. (Mendelian). No date. "Project Close-out Report for Time-Critical Removal Action Area of Concern 1, Site 31, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California."

Tetra Tech. 2001. "Preliminary Assessment Addendum, Area of Concern 1, Naval Weapons Station Seal Beach, Detachment Concord." September 28.

Tetra Tech. 2002. "Draft Final Sampling and Analysis Plan (Field Sampling Plan/Quality Assurance Project Plan), Time-Critical Removal Action and Supplemental Sampling Activities Site 31 (Area of Concern 1), Naval Weapons Station Seal Beach, Detachment Concord, Concord, California." August 23.

Tetra Tech. 2003. "Draft Area of Concern 1 (Site 31) Time-Critical Removal Action Close-Out Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California." March 10.

U.S. Department of the Navy (Navy). 2003. Letter and Enclosed Supplemental Soil Sampling Summary Report, Naval Weapons Station Seal Beach, Detachment Concord. From Stephen Tyahla to distribution. March 21.

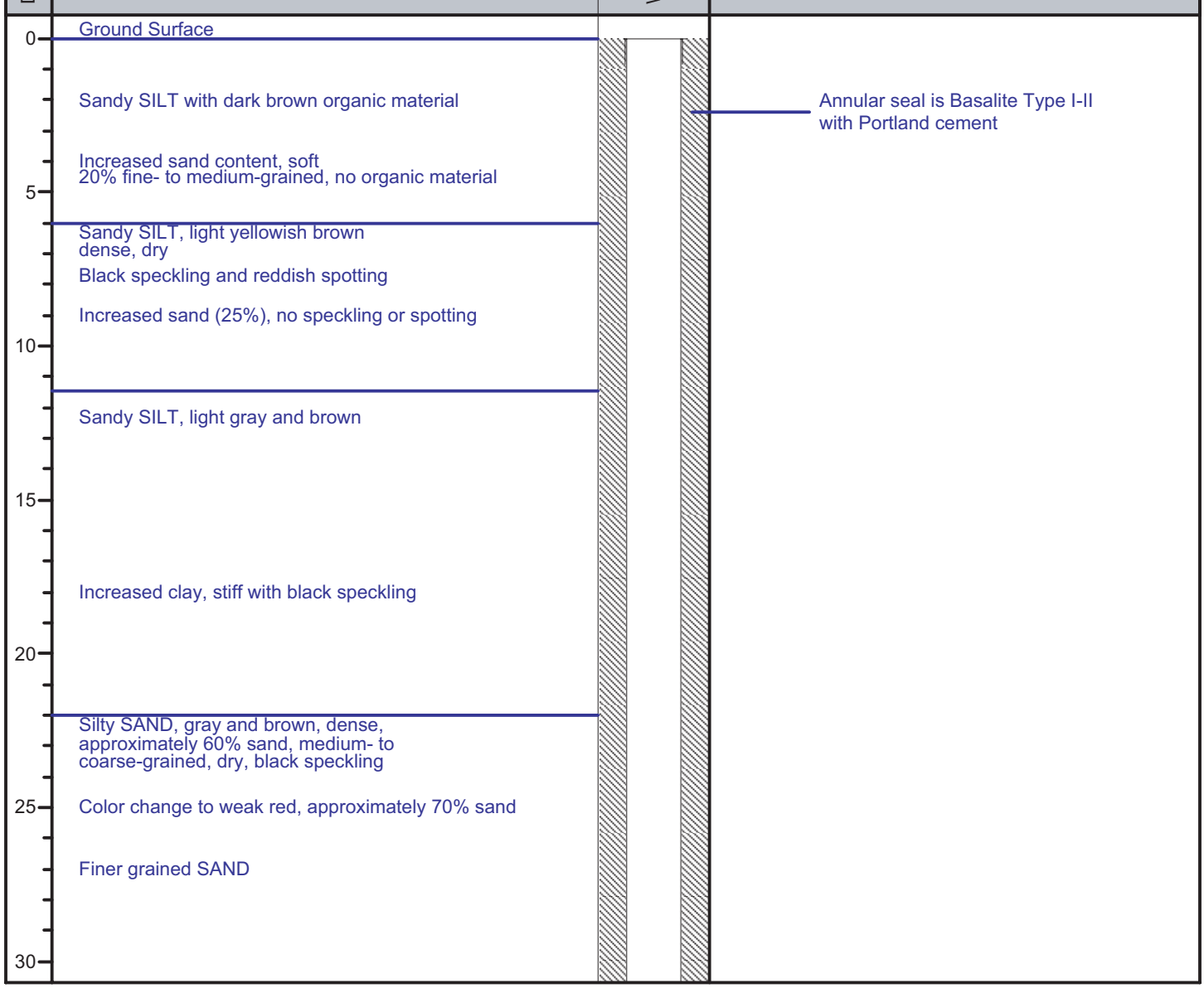
U.S. Environmental Protection Agency (EPA). 2003. "Notice: Slight Revision to the PRG 2002 Table." February 10.

APPENDIX B
MONITORING WELL CONSTRUCTION AND LITHOLOGIC LOGS

Well ID: MW-01

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

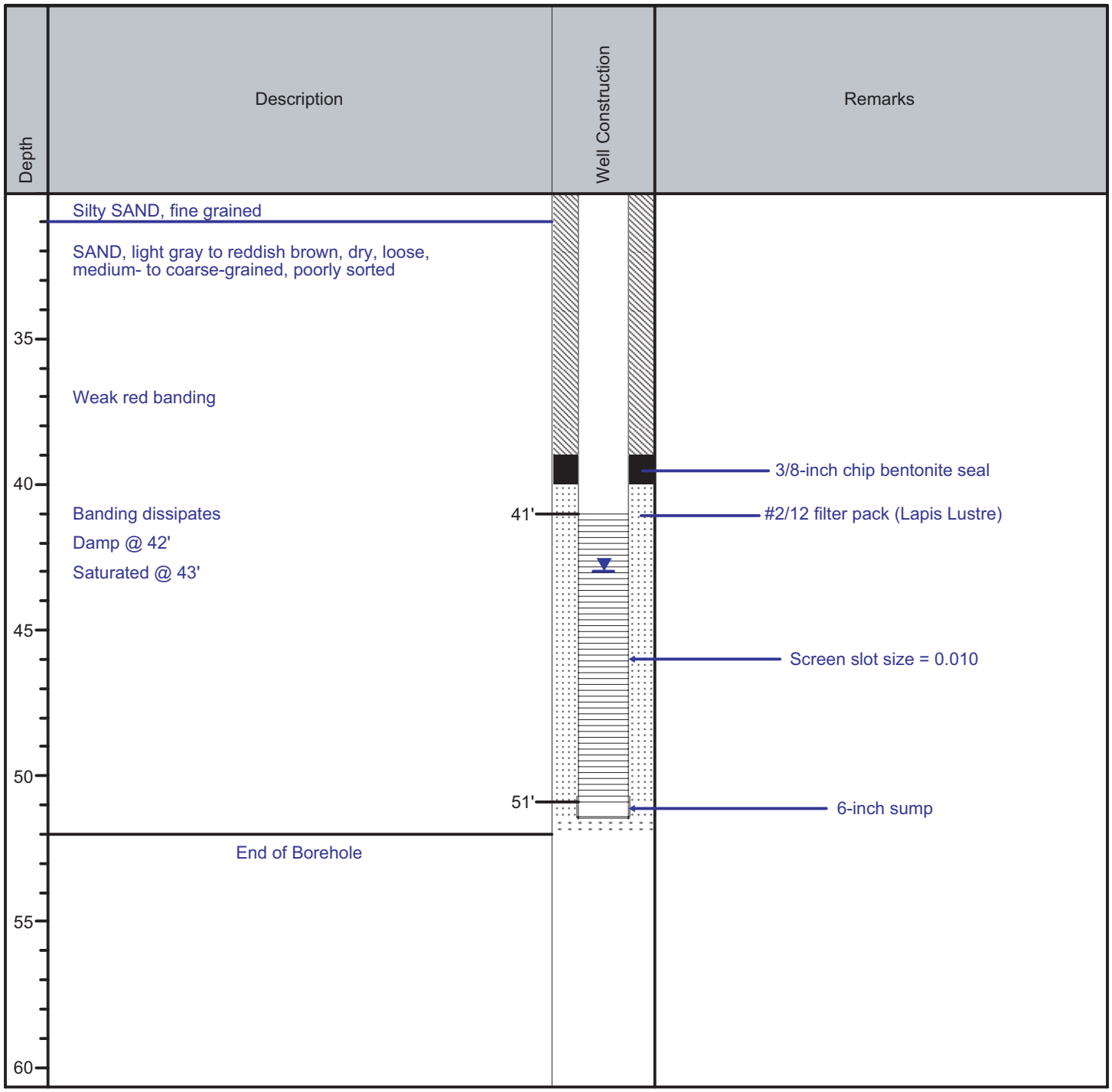
Drill Method: Hollow-stem auger

Drill Date: 1-8-03

Well ID: MW-01

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

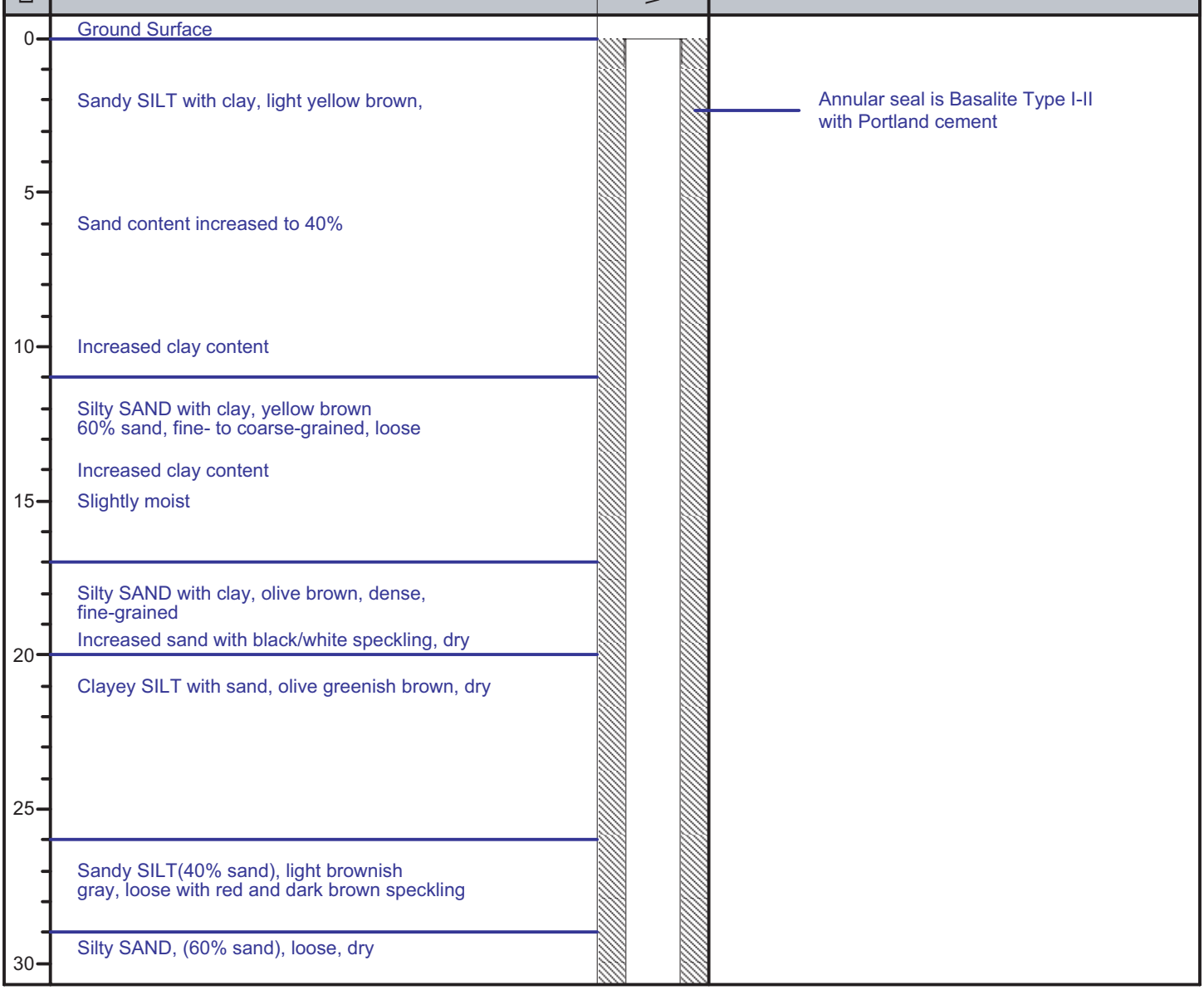
Drill Date: 1-8-03

Sheet: 2 of 2

Well ID: MW-02

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

Drill Date: 1-7-03

Sheet: 1 of 2

Well ID: MW-02

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy

Depth	Description	Well Construction	Remarks
	Silty SAND w/ clay, (60% sand), loose, dry		
	Mica flakes @ 34'		
35			
	Increased sand content (85%), dry, medium- to coarse-grained, loose, poorly sorted		
40	Sandy SILT, 40% sand, loose, dry, fine- to medium-grained with weak red banding		Medium Pure Gold chip bentonite seal
	Color change to medium brown, loose, dry	42'	#2/12 filter pack (Lapis Lustre)
	Damp @ 43'		
	6-inch saturated perch zone		
45	dense CLAY w/ mica flakes		
	Sandy SILT saturated (40% sand)		Screen slot size = 0.010
50		52'	6-inch sump
	End of Borehole		
55			
60			

Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

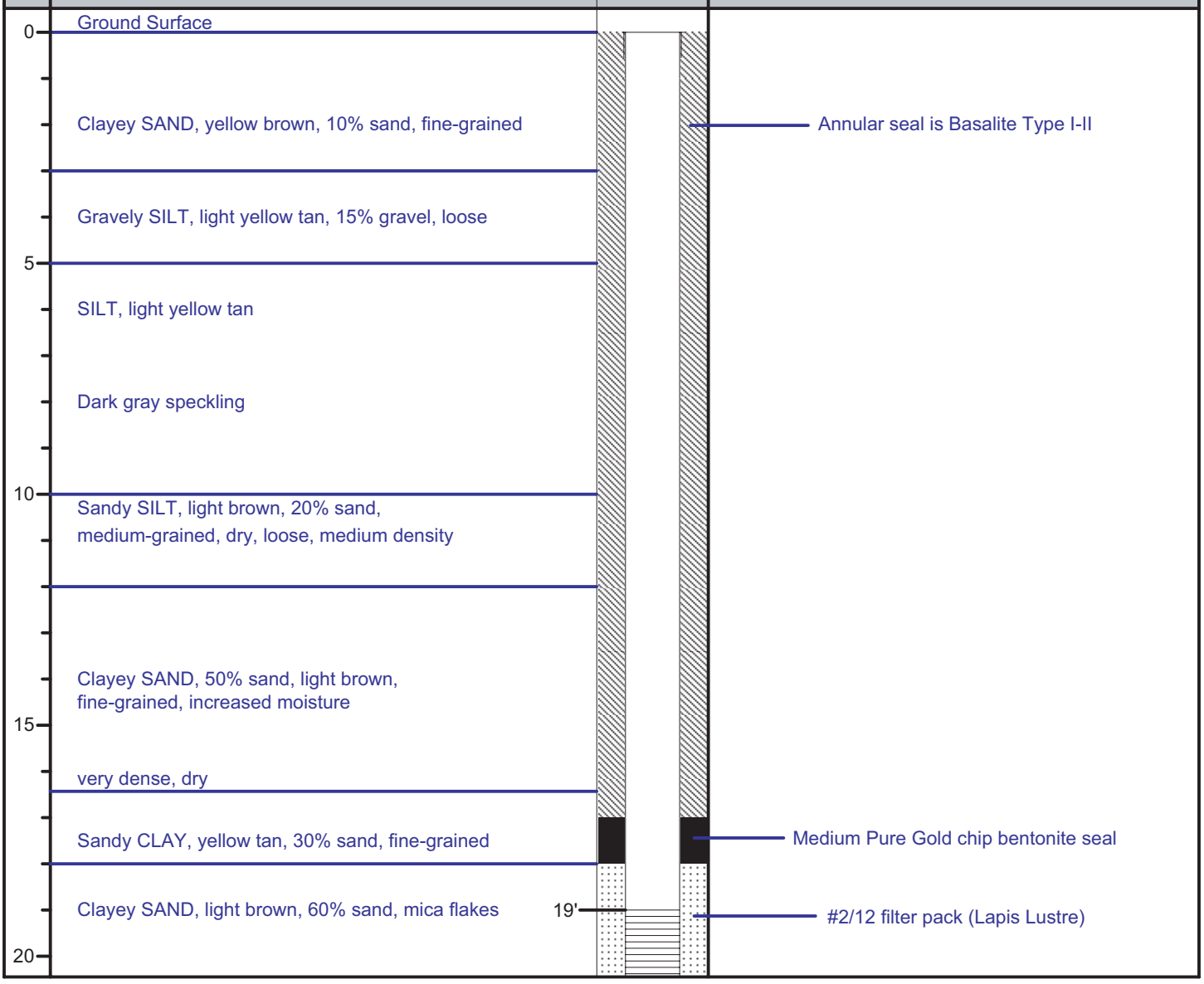
Drill Date: 1-7-03

Sheet: 2 of 2

Well ID: MW-03

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

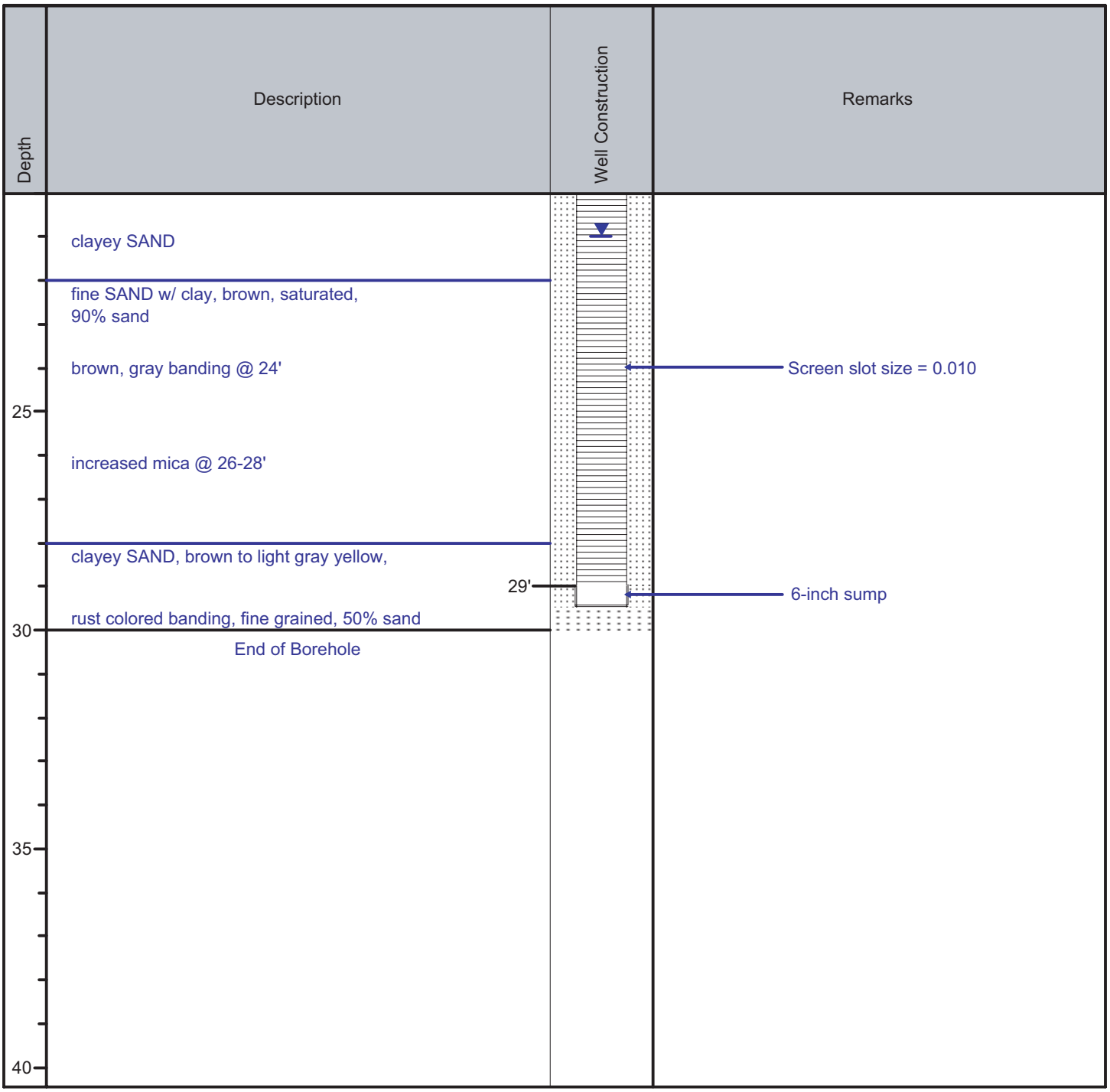
Drill Date: 1-9-03

Sheet: 1 of 2

Well ID: MW-03

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

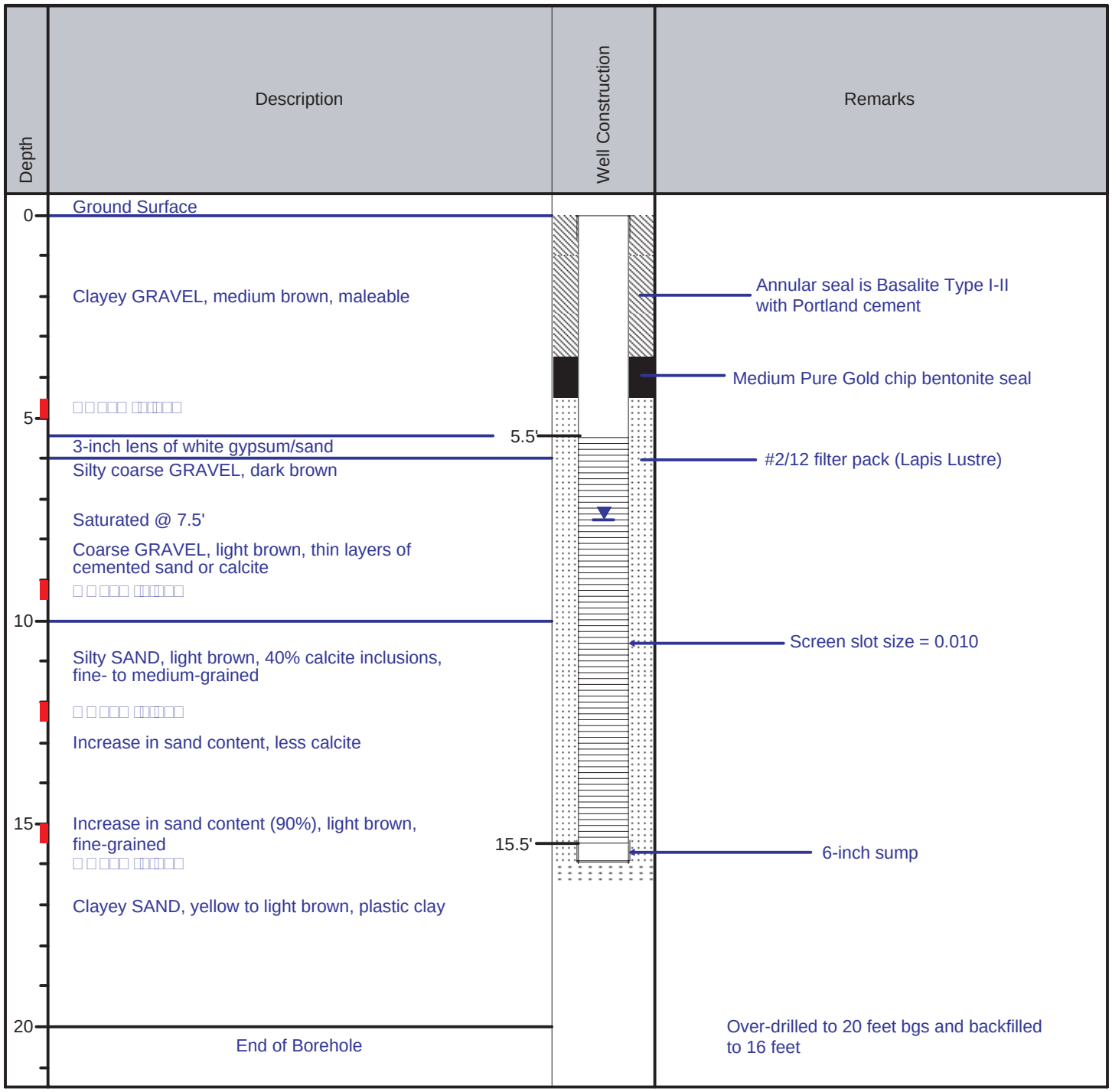
Drill Date: 1-9-03

Sheet: 2 of 2

Well ID: MW-04

Project: NWSSBD Concord AOC 1 (Site 31)

Client: U.S. Department of Navy



Drilled By: Gregg Drilling

Hole Size: 4" monitoring well

Drill Method: Hollow-stem auger

Drill Date: 1-9-03

Sheet: 1 of 1

APPENDIX C
MONITORING WELL SAMPLING AND DEVELOPMENT FIELD RECORDS

TETRA TECH EM INC.
MONITORING WELL SAMPLING SHEET

Date: 4-22-2003

Monitoring Well No.: AOC 1 (#2) #1 Chain of Custody No.: 3638, 3637

Personnel: Doug Sterling & Richard Vernimen

Organic Vapor Concentration TOC: 0.0 ppm Breathing Zone: 0.0 ppm

Depth to Well Bottom: 54.60 ft.

Depth to Water: 45.00 ft.

Water Column: 9.60 ft.

Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
4-inch well = water column x 0.652 gal/ft

Well Volume Calculation: 6.26 gal

Time	Vol. Purged (L)	Flow Rate (L/min)	Water Level (ft bgs)	pH	Conductivity (µS/cm)	Temperature (°C/°F)	Turbidity (NTU)	D.O. (mg/L)	O.R.P. (mV)
1015									
1012	—		45.00	6.98	1.587	19.01	9.0	7.75	216.7
1016	0.5	0.5	45.00	7.14	1.989	19.19	13.9	7.32	213.9
1019	1.0	0.17	45.00	7.17	2.269	19.17	12.2	6.72	209.5
1024	2.0	0.20	45.05	7.19	2.279	19.03	12.0	6.67	204.8
1026	2.5	0.25	45.04	7.18	2.270	19.06	13.4	6.73	203.9
1029	3.0	0.17	45.04	7.19	2.255	18.98	12.4	6.76	203.5
1031.5	3.5	0.20	45.04	7.17	2.241	18.96	12.9	6.79	204.0
1034	4.0	0.20	45.04	7.17	2.233	19.10	11.2	6.80	204.9
1039	5.0	0.20	45.04	7.16	2.192	18.99	8.1	6.90	206.7
1045	6.0	0.17	45.04	7.15	2.178	19.10	5.8	6.83	208.1
1051	7.0	0.17	45.04	7.16	2.161	19.21	4.2	6.87	209.1
1057	8.0	0.17	45.04	7.15	2.150	19.22	4.5	6.92	209.4

Begin Purge: 1015 Method of Purging bladder pump Purged Dry? no

End Purge: 1057 Total Volume Purged: 8.0L How Measured? graduated pitcher

QA/QC Sample Collected Here? ☑ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

Date and Time of Sample Collection: 4-22-03 1115 / 1145 (duplicate) Sample Number (s): 0401AOC1MW01A 0401AOC1MW01A1 -duplic

Comments: Controller mode = MP-CPM 5

Tetra Tech EM Inc.

Sheet 1 of 1

WELL DEVELOPMENT DATA SHEET

BORING NO. — WELL NO. MW-01

Project: Concord AOC 1 (Site 31)
Project No.: 6901600103020209.07
Date(s) of Installation: 1/8/03
Date(s) of Development: 2/11/03
Personnel/Company: Hwakong Cheng / TtEMI
Mark Johnson / Geoprobe
Type of Rig Used: Simco

Casing Diameter/Type: 4" PVC
Borehole Diameter: 11"
Screened Interval(s): 41-51' bgs
Total Length of Well Casing:
Measured Total Depth (TOC) Initial: 52.14
Final: 52.20
Initial Depth to Water (TOC): 44.74 Date: 2/11/03 Time: 1140
Stabilized Depth to Water (TOC): 44.74 Date: 2/11/03 Time: 1145

TECHNIQUE(S)	DEVELOPMENT EQUIPMENT TYPE/CAPACITY
___ Jetting (Airlift)	
X Surge Block	
___ Bailing	
X Pumping	GRUNDFOS RED-I-FLO
___ Other	

FLUIDS ADDED

Lost Drilling Fluid: — Gallons
Lost Purge Water: — Gallons
Water During Installation: — Gallons
Total Fluids Added: — Gallons
Source of Added Water: —
Sample Collected of Added Water: Y N
Sample Designation of Added Water: —

PURGE VOLUME CALCULATION

Casing Volume: 7.4 Ft. of water
x 0.652 Gallons/Foot
= 4.8 Gallons per Single Casing Volume
Sand Pack Volume: 7.4 Ft. of Saturated Sand Pack
x 4.937 Gallons/Foot (borehole diameter)
= 36.5 Gallons (in borehole)
- 4.8 Gallons of Casing Volume
= 31.7 x 0.3 (Assuming porosity = 30%)
= 9.5 Gallons Within Sand Pack
Single Purge Volume: 14.3 Gallons (Casing Vol. + Sand Pack Vol. + Fluids Added)
Minimum Purge Volume: — Gallons
Actual Purge Volume: 57.50 Gallons
Volume Measured by: Flow Meter
Rate of Development: Gallons/Minute (Hour, Day)
Pumping Rate/Depth: 1.7 gal/min @ 50 Ft. (Below Grd.)
Immiscible Phases Present: Y (N) Thickness: —

Development Criteria: Parameter stability within 10%, turbidity below 50 NTU

Total Volume Discharged	Rate of Discharge	Time	Temp	pH	Specific Conductance*	Turbidity (NTU)	D.O., Clarity, Odor, PID Readings, Other:	DTW
5	—	1156	17.9	7.32	2.25	>999	No odor, brown color	
20	—	1204	17.2	7.33	2.41	>999	No odor, brown color	45.41
27.4	1.62 gal/min	1218	17.3	7.32	2.42	>999	No odor, brown color	45.60
37.9	1.67	1224	17.9	7.38	2.39	718	No odor, clearing	45.65
48.4	1.72	1231	17.9	7.26	2.34	0	No odor, clear	45.70
54.7	1.72	1234	17.9	7.26	2.33	0	No odor, clear	45.70
57.5	1.72	1236	17.9	7.26	2.39	0	No odor, clear	45.70

bailed

Development Completed at 57.5 Gallons Discharged. Date: 2/11/03 Time: 1236

Personnel: H. Cheng, M. Johnson

* Specific Conductance readings temperature compensated to 25°C, if not, report temperatures at which reading obtained.

Tetra Tech EM Inc.

Sheet 1 of 1

WELL DEVELOPMENT DATA SHEET

BORING NO. — WELL NO. MW-02

Project: Concord AOC 1 (Site 31)
Project No.: 690160010302020907
Date(s) of Installation: 1/7/03
Date(s) of Development: 2/11/03
Personnel/Company: Hwakong Cheng/Tetra Tech
Mark Johnson / Geoprobe
Type of Rig Used: Smeal

Casing Diameter/Type: 4" PVC
Borehole Diameter: 11"
Screened Interval(s): 42-52' bgs
Total Length of Well Casing:
Measured Total Depth (TOC) Initial: 54.4
Final: 54.4
Initial Depth to Water (TOC): 46.88 Date: ~~1/7/03~~ 2/11/03 (ME) Time: 0935
Stabilized Depth to Water (TOC): 46.88 Date: 2/11/03 Time: 0940

DEVELOPMENT

TECHNIQUE(S)	EQUIPMENT TYPE/CAPACITY
___ Jetting (Airlift)	
X Surge Block	
___ Bailing	
X Pumping	GRUNDFOS REDI FLO
___ Other	

FLUIDS ADDED

Lost Drilling Fluid: — Gallons
Lost Purge Water: — Gallons
Water During Installation: — Gallons
Total Fluids Added: — Gallons
Source of Added Water: —
Sample Collected of Added Water: Y N
Sample Designation of Added Water: —

PURGE VOLUME CALCULATION

Casing Volume: 7.52 Ft. of water
x 0.652 Gallons/Foot
= 4.9 Gallons per Single Casing Volume
Sand Pack Volume: 7.52 Ft. of Saturated Sand Pack
x 4.937 Gallons/Foot (borehole diameter)
= 37.1 Gallons (in borehole)
- 4.9 Gallons of Casing Volume
= 32.2 x 0.3 (Assuming porosity = 30%)
= 9.7 Gallons Within Sand Pack
Single Purge Volume: 14.6 Gallons (Casing Vol. + Sand Pack Vol. + Fluids Added)
Minimum Purge Volume: — Gallons
Actual Purge Volume: 56.5 Gallons
Volume Measured by: Flow Meter
Rate of Development: ____ Gallons/Minute (Hour, Day)
Pumping Rate/Depth: 1.7 @ 54 Ft. (Below Grd.)
Immiscible Phases Present: Y (N) Thickness

Development Criteria: Parameter stability within 10%, turbidity below 50 NTU

Total Volume Discharged	Rate of Discharge	Time	Temp	pH	Specific* Conductance	Turbidity (NTU)	D.O., Clarity, Odor, PID Readings, Other:
5 gal	—	0959	18.0	5.45	3.73	>999	Brown, no odor, soft bottom
19 gal	—	1006	17.9	6.20	3.91	>999	No odor, brown
23	1.61	1023	17.2	6.73	4.02	>999	No odor, brown
27.5	1.62	1025	18.1	6.71	4.04	>999	No odor, brown
37.5	1.68	1031	18.2	6.87	3.99	492	No odor, cloudy
46.4	1.70	1037	18.4	6.94	3.99	0	No odor, clear
52.3	1.72	1041	18.7	6.88	3.97	0	No odor, clear
56.5	1.73	1043	18.8	6.91	3.98	0	No odor, clear

Development Completed at 56.5 Gallons Discharged. Date: 2/11/03 Time: 1043

Personnel: H. Cheng, M. Johnson

* Specific Conductance readings temperature compensated to 25°C, if not, report temperatures at which reading obtained.

Tetra Tech EM Inc.

WELL DEVELOPMENT DATA SHEET

BORING NO. — WELL NO. MW-04

Project CONCORD AOC 1 (SITE 31)
Project No. 6901600103020209.07
Date(s) of Installation 1/9/03
Date(s) of Development 2/11/03
Personnel/Company HWAKONG CHEN/TEEM/ MARK JOHNSON/ GREGG
Type of Rig Used —

Casing Diameter/Type 4" PVC
Borehole Diameter 11"
Screened Interval(s) 5.5-15.5' bgs
Total Length of Well Casing
Measured Total Depth (TOC) Initial 18.78
Final
Initial Depth to Water (TOC) 18.31 Date 2/11/03 Time 1320
Stabilized Depth to Water (TOC) 18.31 Date 2/11/03 Time 1325

TECHNIQUE(S)	DEVELOPMENT EQUIPMENT TYPE/CAPACITY
___ Jetting (Airlift)	
___ Surge Block	
___ Bailing	
___ Pumping	
___ Other	

FLUIDS ADDED

Lost Drilling Fluid: _____ Gallons
Lost Purge Water: _____ Gallons
Water During Installation: _____ Gallons
Total Fluids Added: _____ Gallons
Source of Added Water: _____
Sample Collected of Added Water: Y N
Sample Designation of Added Water: _____

PURGE VOLUME CALCULATION

Casing Volume: 0.47 Ft. of water
x 0.652 Gallons/Foot
= 0.31 Gallons per Single Casing Volume
Sand Pack Volume: _____ Ft. of Saturated Sand Pack
x _____ Gallons/Foot (borehole diameter)
= _____ Gallons (in borehole)
- _____ Gallons of Casing Volume
= _____ x 0.3 (Assuming porosity = 30%)
= _____ Gallons Within Sand Pack
Single Purge Volume: _____ Gallons (Casing Vol. + Sand Pack Vol. + Fluids Added)
Minimum Purge Volume: _____ Gallons
Actual Purge Volume: _____ Gallons
Volume Measured by: _____
Rate of Development _____ Gallons/Minute (Hour, Day)
Pumping Rate/Depth _____ @ _____ Ft. (Below Grd.)
Immiscible Phases Present: Y (N) Thickness _____

Development Criteria: _____

Total Volume Discharged	Rate of Discharge	Time	Temp	pH	Specific* Conductance	Turbidity (NTU)	D.O., Clarity, Odor, PID Readings, Other:
NO WATER IN SCREENED INTERVAL - DEVELOPMENT CAN NOT							
BE PERFORMED							

Development Completed at _____ Gallons Discharged. Date: _____ Time: _____

Personnel: _____

* Specific Conductance readings temperature compensated to 25°C, if not, report temperatures at which reading obtained.

WELL DEVELOPMENT DATA SHEET

WELL DEVELOPMENT DATA SHEET

Sheet ___ of ___

BORING NO. — WELL NO. MW03

Project Concord AOC 1 (Site 31)
Project No. G901600018382820957
Date(s) of Installation 1-7-03
Date(s) of Development 5/22/03
Personnel/Company Gregg Drilling
Mark Johnson
Type of Rig Used

Casing Diameter/Type 4" PVC
Borehole Diameter 11"
Screened Interval(s)
Total Length of Well Casing
Measured Total Depth (TOC) Initial 31.35
Final 31.8
Initial Depth to Water (TOC) 22.09 Date 5/22 Time 0900
Stabilized Depth to Water (TOC) 22.13 Date 5/22 Time 1135

DEVELOPMENT TECHNIQUE(S) / EQUIPMENT TYPE/CAPACITY

- ✓ Surging
- ✓ Overpumping Grundfos
- ___ Air Lift Pumping
- ___ Backwashing
- ___ Bailing
- ___ Well Jetting

FLUIDS ADDED

Lost Drilling Fluid: — Gallons
Lost Purge Water: — Gallons
Water During Installation: — Gallons
Total Fluids Added: — Gallons
Source of Added Water: —
Sample Collected of Added Water: Y N
Sample Designation of Added Water: —

PURGE VOLUME CALCULATION

Casing Volume: 9.26 Ft. of water
x 0.652 Gallons/Foot
= 6.03 Gallons per Single Casing Volume
Sand Pack Volume: 7.52 Ft. of Saturated Sand Pack
x 4.437 Gallons/Foot (borehole diameter)
= 37.12 Gallons (in borehole)
- 6.03 Gallons of Casing Volume
= 31.09 x 0.3 (Assuming porosity = 30%)
= 9.32 Gallons Within Sand Pack
Single Purge Volume: 15.35 Gallons (Casing Vol. + Sand Pack Vol. + Fluids Added)
Minimum Purge Volume: — Gallons
Actual Purge Volume: 93 Gallons
Volume Measured by: Flow meter
Rate of Development ___ Gallons/Minute (Hour, Day)
Pumping Rate/Depth ___ @ ___ Ft. (Below Grd.)
Immiscible Phases Present: Y (N) Thickness

Development Criteria:

Total Volume Discharged	Rate of Discharge	Time	Temp	pH	Specific* Conductance	Turbidity (NTU)	(D.O.) Clarity, Odor, PID Readings, Other:
5	—	1035	18.7	5.74	4.48	999	11.49
10	—	1037	18.4	6.06	2.85	999	11.66
15	—	1038	17.9	6.26	2.9	999	11.27
17.5	—	1039	17.8	6.25	2.92	999	11.48
~~20~~	—	1040	17.4	6.25	3.05	57	11.39
270	~~36~~ 4.5	1055	18.4	5.77	3.25	999	11.87
13		1056	18.2	5.92	3.16	999	11.95
25	1.89	1057	18.2	5.92	3.31	999	11.66
28	1.89	1100	18.2	5.92	3.37	927	11.44
35	1.89	1105	18.2	5.93	3.31	261	11.29

Bailed 23

Development Completed at 11:20 / 93 gal. Gallons Discharged. Date: 5/22/03 Time: 11:20

Personnel: D Sterli

* Specific Conductance readings temperature compensated to 25°C, if not, report temperatures at which reading obtained.

WELL DEVELOPMENT DATA SHEET

WELL DEVELOPMENT DATA SHEET

Sheet ___ of ___

BORING NO. _____ WELL NO. _____

Project _____
Project No. _____
Date(s) of Installation _____
Date(s) of Development _____
Personnel/Company _____
_____
Type of Rig Used _____

Casing Diameter/Type _____
Borehole Diameter _____
Screened Interval(s) _____
Total Length of Well Casing _____
Measured Total Depth (TOC) Initial _____
Final _____
Initial Depth to Water
(TOC) _____ Date _____ Time _____
Stabilized Depth to Water
(TOC) _____ Date _____ Time _____

DEVELOPMENT TECHNIQUE(S) EQUIPMENT TYPE/CAPACITY

___ Surging _____
___ Overpumping _____
___ Air Lift Pumping _____
___ Backwashing _____
___ Bailing _____
___ Well Jetting _____

FLUIDS ADDED

Lost Drilling Fluid: _____ Gallons
Lost Purge Water: _____ Gallons
Water During Installation: _____ Gallons
Total Fluids Added: _____ Gallons
Source of Added Water: _____
Sample Collected of Added Water: Y N
Sample Designation of Added Water: _____

PURGE VOLUME CALCULATION

Casing Volume: _____ Ft. of water
x _____ Gallons/Foot
= _____ Gallons per Single Casing Volume
Sand Pack Volume: _____ Ft. of Saturated Sand Pack
x _____ Gallons/Foot (borehole diameter)
= _____ Gallons (in borehole)
- _____ Gallons of Casing Volume
= _____ x 0.3 (Assuming porosity = 30%)
= _____ Gallons Within Sand Pack
Single Purge Volume: _____ Gallons (Casing Vol. + Sand Pack Vol. + Fluids Added)
Minimum Purge Volume: _____ Gallons
Actual Purge Volume: _____ Gallons
Volume Measured by: _____
Rate of Development _____ Gallons/Minute (Hour, Day)
Pumping Rate/Depth _____ @ _____ Ft. (Below Grd.)
Immiscible Phases Present: Y N Thickness _____

Development Criteria: _____

Total Volume Discharged	Rate of Discharge	Time	Temp	pH	Specific* Conductance	Turbidity (NTU)	D.O. Clarity, Odor, PID Readings, Other:
40 g	[redacted]	11.07	18.2	5.93	3.30	130	11.12
45 g	1.97	11.09	18.1	5.98	3.32	66	11.05
50 g		11.11	18.0	5.95	3.32	26	10.68
55 g		11.14	17.9	5.97	3.32	6	10.52
60 g		11.17	18.0	5.99	3.32	5	10.50
65	2.09	11.19	18.1	6.0	3.32	4	10.49
70	2.09	11.20	18.0	6.0	3.31	5	10.52

197

Development Completed at _____ Gallons Discharged. Date: _____ Time: _____

Personnel: _____
_____

* Specific Conductance readings temperature compensated to 25°C, if not, report temperatures at which reading obtained.

TETRA TECH EM INC.
MONITORING WELL SAMPLING SHEET

Date: 4-22-2003

Monitoring Well No.: AOC-1 Well #2 Chain of Custody No.: 3638, 3637

Personnel: Doug Sterling & Richard Vernimen

Organic Vapor Concentration TOC: 0.0 ppm Breathing Zone: 0.0 ppm

Depth to Well Bottom: 54.45 ft.

Depth to Water: 47.15 ft.

Water Column: 7.30 ft.

Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
4-inch well = water column x 0.652 gal/ft

Well Volume Calculation: 4.76 gal

Time	Vol. Purged (L)	Flow Rate (L/min)	Water Level (ft btoc)	pH	Conductivity (mS/cm)	Temperature (°C/°F)	Turbidity (NTU)	D. O. (mg/L)	O. R. P. (mV)
1353.5	0	--	47.19	7.91	1.368	22.10	7.3	6.59	161.4
1356.0	0.5	0.20	47.20	7.26	3.277	20.94	27.7	5.09	159.1
1358.0	1.0	0.25	47.20	7.21	3.535	20.19	15.0	4.41	158.7
1400.0	1.5	0.25	47.20	7.21	3.564	19.85	4.8	4.17	159.2
1402.0	2.0	0.25	47.20	7.18	3.561	19.76	5.2	4.07	160.2
1404.0	2.5	0.25	47.20	7.17	3.552	19.72	4.9	4.09	161.1
1406.0	3.0	0.25	47.20	7.16	3.547	19.73	5.5	4.19	162.6
1408.0	3.5	0.25	47.20	7.14	3.544	19.67	3.7	4.21	163.9
1410.0	4.0	0.25	47.20	7.12	3.540	19.66	5.3	4.21	165.2
1414.0	5.0	0.25	47.20	7.11	3.535	19.65	4.4	4.32	167.3
1418.0	6.0	0.25	47.20	7.10	3.531	19.58	2.3	4.34	168.9
1422.0	7.0	0.25	47.20	7.10	3.533	19.58	2.0	4.40	170.7
1426.0	8.0	0.25	47.20	7.09	3.537	19.59	1.8	4.47	172.0
1430.0	9.0	0.25	47.20	7.09	3.539	19.60	2.0	4.40	172.2

Begin Purge: 1353 Method of Purging bladder pump Purged Dry? no

End Purge: 1430 Total Volume Purged: 9.0 L How Measured? graduated pitcher

QA/QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

Date and Time of Sample Collection: 4-22-03 1440 Sample Number (s): DO1AOC01MW02

Comments:

TETRA TECH EM, INC.

MONITORING WELL SAMPLING SHEET

Monitoring Well No.: MWΦ1 Date: 5/26/Φ3

Personnel: H. CHENG, D. CHENG

Organic Vapor Concentration TOC: N/A ppm Breathing Zone: N/A ppm

Depth to Well Bottom: ft Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
4-inch well = water column x 0.652 gal/ft

Depth to Water: 44.97 ft

Water Column: N/A ft Well Volume: N/A gal

Time	Vol. Purged	Water Level	pH	Conductivity ~~(µmhos/cm)~~ mS/cm	Temperature (°C/~~°F~~)	Turbidity NTU	DO ~~mg/L~~ %
1202	Φ	44.97	7.Φ8	2.25Φ	19.43	2.35	52.4
1205	1	44.97	7.Φ5	2.217	19.37	1.89	5Φ.6
1208	2	45.ΦΦ	7.Φ3	2.19Φ	19.35	1.69	51.3
121Φ	3	44.99	7.Φ2	2.179	19.26	1.71	52.6
1212	4	44.99	7.Φ1	2.168	19.25	1.7Φ	53.3
1214	5	44.99	7.Φ1	2.166	19.24	1.35	54.3
1216	6	44.99	7.Φ1	2.165	19.26	1.Φ2	54.2
1218	7	44.99	7.Φ1	2.165	19.27	1.2Φ	54.Φ
122Φ	8	45.ΦΦ	7.Φ1	2.169	19.26	Φ.9Φ	54.6

Begin Purge: 12ΦΦ Method of Purging ☒ Pump ☐ Bailer

End Purge: 1227 Purged Dry? NO

Total Volume Purged: 8L How Measured? Graduated cylinder

QA\QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

Date and Time of Sample Collection: 5/26/Φ3 1225 Sample Number (s): ΦΦ1AΦC1MWΦΦ1R

Comments:

TETRA TECH EM, INC.

MONITORING WELL SAMPLING SHEET

Monitoring Well No.: MW02 Date: 5/26/03

Personnel: H. CHENG, D. CHENG

Organic Vapor Concentration TOC: N/A ppm Breathing Zone: N/A ppm

Depth to Well Bottom: ft Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
4-inch well = water column x 0.652 gal/ft

Depth to Water: 47.03 ft

Water Column: N/A ft Well Volume: N/A gal

Time	Vol. Purged	Water Level	pH	Conductivity (~~µmhos/cm~~ mS/cm)	Temperature (°C/~~°F~~)	Turbidity NTU	DO mg/L
1435	0	47.03	7.03	4.47	22.42	1.15	9.93
1437	1	47.15	7.04	4.43	21.85	1.02	9.24
1438	2	47.16	7.06	4.40	21.56	0.89	8.67
1439	3	47.16	7.09	4.46	21.60	0.81	8.20
1441	4	47.16	7.12	4.46	21.57	0.90	7.94
1443	5	47.16	7.13	4.41	21.56	1.13	7.37
1444	6	47.11	7.13 7.14	4.42	21.58	0.97	7.90
1446	7	47.11	~~7.00~~	4.41	21.56	0.61	7.92
1447	8	47.11	7.15	4.40	21.53	0.78	7.91

Begin Purge: 1433 Method of Purging ☒ Pump ☐ Bailer

End Purge: 1457 Purged Dry? NO

Total Volume Purged: 8 L How Measured? Graduated cylinder

QA\QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

Date and Time of Sample Collection: 5/26/03 1455 Sample Number (s): 0001ACC1MW0002R

Comments:

TETRA TECH EM, INC.

MONITORING WELL SAMPLING SHEET

Monitoring Well No.: MW03 Date: 5/26/03

Personnel: H. CHENG, D. CHENG

Organic Vapor Concentration TOC: N/A ppm Breathing Zone: N/A ppm

Depth to Well Bottom: ft Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
4-inch well = water column x 0.652 gal/ft

Depth to Water: 22.04 ft

Water Column: N/A ft Well Volume: N/A gal

Time	Vol. Purged	Water Level	pH	Conductivity (~~umhos/cm~~ mS/cm)	Temperature (°C/~~°F~~)	Turbidity NTU	DO mg/L
1553	0	22.04	6.70	3.36	21.25	15.0	9.19
1555	1	22.16	6.65	3.12	20.20	7.03	4.78
1556	2	22.18	6.64	3.26	20.10	5.36	4.04
1558	3	22.18	6.64	3.27	19.91	4.30	3.21
1559	4	22.18	6.65	3.31	19.89	3.66	2.87
1601	5	22.19	6.65	3.34	19.91	3.23	2.64
1602	6	22.19	6.66	3.37	19.89	2.95	2.44
1603	7	22.19	6.66	3.38	19.91	2.12	2.30
1605	8	22.19	6.66	3.40	19.92	~~2.20~~ 2.31	2.20
1606	9	22.19	6.66	3.40	19.90	2.19	2.16

Begin Purge: 1550 Method of Purging ☒ Pump ☐ Bailer

End Purge: 1612 Purged Dry? NO

Total Volume Purged: 9 L How Measured? Graduated cylinder

QA\QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

Date and Time of Sample Collection: 5/26/03 1610 Sample Number (s): 0001A0C1MW0003

Comments:

TETRA TECH EM, INC.

MONITORING WELL SAMPLING SHEET

Monitoring Well No.: MW01 Date: 7/10/03

Personnel: D. CHENG, H. CHENG

Organic Vapor Concentration TOC: N/A ppm Breathing Zone: N/A ppm

Depth to Well Bottom: 52.18 ft Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
Depth to Water: 45.31 ft (4-inch well) = water column x 0.652 gal/ft

Water Column: N/A ft Well Volume: N/A gal

Time	Vol. Purged	Water Level	pH	Conductivity ~~(µmhos/cm)~~ mS/cm	Temperature (°C) ~~°F~~	Turbidity NTU	DO mg/L
1452	0	45.31	7.38	2.666	22.89	1.07	5.40
1456	1	45.45	7.25	2.738	21.01	1.49	4.83
1501	2	45.46	7.22	2.742	20.60	1.35	5.22
1505	3	45.49	7.20	2.668	20.50	1.15	5.20
1509	4	45.51	7.18	2.599	20.46	2.01	5.18
1513	5	45.50	7.15	2.568	20.47	0.75	5.23
1519	6	45.55	7.15	2.553	20.73	0.67	5.33
1523	7	46.52	7.14	2.548	20.66	0.55	5.24
1529	8	45.51	7.14	2.541	20.70	0.68	5.31

Begin Purge: 1452 Method of Purging ☒ Pump ☐ Bailer

End Purge: 1529 Purged Dry? NO

Total Volume Purged: 8L How Measured? Graduated cylinder

QA\QC Sample Collected Here? ☐ Duplicate ☒ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

Date and Time of Sample Collection: 7/10/03 1545 Sample Number (s): 001AOC1MW0008

Comments: DEDICATED BLADDER PUMP

TETRA TECH EM, INC.

MONITORING WELL SAMPLING SHEET

Monitoring Well No.: MW02 Date: 7/10/03

Personnel: H. CHENG, D. CHENG

Organic Vapor Concentration TOC: N/A ppm Breathing Zone: N/A ppm

Depth to Well Bottom: 59.46 ft BTOC Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
4-inch well = water column x 0.652 gal/ft

Depth to Water: 47.26 ft BTOC

Water Column: N/A ft Well Volume: N/A gal

Time	Vol. Purged	Water Level	pH	Conductivity mS/cm ~~(umhos/cm)~~	Temperature °C ~~(°C/°F)~~	Turbidity NTU	DO mg/L
0900	0	47.26	7.03	4.232	20.46	0.74	4.56
0902	1	47.27	7.04	4.218	20.29	0.49	4.13
0907	2	47.28	7.02	4.217	20.51	0.50	4.04
0911	3	47.33	7.01	4.222	19.94	0.44	4.20
0914	4	47.33	7.00	4.214	19.98	0.31	4.35
0918	5	47.32	7.03	4.222	19.78	0.17	4.45
0922	6	47.31	7.07	4.225	19.73	0.51	4.44
0925	7	47.28	7.08	4.209	19.98	0.19	4.27
0929	8	47.32	7.05	4.212	20.19	0.87	4.15
0933	9	47.33	7.02	4.231	19.85	0.24	4.05
0937	10	47.35	7.05	4.231	19.75	0.32	3.97

Begin Purge: 0900 Method of Purging ☒ Pump ☐ Bailer

End Purge: 0937 Purged Dry? NO

Total Volume Purged: 10 L How Measured? Graduated cylinder

QA\QC Sample Collected Here? ☐ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☒ No QA/QC Sample

Date and Time of Sample Collection: 7/10/03 0945 Sample Number (s): 0301A01MW005

Comments: DEDICATED BLADDER PUMP

TETRA TECH EM, INC.

MONITORING WELL SAMPLING SHEET

Monitoring Well No.: MW03 Date: 7/10/03

Personnel: H. CHENG, D. CHONG

Organic Vapor Concentration TOC: N/A ppm Breathing Zone: N/A ppm

Depth to Well Bottom: 31.84 ft BTOC Well Volume: 2-inch well = water column x 0.163 gal/ft
3-inch well = water column x 0.367 gal/ft
(4-inch well) = water column x 0.652 gal/ft

Depth to Water: 22.68 ft BTOC

Water Column: N/A ft Well Volume: N/A gal

Time	Vol. Purged	Water Level	pH	Conductivity mS/cm ~~(umhos/cm)~~	Temperature (°C/~~°F~~)	Turbidity NTU	DO mg/L
1115	0	22.68	6.87	2.911	19.29	2.31	1.61
1118	1	22.78	6.58	2.849	18.45	4.04	0.59
1120	2	22.79	6.52	2.838	18.44	3.08	0.53
1124	3	22.81	6.53	2.845	18.50	3.54	0.48
1127	4	22.81	6.49	2.846	18.51	3.05	0.40
1132	5	22.80	6.50	2.859	18.47	2.39	0.36
1135	6	22.82	6.52	2.872	18.52	2.29	0.34
1138	7	22.85	6.56	2.886	18.56	2.30	0.33
1142	8	22.85	6.55	2.907	18.50	2.52	0.37

Begin Purge: 1115 Method of Purging ☒ Pump ☐ Bailer

End Purge: 1142 Purged Dry? NO

Total Volume Purged: 8L How Measured? Graduated cylinder

QA\QC Sample Collected Here? ☒ Duplicate ☐ Matrix Spike ☐ Equip. Blank ☐ No QA/QC Sample

Date and Time of Sample Collection: 7/10/03 1145
" 1215

Sample Number (s): 0001ACC1MW0006
0001ACC1MW0007 (Dup)

Comments: DEDICATED BLADDER PUMP

APPENDIX D
LABORATORY ANALYTICAL DATA SUMMARY SHEETS

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco, CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 3637

Page ____ of ____

3637

Lab PO#: 032209	Lab: Lauks
Project name: Concord Naval Weapons Station AOC-1	TtEMI technical contact: Sara Woolley
Project (CTO) number: G901600103020907	TtEMI project manager: Rik Lantz
	Field samplers: Douglas Sterling
	Field samplers' signatures:

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS/MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Preservative Added: HCl	Analysis Required: VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Hard TDS/TSS
001AOC1ER03	EQUIP rinsate	4/22/03	0700	water		3				2			X	X	X		X	X
001AOC1MW01	mw-1		1115			3	1	1		2			X	X	X		X	X
001AOC1MW01A	mw-1 Field dup		1145			6				2			X	X	X		X	X
001AOC1MW02	mw-2		1440			6				2			X	X	X		X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling	Ttemi	4/24/03	1100
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 834034772917

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

MAY 21 '03 09:22AM P.2/3

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco, CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 3638

Page 1 of 1

Project name: Concord Naval Weapons Station AOC-1	Lab PO#: 032208	Lab: Columbia	3638
Project (CTO) number: G901600103020907	TtEMI technical contact: Sara Woolley	Field samplers: Douglas Sterling	
	TtEMI project manager: Rik Lantz	Field samplers' signature:	

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Stericul Poly	VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Preservative Added: Hg	Analysis Required: 1631
001AOC1ER03	Equip Rinsate	4/22/03	0700	water							1							X	X
001AOC1MW01	MW-1		1115								1							X	X
001AOC1MW01A	Field dup of MW1		1145								1							X	X
001AOC1MW02	MW-2	↓	1140	↓							1							X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling	TtEMI	4/23/03	0900
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 834034772923

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

MAY 21 '03 09:22AM P.3/3

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco, CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 3637

Page ____ of ____

3637

Lab PO#: 032209	Lab: Lauks
Project name: Concord Naval Weapons Station AOC-1	TtEMI technical contact: Sara Woolley
Project (CTO) number: G901600103020907	TtEMI project manager: Rik Lantz
	Field samplers: Douglas Sterling
	Field samplers' signatures:

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS/MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Preservative Added: HCl	Analysis Required: VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Hard TDS/TSS
001AOC1ER03	EQUIP rinsate	4/22/03	0700	water		3				2			X	X	X		X	X
001AOC1MW01	mw-1		1115			3	1	1		2			X	X	X		X	X
001AOC1MW01A	mw-1 Field dup		1145			6				2			X	X	X		X	X
001AOC1MW02	mw-2		1440			6				2			X	X	X		X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling	Ttemi	4/24/03	1100
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 834034772917

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

MAY 21 '03 09:22AM P.2/3

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco, CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 3638

Page 1 of 1

Project name: Concord Naval Weapons Station AOC-1	Lab PO#: 032208	Lab: Columbia	3638
Project (CTO) number: G901600103020907	TtEMI technical contact: Sara Woolley	Field samplers: Douglas Sterling	
	TtEMI project manager: Rik Lantz	Field samplers' signature:	

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	No./Container Types: 40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	Stericul Poly	VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Preservative Added: Hg	Analysis Required: 1631
001AOC1ER03	Equip Rinsate	4/22/03	0700	water							1							X	X
001AOC1MW01	MW-1		1115								1							X	X
001AOC1MW01A	Field dup of MW1		1145								1							X	X
001AOC1MW02	MW-2	↓	1140	↓							1							X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	Doug Sterling	TtEMI	4/23/03	0900
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 834034772923

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

MAY 21 '03 09:22AM P.3/3

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco. CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 4608

4608

Lab PO#:	Lab:
Ø322Ø8	Columbia Analytical

Project name:	TtEMI technical contact:	Field samplers:
[illegible]	[illegible]	[illegible] Cheng

Project (CTO) number:	TtEMI project manager:	Field samplers' signatures:
[illegible]	R. [illegible]	[signature]

Preservative Added: HCl (Hg)

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Hg
ØØ1AØ6MWØØ1R	MWØ1	5/26/03	1225	WATER		—		1	—	—	—	—	—	—	—	—	X
ØØ1AØ6MWØØ2R	MWØ2	↓	1455	↓		—		1	—	—	—	—	—	—	—	—	X
ØØ1AØ6MWØØ3	MWØ3	↓	161Ø	↓		—		1	—	—	—	—	—	—	—	—	X
ØØ1AØ6MWØØ4	Equipment Rinsate	↓	1645	↓		—		1	—	—	—	—	—	—	—	—	X

DC

	Name (print)	Company Name	Date	Time
Relinquished by: [signature]	Hwakong Cheng	TtEMI	5/27/03	113Ø
Received by: Fed Ex				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks: UNFILTERED

Fed Ex #: 8308 9469 4362

Chain of Custody Record No. 4609

Tetra Tech EM Inc.
San Francisco Office
135 Main St. Suite 1800
San Francisco. CA 94105
415-543-4880
Fax 415-543-5480

Page 1 of 1

4609

Lab PO#:	Lab:
Ø322Ø9	Lancs

Project name:	TtEMI technical contact:	Field samplers:
Concord GW Sampling	Sam Walley	Hwakung Chang

Project (CTO) number:	TtEMI project manager:	Field samplers' signatures:
CMMA6MW0022Ø9Ø7	Rik Lantz	H Chang

Preservative Added: HNO3

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	1 L Poly	VOA	SVOA	Pest/PCBs	Metals, TOTAL	TPH Purgeables	TPH Extractables	TDS/TSS	HCO3
CMMADC1MW001R	MWØ1	5/26/Ø3	1225	WATER		—	—	1	—	—	1	—	—	—	X	—	—	X	—
CMMADC1MWØØ2R	MWØ2	↓	1455	↓		—	—	1	—	—	1	—	—	—	X	—	—	X	—
CMMADC1MWØØ3	MWØ3	↓	1610	↓		—	6	1	—	—	1	—	X	X	X	—	—	X	X
CMMADC1MWØØ4	Equipment Rinsate	↓	1645	↓		—	6	1	—	—	—	—	X	X	X	—	—		X

	Name (print)	Company Name	Date	Time
Relinquished by: H Chang	Hwakung Chang	TtEMI	5/27/Ø3	1030
Received by: Fed Ex				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks: METALS ARE UNFILTERED

Fed Ex #: 8368 9469 4351

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW01

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC11

Matrix (soil/water): WATER Lab Sample ID: 0304458-02

Level (low/med): LOW Date Received: 4/25/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	66.6	B		P
7440-36-0	Antimony	3.9	B		P
7440-38-2	Arsenic	5.2	U		P
7440-39-3	Barium	73.0	B		P
7440-41-7	Beryllium	0.40	U		P
7440-43-9	Cadmium	0.51	B		P
7440-70-2	Calcium	204000			P
7440-47-3	Chromium	18.8			P
7440-50-8	Copper	1.1	B		P
7440-48-4	Cobalt	1.3	U		P
7439-89-6	Iron	15.7	U		P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	107000			P
7439-96-5	Manganese	2.3	B		P
7440-02-0	Nickel	3.0	B		P
7440-09-7	Potassium	7470			P
7782-49-2	Selenium	18.9			P
7440-22-4	Silver	0.40	U		P
7439-97-6	Mercury	0.020	U		CV
7440-23-5	Sodium	149000			P
7440-28-0	Thallium	4.1	U		P
7440-62-2	Vanadium	7.8	B		P
7440-66-6	Zinc	3.7	B		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW01A

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC11

Matrix (soil/water): WATER Lab Sample ID: 0304458-03

Level (low/med): LOW Date Received: 4/25/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	62.0	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	7.3	B		P
7440-39-3	Barium	74.9	B		P
7440-41-7	Beryllium	0.40	U		P
7440-43-9	Cadmium	0.48	B		P
7440-70-2	Calcium	217000			P
7440-47-3	Chromium	20.0			P
7440-50-8	Copper	1.1	B		P
7440-48-4	Cobalt	1.3	U		P
7439-89-6	Iron	15.7	U		P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	113000			P
7439-96-5	Manganese	1.4	B		P
7440-02-0	Nickel	1.8	U		P
7440-09-7	Potassium	7820			P
7782-49-2	Selenium	16.6			P
7440-22-4	Silver	0.40	U		P
7439-97-6	Mercury	0.020	U		CV
7440-23-5	Sodium	162000			P
7440-28-0	Thallium	4.1	U		P
7440-62-2	Vanadium	8.3	B		P
7440-66-6	Zinc	5.1	B		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW02

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC11

Matrix (soil/water): WATER Lab Sample ID: 0304458-04

Level (low/med): LOW Date Received: 4/25/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	62.0	B		P
7440-36-0	Antimony	2.6	U		P
7440-38-2	Arsenic	5.4	B		P
7440-39-3	Barium	97.8	B		P
7440-41-7	Beryllium	0.40	U		P
7440-43-9	Cadmium	0.31	B		P
7440-70-2	Calcium	269000			P
7440-47-3	Chromium	18.4			P
7440-50-8	Copper	1.2	B		P
7440-48-4	Cobalt	1.3	U		P
7439-89-6	Iron	15.7	U		P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	248000			P
7439-96-5	Manganese	12.2	B		P
7440-02-0	Nickel	3.1	B		P
7440-09-7	Potassium	12100			P
7782-49-2	Selenium	3.5	U		P
7440-22-4	Silver	0.40	U		P
7439-97-6	Mercury	0.020	U		CV
7440-23-5	Sodium	247000			P
7440-28-0	Thallium	4.1	U		P
7440-62-2	Vanadium	8.2	B		P
7440-66-6	Zinc	4.9	B		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW001R

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-01

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	80.3	B		P
7440-36-0	Antimony	4.1	B		P
7440-38-2	Arsenic	2.5	U		P
7440-39-3	Barium	77.8	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	207000			P
7440-47-3	Chromium	19.3			P
7440-50-8	Copper	1.4	U		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	12.8	U		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	105000			P
7439-96-5	Manganese	1.3	B		P
7440-02-0	Nickel	2.9	U		P
7440-09-7	Potassium	7050		NE	P
7782-49-2	Selenium	19.1			P
7439-97-6	Mercury	0.087	B		CV
7440-22-4	Silver	0.40	U		P
7440-23-5	Sodium	135000		NE	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	7.8	B		P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW001R

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-01

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7439-98-7	Molybdenum	2.8	B		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW002R

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-02

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	74.5	B		P
7440-36-0	Antimony	4.0	B		P
7440-38-2	Arsenic	3.9	B		P
7440-39-3	Barium	103	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.64	B		P
7440-70-2	Calcium	271000			P
7440-47-3	Chromium	18.8			P
7440-50-8	Copper	1.4	U		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	12.8	U		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	244000			P
7439-96-5	Manganese	6.5	B		P
7440-02-0	Nickel	3.0	B		P
7440-09-7	Potassium	11900		NE	P
7782-49-2	Selenium	3.7	B		P
7439-97-6	Mercury	0.069	B		CV
7440-22-4	Silver	0.40	U		P
7440-23-5	Sodium	176000		NE	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	8.5	B		P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW002R

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-02

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7439-98-7	Molybdenum	1.8	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW003

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-03

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	102	B		P
7440-36-0	Antimony	3.1	B		P
7440-38-2	Arsenic	1230			P
7440-39-3	Barium	110	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.50	B		P
7440-70-2	Calcium	157000			P
7440-47-3	Chromium	2.9	B		P
7440-50-8	Copper	5.4	B		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	74.8	B		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	218000			P
7439-96-5	Manganese	238			P
7440-02-0	Nickel	19.2	B		P
7440-09-7	Potassium	16500		NE	P
7782-49-2	Selenium	18.1			P
7439-97-6	Mercury	0.11	B		CV
7440-22-4	Silver	0.40	U		P
7440-23-5	Sodium	127000		NE	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	162			P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW003

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-03

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7439-98-7	Molybdenum	4.3	B		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW004

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-04

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	64.4	U		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.5	U		P
7440-39-3	Barium	0.59	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	132	B		P
7440-47-3	Chromium	0.70	U		P
7440-50-8	Copper	1.4	U		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	12.8	U		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	89.1	B		P
7439-96-5	Manganese	1.6	B		P
7440-02-0	Nickel	2.9	U		P
7440-09-7	Potassium	14.5	U	NE	P
7782-49-2	Selenium	2.9	U		P
7439-97-6	Mercury	0.069	B		CV
7440-22-4	Silver	0.40	U		P
7440-23-5	Sodium	295	B	NE	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	0.40	B		P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001A0C1MW004

Lab Name: Laucks Laboratories Contract: Concord Naval We

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CNC12

Matrix (soil/water): WATER Lab Sample ID: 0305374-04

Level (low/med): LOW Date Received: 5/28/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7439-98-7	Molybdenum	1.8	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW005

Lab Name: Laucks Laboratories Contract: Concord AOC1

Lab Code: LAUCKS Case No.: _____ SAS No.: _____ SDG No.: CNC13

Matrix (soil/water): WATER Lab Sample ID: 0307142-01

Level (low/med): LOW Date Received: 7/11/03

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	64.4	U		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	7.6	B		P
7440-39-3	Barium	108	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.83	B		P
7440-70-2	Calcium	280000			P
7440-47-3	Chromium	19.2			P
7440-50-8	Copper	1.8	B		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	12.8	U		P
7439-92-1	Lead	2.2	B		P
7439-95-4	Magnesium	252000			P
7439-96-5	Manganese	3.4	B		P
7439-98-7	Molybdenum	13.3	B		P
7440-02-0	Nickel	3.8	B		P
7440-09-7	Potassium	8090	B	E	P
7782-49-2	Selenium	2.9	U		P
7440-22-4	Silver	0.40	U		P
7439-97-6	Mercury	0.044	B		CV
7440-23-5	Sodium	240000		E	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	8.4	B		P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture: _____

Color After: Colorless Clarity After: Clear Artifacts: _____

Comments: _____

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW006

Lab Name: Laucks Laboratories Contract: Concord AOC1

Lab Code: LAUCKS Case No.: _____ SAS No.: _____ SDG No.: CNC13

Matrix (soil/water): WATER Lab Sample ID: 0307142-02

Level (low/med): LOW Date Received: 7/11/03

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	76.1	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	1170			P
7440-39-3	Barium	100	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.71	B		P
7440-70-2	Calcium	162000			P
7440-47-3	Chromium	1.8	B		P
7440-50-8	Copper	4.6	B		P
7440-48-4	Cobalt	0.64	B		P
7439-89-6	Iron	28.2	B		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	219000			P
7439-96-5	Manganese	254			P
7439-98-7	Molybdenum	11.0	B		P
7440-02-0	Nickel	19.8	B		P
7440-09-7	Potassium	16100		E	P
7782-49-2	Selenium	19.2			P
7440-22-4	Silver	0.44	B		P
7439-97-6	Mercury	0.066	B		CV
7440-23-5	Sodium	141000		E	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	152			P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture: _____

Color After: Colorless Clarity After: Clear Artifacts: _____

Comments: _____

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW007

Lab Name: Laucks Laboratories Contract: Concord AOC1

Lab Code: LAUCKS Case No.: _____ SAS No.: _____ SDG No.: CNC13

Matrix (soil/water): WATER Lab Sample ID: 0307142-03

Level (low/med): LOW Date Received: 7/11/03

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	68.0	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	1150			P
7440-39-3	Barium	95.1	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.57	B		P
7440-70-2	Calcium	159000			P
7440-47-3	Chromium	1.4	B		P
7440-50-8	Copper	4.5	B		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	17.8	B		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	215000			P
7439-96-5	Manganese	252			P
7439-98-7	Molybdenum	7.2	B		P
7440-02-0	Nickel	19.4	B		P
7440-09-7	Potassium	15700		E	P
7782-49-2	Selenium	18.8			P
7440-22-4	Silver	0.52	B		P
7439-97-6	Mercury	0.075	B		CV
7440-23-5	Sodium	133000		E	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	149			P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture: _____

Color After: Colorless Clarity After: Clear Artifacts: _____

Comments: _____

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW008

Lab Name: Laucks Laboratories Contract: Concord AOC1

Lab Code: LAUCKS Case No.: SAS No.: SDG No.: CNC13

Matrix (soil/water): WATER Lab Sample ID: 0307142-04

Level (low/med): LOW Date Received: 7/11/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	64.4	U		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	5.1	B		P
7440-39-3	Barium	74.7	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	201000			P
7440-47-3	Chromium	20.2			P
7440-50-8	Copper	1.4	U		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	12.8	U		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	102000			P
7439-96-5	Manganese	0.60	U		P
7439-98-7	Molybdenum	5.0	B		P
7440-02-0	Nickel	2.9	U		P
7440-09-7	Potassium	6850		E	P
7782-49-2	Selenium	17.1			P
7440-22-4	Silver	0.40	U		P
7439-97-6	Mercury	0.025	B		CV
7440-23-5	Sodium	150000		E	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	7.8	B		P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW009

Lab Name: Laucks Laboratories Contract: Concord AOC1

Lab Code: LAUCKS Case No.: _____ SAS No.: _____ SDG No.: CNC13

Matrix (soil/water): WATER Lab Sample ID: 0307142-05

Level (low/med): LOW Date Received: 7/11/03

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	64.4	U		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.5	U		P
7440-39-3	Barium	1.1	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.54	B		P
7440-70-2	Calcium	61.6	U		P
7440-47-3	Chromium	0.70	U		P
7440-50-8	Copper	1.4	U		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	12.8	U		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	36.8	U		P
7439-96-5	Manganese	0.60	U		P
7439-98-7	Molybdenum	3.3	B		P
7440-02-0	Nickel	2.9	U		P
7440-09-7	Potassium	14.5	U	E	P
7782-49-2	Selenium	2.9	U		P
7440-22-4	Silver	0.40	U		P
7439-97-6	Mercury	0.024	B		CV
7440-23-5	Sodium	204	U	E	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	0.40	U		P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture: _____

Color After: Colorless Clarity After: Clear Artifacts: _____

Comments: _____

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1MW010

Lab Name: Laucks Laboratories Contract: Concord AOC1

Lab Code: LAUCKS Case No.: SAS No.: SDG No.: CNC13

Matrix (soil/water): WATER Lab Sample ID: 0307142-06

Level (low/med): LOW Date Received: 7/11/03

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	64.4	U		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.5	U		P
7440-39-3	Barium	0.79	B		P
7440-41-7	Beryllium	0.80	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	61.6	U		P
7440-47-3	Chromium	0.70	U		P
7440-50-8	Copper	1.4	U		P
7440-48-4	Cobalt	0.50	U		P
7439-89-6	Iron	12.8	U		P
7439-92-1	Lead	1.9	U		P
7439-95-4	Magnesium	36.8	U		P
7439-96-5	Manganese	0.60	U		P
7439-98-7	Molybdenum	1.8	U		P
7440-02-0	Nickel	2.9	U		P
7440-09-7	Potassium	14.5	U	E	P
7782-49-2	Selenium	2.9	U		P
7440-22-4	Silver	0.40	U		P
7439-97-6	Mercury	0.040	B		CV
7440-23-5	Sodium	204	U	E	P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	0.40	U		P
7440-66-6	Zinc	12.3	U		P

Color Before: Colorless Clarity Before: Clear Texture:

Color After: Colorless Clarity After: Clear Artifacts:

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Tetra Tech EM Inc.	**Service Request:**	K2303096
Project:	Concord Naval Weapons Station AOL-1/G90160010302020907	**Date Collected:**	4/22/2003
Sample Matrix:	Water	**Date Received:**	4/25/2003

Mercury, Total

Prep Method:	METHOD	Units:	ng/L
Analysis Method:	1631E	Basis:	NA
Test Notes:			

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
001AOC1ER03	K2303096-001	1.0	0.2	1	4/30/2003	5/1/2003	0.7	B
001AOC1MW01	K2303096-002	1.0	0.2	1	4/30/2003	5/1/2003	1.0	
001AOC1MW01A	K2303096-003	1.0	0.2	1	4/30/2003	5/1/2003	1.0	
001AOC1MW02	K2303096-004	1.0	0.2	1	4/30/2003	5/1/2003	1.6	
Method Blank	K2303096-MB	1.0	0.2	1	4/30/2003	5/1/2003	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Tetra Tech EM Inc.	**Service Request:**	K2303897
Project:	Concord GW Sampling/G90160010302020907	**Date Collected:**	5/26/2003
Sample Matrix:	Water	**Date Received:**	5/28/2003

Mercury, Total

Prep Method:	METHOD	Units:	ng/L
Analysis Method:	1631E	Basis:	NA
Test Notes:			

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
001A0C1MW001R	K2303897-001	1.0	0.2	1	6/5/2003	6/6/2003	1.0	B
001A0C1MW002R	K2303897-002	1.0	0.2	1	6/5/2003	6/6/2003	1.4	
001A0C1MW003	K2303897-003	1.0	0.2	1	6/5/2003	6/6/2003	68.3	
001A0C1MW004	K2303897-004	1.0	0.2	1	6/5/2003	6/6/2003	0.4	B
Method Blank	K2303897-MB	1.0	0.2	1	6/5/2003	6/6/2003	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Tetra Tech EM Inc.	**Service Request:**	K2305087
Project:	Concord Naval Weapons Station AOL-1/G90160010302020907	**Date Collected:**	7/10/2003
Sample Matrix:	Water	**Date Received:**	7/11/2003

Mercury, Total

Prep Method:	METHOD	Units:	ng/L
Analysis Method:	1631E	Basis:	NA
Test Notes:			

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
001AOC1MW005	K2305087-001	1.0	0.2	1	7/21/2003	7/22/2003	1.7	
001AOC1MW006	K2305087-002	1.0	0.2	1	7/21/2003	7/22/2003	62.2	
001AOC1MW007	K2305087-003	1.0	0.2	1	7/21/2003	7/22/2003	62.3	
001AOC1MW008	K2305087-004	1.0	0.2	1	7/21/2003	7/22/2003	1.3	
001AOC1MW009	K2305087-005	1.0	0.2	1	7/21/2003	7/22/2003	0.5	B
001AOC1MW010	K2305087-006	1.0	0.2	1	7/21/2003	7/22/2003	0.6	B
Method Blank	K2305087-MB	1.0	0.2	1	7/21/2003	7/22/2003	ND	

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001AOC1MW01
SDG No. : CNC11 Lab Sample ID: 0304458-02
Matrix : WATER Date Received: 04/25/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	2000	mg/L	04/28/03	04/28/03	10.	EPA 160.1
Total Suspended Solids	2.	mg/L	04/28/03	04/28/03	2.	EPA 160.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001AOC1MW01A
SDG No. : CNC11 Lab Sample ID: 0304458-03
Matrix : WATER Date Received: 04/25/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	1700	mg/L	04/28/03	04/28/03	10.	EPA 160.1
Total Suspended Solids	2. U	mg/L	04/28/03	04/28/03	2.	EPA 160 2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001AOC1MW02
SDG No. : CNC11 Lab Sample ID: 0304458-04
Matrix : WATER Date Received: 04/25/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	2700	mg/L	04/28/03	04/28/03	20.	EPA 160.1
Total Suspended Solids	2. U	mg/L	04/28/03	04/28/03	2.	EPA 160 2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001A0C1MW001R
SDG No. : CNC12 Lab Sample ID: 0305374-01
Matrix : WATER Date Received: 05/28/03

Analyte	Result		Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	1500		mg/L	05/30/03	05/30/03	8.	EPA 160.1
Total Suspended Solids	2.	U	mg/L	05/30/03	05/30/03	2.	EPA 160.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001A0C1MW002R
SDG No. : CNC12 Lab Sample ID: 0305374-02
Matrix : WATER Date Received: 05/28/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	3100	mg/L	05/30/03	05/30/03	20.	EPA 160.1
Total Suspended Solids	4.	mg/L	05/30/03	05/30/03	2.	EPA 160 2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs
SDG No. : CNC12
Matrix : WATER

Sample ID : 001A0C1MW003
Lab Sample ID: 0305374-03
Date Received: 05/28/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	1900	mg/L	05/30/03	05/30/03	20.	EPA 160.1
Total Suspended Solids	3.	mg/L	05/30/03	05/30/03	2.	EPA 160 2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001AOC1MW005
SDG No. : CNC13 Lab Sample ID: 0307142-01
Matrix : WATER Date Received: 07/11/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	2600	mg/L	07/15/03	07/15/03	8.	EPA 160.1
Total Suspended Solids	8.	mg/L	07/15/03	07/15/03	8.	EPA 160 2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001AOC1MW006
SDG No. : CNC13 Lab Sample ID: 0307142-02
Matrix : WATER Date Received: 07/11/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	1900	mg/L	07/15/03	07/15/03	8.	EPA 160.1
Total Suspended Solids	12.	mg/L	07/15/03	07/15/03	8.	EPA 160 2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001AOC1MW007
SDG No. : CNC13 Lab Sample ID: 0307142-03
Matrix : WATER Date Received: 07/11/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	2000	mg/L	07/15/03	07/15/03	8.	EPA 160.1
Total Suspended Solids	16.	mg/L	07/15/03	07/15/03	8.	EPA 160.2

INORGANICS ANALYSIS DATA SHEET

Lab Name: Laucks Testing Labs Sample ID : 001AOC1MW008
SDG No. : CNC13 Lab Sample ID: 0307142-04
Matrix : WATER Date Received: 07/11/03

Analyte	Result	Units	Prepped	Analyzed	Limit	Method
Total Dissolved Solids	1600	mg/L	07/15/03	07/15/03	8.	EPA 160.1
Total Suspended Solids	8.	mg/L	07/15/03	07/15/03	8.	EPA 160.2

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW01

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-02

Sample wt/vol: 1010 (g/ml) ML Lab File ID: L0501019.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted:(Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW01

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-02

Sample wt/vol: 1010 (g/ml) ML Lab File ID: L0501019.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted:(Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,I]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

001AOC1MW01

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-02

Sample wt/vol: 1010 (g/ml) ML Lab File ID: L0501019.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted: (Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

Number TICs found: 1 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	unknown	7.83	4	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW01A

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-03

Sample wt/vol: 1020 (g/ml) ML Lab File ID: L0501020.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted:(Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW01A

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-03

Sample wt/vol: 1020 (g/ml) ML Lab File ID: L0501020.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted:(Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,i]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET SAMPLE NO.

TENTATIVELY IDENTIFIED COMPOUNDS

001AOC1MW01A

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-03

Sample wt/vol: 1020 (g/ml) ML Lab File ID: L0501020.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted: (Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

Number TICs found: 1 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	unknown	7.83	3	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW02

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-04

Sample wt/vol: 1040 (g/ml) ML Lab File ID: L0501021.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted:(Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW02

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-04

Sample wt/vol: 1040 (g/ml) ML Lab File ID: L0501021.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted:(Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,i]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

001AOC1MW02

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC11

Matrix: (soil/water) WATER Lab Sample ID: 0304458-04

Sample wt/vol: 1040 (g/ml) ML Lab File ID: L0501021.D

Level: (low/med) LOW Date Received: 04/25/03

% Moisture: decanted: (Y/N) N Date Extracted: 04/28/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/01/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 1

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	unknown	7.83	4	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001A0C1MW003

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC12

Matrix: (soil/water) WATER Lab Sample ID: 0305374-03

Sample wt/vol: 1030 (g/ml) ML Lab File ID: Z0605014.D

Level: (low/med) LOW Date Received: 05/28/03

% Moisture: decanted:(Y/N) N Date Extracted: 06/02/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/05/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001A0C1MW003

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC12

Matrix: (soil/water) WATER Lab Sample ID: 0305374-03

Sample wt/vol: 1030 (g/ml) ML Lab File ID: Z0605014.D

Level: (low/med) LOW Date Received: 05/28/03

% Moisture: decanted:(Y/N) N Date Extracted: 06/02/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/05/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	2	J
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,i]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

001A0C1MW003

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC12

Matrix: (soil/water) WATER Lab Sample ID: 0305374-03

Sample wt/vol: 1030 (g/ml) ML Lab File ID: Z0605014.D

Level: (low/med) LOW Date Received: 05/28/03

% Moisture: decanted: (Y/N) N Date Extracted: 06/02/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/05/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000593-71-5	Chloroiodomethane	3.64	4	JN
2.	unknown	8.25	13	J
3.	unknown	10.58	7	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001A0C1MW004

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC12

Matrix: (soil/water) WATER Lab Sample ID: 0305374-04

Sample wt/vol: 1040 (g/ml) ML Lab File ID: Z0605015.D

Level: (low/med) LOW Date Received: 05/28/03

% Moisture: decanted:(Y/N) N Date Extracted: 06/02/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/05/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001A0C1MW004

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC12

Matrix: (soil/water) WATER Lab Sample ID: 0305374-04

Sample wt/vol: 1040 (g/ml) ML Lab File ID: Z0605015.D

Level: (low/med) LOW Date Received: 05/28/03

% Moisture: decanted:(Y/N) N Date Extracted: 06/02/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 06/05/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,I]perylene	5	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW005

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-01

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723005.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW005

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-01

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723005.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,i]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET SAMPLE NO.

TENTATIVELY IDENTIFIED COMPOUNDS

001AOC1MW005

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-01

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723005.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted: (Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

Number TICs found: 1 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	unknown	7.80	3	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW006

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-02

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723006.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW006

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-02

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723006.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,I]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

001AOC1MW006

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-02

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723006.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted: (Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 2

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	unknown	7.80	4	J
2. 000126-73-8	Tributyl phosphate	10.16	4	JN

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW007

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-03

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723007.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW007

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-03

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723007.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,I]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

001AOC1MW007

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-03

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723007.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted: (Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 4

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	000593-71-5	Chloroiodomethane	3.21	2	JN
2.	000286-20-4	7-Oxabicyclo[4.1.0]heptane	4.68	3	JN
3.		unknown	7.80	5	J
4.	000126-73-8	Tributyl phosphate	10.16	4	JN

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW008

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-04

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723008.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW008

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-04

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723008.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,i]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

001AOC1MW008

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-04

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723008.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted: (Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 1

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	unknown	7.80	4	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW009

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-05

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723011.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW009

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-05

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723011.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,i]perylene	5	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW010

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-06

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723012.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
100-52-7	Benzaldehyde	5	U
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
98-86-2	Acetophenone	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
105-60-2	Caprolactam	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	5	U
92-52-4	1,1'-Biphenyl	5	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
606-20-2	2,6-Dinitrotoluene	5	U
208-96-8	Acenaphthylene	5	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene	5	U
51-28-5	2,4-Dinitrophenol	5	U
100-02-7	4-Nitrophenol	5	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

001AOC1MW010

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-06

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723012.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted:(Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
84-66-2	Diethylphthalate	5	U
86-73-7	Fluorene	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
100-01-6	4-Nitroaniline	5	U
534-52-1	4,6-Dinitro-2-methylphenol	5	U
86-30-6	N-Nitrosodiphenylamine	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
1912-24-9	Atrazine	5	U
87-86-5	Pentachlorophenol	5	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
86-74-8	Carbazole	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo[a]anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo[b]fluoranthene	5	U
207-08-9	Benzo[k]fluoranthene	5	U
50-32-8	Benzo[a]pyrene	5	U
193-39-5	Indeno[1,2,3-cd]pyrene	5	U
53-70-3	Dibenzo[a,h]anthracene	5	U
191-24-2	Benzo[g,h,i]perylene	5	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

001AOC1MW010

Lab Name: Laucks Testing Labs Contract:

Lab Code: Case No.: SAS No.: SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-06

Sample wt/vol: 1000 (g/ml) ML Lab File ID: L0723012.D

Level: (low/med) LOW Date Received: 07/11/03

% Moisture: decanted: (Y/N) N Date Extracted: 07/17/03

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 07/23/03

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	unknown	4.68	2	J

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW01

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 1060 (g/ml) ml

% Moisture: N/A

Extraction: SEPF

Concentrated Extract Volume: 10000 (uL)

Dilution Factor: 1.0

SDG No.: CNC11

Lab Sample ID: 0304458-02

Lab File ID: D509322.D

Date Collected: 04/22/03

Date Received: 04/25/03

Date Prepared: 04/29/03

Date Analyzed: 05/10/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.047	U	0.047
319-85-7	beta-BHC	0.047	U	0.047
319-86-8	delta-BHC	0.047	U	0.047
58-89-9	gamma-BHC (Lindane)	0.047	U	0.047
76-44-8	Heptachlor	0.047	U	0.047
309-00-2	Aldrin	0.047	U	0.047
1024-57-3	Heptachlor epoxide	0.047	U	0.047
5103-74-2	gamma-Chlordane	0.047	U	0.047
5103-71-9	alpha-Chlordane	0.047	U	0.047
959-98-8	Endosulfan I	0.047	U	0.047
60-57-1	Dieldrin	0.094	U	0.094
72-55-9	4,4'-DDE	0.094	U	0.094
72-20-8	Endrin	0.094	U	0.094
33213-65-9	Endosulfan II	0.094	U	0.094
72-54-8	4,4'-DDD	0.094	U	0.094
1031-07-8	Endosulfan sulfate	0.094	U	0.094
50-29-3	4,4'-DDT	0.094	U	0.094
72-43-5	Methoxychlor	0.47	U	0.47
7421-93-4	Endrin aldehyde	0.094	U	0.094
53494-70-5	Endrin ketone	0.094	U	0.094
12674-11-2	Aroclor-1016	0.94	U	0.94
11104-28-2	Aroclor-1221	0.94	U	0.94
11141-16-5	Aroclor-1232	0.94	U	0.94
53469-21-9	Aroclor-1242	0.94	U	0.94
12672-29-6	Aroclor-1248	0.94	U	0.94
11097-69-1	Aroclor-1254	0.94	U	0.94
11096-82-5	Aroclor-1260	0.94	U	0.94
8001-35-2	Toxaphene	4.7	U	4.7
	Chlordane (technical)	0.094	U	0.094

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW01A

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 1050 (g/ml) ml

% Moisture: N/A

Extraction: SEPF

Concentrated Extract Volume: 10000 (uL)

Dilution Factor: 1.0

SDG No.: CNC11

Lab Sample ID: 0304458-03

Lab File ID: D509323.D

Date Collected: 04/22/03

Date Received: 04/25/03

Date Prepared: 04/29/03

Date Analyzed: 05/10/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.048	U	0.048
319-85-7	beta-BHC	0.048	U	0.048
319-86-8	delta-BHC	0.048	U	0.048
58-89-9	gamma-BHC (Lindane)	0.048	U	0.048
76-44-8	Heptachlor	0.048	U	0.048
309-00-2	Aldrin	0.048	U	0.048
1024-57-3	Heptachlor epoxide	0.048	U	0.048
5103-74-2	gamma-Chlordane	0.048	U	0.048
5103-71-9	alpha-Chlordane	0.048	U	0.048
959-98-8	Endosulfan I	0.048	U	0.048
60-57-1	Dieldrin	0.095	U	0.095
72-55-9	4,4'-DDE	0.095	U	0.095
72-20-8	Endrin	0.095	U	0.095
33213-65-9	Endosulfan II	0.095	U	0.095
72-54-8	4,4'-DDD	0.095	U	0.095
1031-07-8	Endosulfan sulfate	0.095	U	0.095
50-29-3	4,4'-DDT	0.095	U	0.095
72-43-5	Methoxychlor	0.48	U	0.48
7421-93-4	Endrin aldehyde	0.095	U	0.095
53494-70-5	Endrin ketone	0.095	U	0.095
12674-11-2	Aroclor-1016	0.95	U	0.95
11104-28-2	Aroclor-1221	0.95	U	0.95
11141-16-5	Aroclor-1232	0.95	U	0.95
53469-21-9	Aroclor-1242	0.95	U	0.95
12672-29-6	Aroclor-1248	0.95	U	0.95
11097-69-1	Aroclor-1254	0.95	U	0.95
11096-82-5	Aroclor-1260	0.95	U	0.95
8001-35-2	Toxaphene	4.8	U	4.8
	Chlordane (technical)	0.095	U	0.095

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW02

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 1060 (g/ml) ml

% Moisture: N/A

Extraction: SEPF

Concentrated Extract Volume: 10000 (uL)

Dilution Factor: 1.0

SDG No.: CNC11

Lab Sample ID: 0304458-04

Lab File ID: D509324.D

Date Collected: 04/22/03

Date Received: 04/25/03

Date Prepared: 04/29/03

Date Analyzed: 05/10/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.047	U	0.047
319-85-7	beta-BHC	0.047	U	0.047
319-86-8	delta-BHC	0.047	U	0.047
58-89-9	gamma-BHC (Lindane)	0.047	U	0.047
76-44-8	Heptachlor	0.047	U	0.047
309-00-2	Aldrin	0.047	U	0.047
1024-57-3	Heptachlor epoxide	0.047	U	0.047
5103-74-2	gamma-Chlordane	0.047	U	0.047
5103-71-9	alpha-Chlordane	0.047	U	0.047
959-98-8	Endosulfan I	0.047	U	0.047
60-57-1	Dieldrin	0.094	U	0.094
72-55-9	4,4'-DDE	0.094	U	0.094
72-20-8	Endrin	0.094	U	0.094
33213-65-9	Endosulfan II	0.094	U	0.094
72-54-8	4,4'-DDD	0.094	U	0.094
1031-07-8	Endosulfan sulfate	0.094	U	0.094
50-29-3	4,4'-DDT	0.094	U	0.094
72-43-5	Methoxychlor	0.47	U	0.47
7421-93-4	Endrin aldehyde	0.094	U	0.094
53494-70-5	Endrin ketone	0.094	U	0.094
12674-11-2	Aroclor-1016	0.94	U	0.94
11104-28-2	Aroclor-1221	0.94	U	0.94
11141-16-5	Aroclor-1232	0.94	U	0.94
53469-21-9	Aroclor-1242	0.94	U	0.94
12672-29-6	Aroclor-1248	0.94	U	0.94
11097-69-1	Aroclor-1254	0.94	U	0.94
11096-82-5	Aroclor-1260	0.94	U	0.94
8001-35-2	Toxaphene	4.7	U	4.7
	Chlordane (technical)	0.094	U	0.094

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET CLIENT SAMPLE ID

001A0C1MW003

Lab Name: LAUCKS TESTING LABS SDG No.: CNC12

Matrix: (soil/water) WATER Lab Sample ID: 0305374-03

Sample wt/vol: 970 (g/ml) ml Lab File ID: A604324.D

% Moisture: N/A Date Collected: 05/26/03

Extraction: SEPF Date Received: 05/28/03

Concentrated Extract Volume: 10000 (uL) Date Prepared: 06/02/03

Dilution Factor: 1.0 Date Analyzed: 06/05/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.052	U	0.052
319-85-7	beta-BHC	0.052	U	0.052
319-86-8	delta-BHC	0.052	U	0.052
58-89-9	gamma-BHC (Lindane)	0.052	U	0.052
76-44-8	Heptachlor	0.052	U	0.052
309-00-2	Aldrin	0.052	U	0.052
1024-57-3	Heptachlor epoxide	0.052	U	0.052
5103-74-2	gamma-Chlordane	0.052	U	0.052
5103-71-9	alpha-Chlordane	0.052	U	0.052
959-98-8	Endosulfan I	0.052	U	0.052
60-57-1	Dieldrin	0.10	U	0.10
72-55-9	4,4'-DDE	0.10	U	0.10
72-20-8	Endrin	0.10	U	0.10
33213-65-9	Endosulfan II	0.10	U	0.10
72-54-8	4,4'-DDD	0.10	U	0.10
1031-07-8	Endosulfan sulfate	0.10	U	0.10
50-29-3	4,4'-DDT	0.10	U	0.10
72-43-5	Methoxychlor	0.52	U	0.52
7421-93-4	Endrin aldehyde	0.10	U	0.10
53494-70-5	Endrin ketone	0.10	U	0.10
12674-11-2	Aroclor-1016	1.0	U	1.0
11104-28-2	Aroclor-1221	1.0	U	1.0
11141-16-5	Aroclor-1232	1.0	U	1.0
53469-21-9	Aroclor-1242	1.0	U	1.0
12672-29-6	Aroclor-1248	1.0	U	1.0
11097-69-1	Aroclor-1254	1.0	U	1.0
11096-82-5	Aroclor-1260	1.0	U	1.0
8001-35-2	Toxaphene	5.2	U	5.2

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001A0C1MW004

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC12

Matrix: (soil/water) WATER

Lab Sample ID: 0305374-04

Sample wt/vol: 1030 (g/ml) ml

Lab File ID: A604325.D

% Moisture: N/A

Date Collected: 05/26/03

Extraction: SEPF

Date Received: 05/28/03

Concentrated Extract Volume: 10000 (uL)

Date Prepared: 06/02/03

Dilution Factor: 1.0

Date Analyzed: 06/05/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.049	U	0.049
319-85-7	beta-BHC	0.049	U	0.049
319-86-8	delta-BHC	0.049	U	0.049
58-89-9	gamma-BHC (Lindane)	0.049	U	0.049
76-44-8	Heptachlor	0.049	U	0.049
309-00-2	Aldrin	0.049	U	0.049
1024-57-3	Heptachlor epoxide	0.049	U	0.049
5103-74-2	gamma-Chlordane	0.049	U	0.049
5103-71-9	alpha-Chlordane	0.049	U	0.049
959-98-8	Endosulfan I	0.049	U	0.049
60-57-1	Dieldrin	0.097	U	0.097
72-55-9	4,4'-DDE	0.097	U	0.097
72-20-8	Endrin	0.097	U	0.097
33213-65-9	Endosulfan II	0.097	U	0.097
72-54-8	4,4'-DDD	0.097	U	0.097
1031-07-8	Endosulfan sulfate	0.097	U	0.097
50-29-3	4,4'-DDT	0.097	U	0.097
72-43-5	Methoxychlor	0.49	U	0.49
7421-93-4	Endrin aldehyde	0.097	U	0.097
53494-70-5	Endrin ketone	0.097	U	0.097
12674-11-2	Aroclor-1016	0.97	U	0.97
11104-28-2	Aroclor-1221	0.97	U	0.97
11141-16-5	Aroclor-1232	0.97	U	0.97
53469-21-9	Aroclor-1242	0.97	U	0.97
12672-29-6	Aroclor-1248	0.97	U	0.97
11097-69-1	Aroclor-1254	0.97	U	0.97
11096-82-5	Aroclor-1260	0.97	U	0.97
8001-35-2	Toxaphene	4.9	U	4.9

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET CLIENT SAMPLE ID

001AOC1MW005

Lab Name: LAUCKS TESTING LABS SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-01

Sample wt/vol: 1050 (g/ml) ml Lab File ID: A718309.D

% Moisture: N/A Date Collected: 07/10/03

Extraction: SEPF Date Received: 07/11/03

Concentrated Extract Volume: 10000 (uL) Date Prepared: 07/17/03

Dilution Factor: 1.0 Date Analyzed: 07/18/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.048	U	0.048
319-85-7	beta-BHC	0.048	U	0.048
319-86-8	delta-BHC	0.048	U	0.048
58-89-9	gamma-BHC (Lindane)	0.048	U	0.048
76-44-8	Heptachlor	0.048	U	0.048
309-00-2	Aldrin	0.048	U	0.048
1024-57-3	Heptachlor epoxide	0.048	U	0.048
5103-74-2	gamma-Chlordane	0.048	U	0.048
5103-71-9	alpha-Chlordane	0.048	U	0.048
959-98-8	Endosulfan I	0.048	U	0.048
60-57-1	Dieldrin	0.095	U	0.095
72-55-9	4,4'-DDE	0.095	U	0.095
72-20-8	Endrin	0.095	U	0.095
33213-65-9	Endosulfan II	0.095	U	0.095
72-54-8	4,4'-DDD	0.095	U	0.095
1031-07-8	Endosulfan sulfate	0.095	U	0.095
50-29-3	4,4'-DDT	0.095	U	0.095
72-43-5	Methoxychlor	0.48	U	0.48
7421-93-4	Endrin aldehyde	0.095	U	0.095
53494-70-5	Endrin ketone	0.095	U	0.095
12674-11-2	Aroclor-1016	0.95	U	0.95
11104-28-2	Aroclor-1221	0.95	U	0.95
11141-16-5	Aroclor-1232	0.95	U	0.95
53469-21-9	Aroclor-1242	0.95	U	0.95
12672-29-6	Aroclor-1248	0.95	U	0.95
11097-69-1	Aroclor-1254	0.95	U	0.95
11096-82-5	Aroclor-1260	0.95	U	0.95
8001-35-2	Toxaphene	4.8	U	4.8

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET CLIENT SAMPLE ID

001AOC1MW006

Lab Name: LAUCKS TESTING LABS SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-02

Sample wt/vol: 1050 (g/ml) ml Lab File ID: A718310.D

% Moisture: N/A Date Collected: 07/10/03

Extraction: SEPF Date Received: 07/11/03

Concentrated Extract Volume: 10000 (uL) Date Prepared: 07/17/03

Dilution Factor: 1.0 Date Analyzed: 07/18/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.048	U	0.048
319-85-7	beta-BHC	0.048	U	0.048
319-86-8	delta-BHC	0.048	U	0.048
58-89-9	gamma-BHC (Lindane)	0.048	U	0.048
76-44-8	Heptachlor	0.048	U	0.048
309-00-2	Aldrin	0.048	U	0.048
1024-57-3	Heptachlor epoxide	0.048	U	0.048
5103-74-2	gamma-Chlordane	0.048	U	0.048
5103-71-9	alpha-Chlordane	0.048	U	0.048
959-98-8	Endosulfan I	0.048	U	0.048
60-57-1	Dieldrin	0.095	U	0.095
72-55-9	4,4'-DDE	0.095	U	0.095
72-20-8	Endrin	0.095	U	0.095
33213-65-9	Endosulfan II	0.095	U	0.095
72-54-8	4,4'-DDD	0.095	U	0.095
1031-07-8	Endosulfan sulfate	0.095	U	0.095
50-29-3	4,4'-DDT	0.095	U	0.095
72-43-5	Methoxychlor	0.48	U	0.48
7421-93-4	Endrin aldehyde	0.095	U	0.095
53494-70-5	Endrin ketone	0.095	U	0.095
12674-11-2	Aroclor-1016	0.95	U	0.95
11104-28-2	Aroclor-1221	0.95	U	0.95
11141-16-5	Aroclor-1232	0.95	U	0.95
53469-21-9	Aroclor-1242	0.95	U	0.95
12672-29-6	Aroclor-1248	0.95	U	0.95
11097-69-1	Aroclor-1254	0.95	U	0.95
11096-82-5	Aroclor-1260	0.95	U	0.95
8001-35-2	Toxaphene	4.8	U	4.8

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW007

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC13

Matrix: (soil/water) WATER

Lab Sample ID: 0307142-03

Sample wt/vol: 970 (g/ml) ml

Lab File ID: A718311.D

% Moisture: N/A

Date Collected: 07/10/03

Extraction: SEPF

Date Received: 07/11/03

Concentrated Extract Volume: 10000 (uL)

Date Prepared: 07/17/03

Dilution Factor: 1.0

Date Analyzed: 07/18/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.052	U	0.052
319-85-7	beta-BHC	0.052	U	0.052
319-86-8	delta-BHC	0.052	U	0.052
58-89-9	gamma-BHC (Lindane)	0.052	U	0.052
76-44-8	Heptachlor	0.052	U	0.052
309-00-2	Aldrin	0.052	U	0.052
1024-57-3	Heptachlor epoxide	0.052	U	0.052
5103-74-2	gamma-Chlordane	0.052	U	0.052
5103-71-9	alpha-Chlordane	0.052	U	0.052
959-98-8	Endosulfan I	0.052	U	0.052
60-57-1	Dieldrin	0.10	U	0.10
72-55-9	4,4'-DDE	0.10	U	0.10
72-20-8	Endrin	0.10	U	0.10
33213-65-9	Endosulfan II	0.10	U	0.10
72-54-8	4,4'-DDD	0.10	U	0.10
1031-07-8	Endosulfan sulfate	0.10	U	0.10
50-29-3	4,4'-DDT	0.10	U	0.10
72-43-5	Methoxychlor	0.52	U	0.52
7421-93-4	Endrin aldehyde	0.10	U	0.10
53494-70-5	Endrin ketone	0.10	U	0.10
12674-11-2	Aroclor-1016	1.0	U	1.0
11104-28-2	Aroclor-1221	1.0	U	1.0
11141-16-5	Aroclor-1232	1.0	U	1.0
53469-21-9	Aroclor-1242	1.0	U	1.0
12672-29-6	Aroclor-1248	1.0	U	1.0
11097-69-1	Aroclor-1254	1.0	U	1.0
11096-82-5	Aroclor-1260	1.0	U	1.0
8001-35-2	Toxaphene	5.2	U	5.2

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET CLIENT SAMPLE ID

001AOC1MW008

Lab Name: LAUCKS TESTING LABS SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-04

Sample wt/vol: 1060 (g/ml) ml Lab File ID: A718316.D

% Moisture: N/A Date Collected: 07/10/03

Extraction: SEPF Date Received: 07/11/03

Concentrated Extract Volume: 10000 (uL) Date Prepared: 07/17/03

Dilution Factor: 1.0 Date Analyzed: 07/18/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.047	U	0.047
319-85-7	beta-BHC	0.047	U	0.047
319-86-8	delta-BHC	0.047	U	0.047
58-89-9	gamma-BHC (Lindane)	0.047	U	0.047
76-44-8	Heptachlor	0.047	U	0.047
309-00-2	Aldrin	0.047	U	0.047
1024-57-3	Heptachlor epoxide	0.047	U	0.047
5103-74-2	gamma-Chlordane	0.047	U	0.047
5103-71-9	alpha-Chlordane	0.047	U	0.047
959-98-8	Endosulfan I	0.047	U	0.047
60-57-1	Dieldrin	0.094	U	0.094
72-55-9	4,4'-DDE	0.094	U	0.094
72-20-8	Endrin	0.094	U	0.094
33213-65-9	Endosulfan II	0.094	U	0.094
72-54-8	4,4'-DDD	0.094	U	0.094
1031-07-8	Endosulfan sulfate	0.094	U	0.094
50-29-3	4,4'-DDT	0.094	U	0.094
72-43-5	Methoxychlor	0.47	U	0.47
7421-93-4	Endrin aldehyde	0.094	U	0.094
53494-70-5	Endrin ketone	0.094	U	0.094
12674-11-2	Aroclor-1016	0.94	U	0.94
11104-28-2	Aroclor-1221	0.94	U	0.94
11141-16-5	Aroclor-1232	0.94	U	0.94
53469-21-9	Aroclor-1242	0.94	U	0.94
12672-29-6	Aroclor-1248	0.94	U	0.94
11097-69-1	Aroclor-1254	0.94	U	0.94
11096-82-5	Aroclor-1260	0.94	U	0.94
8001-35-2	Toxaphene	4.7	U	4.7

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET CLIENT SAMPLE ID

001AOC1MW009

Lab Name: LAUCKS TESTING LABS SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-05

Sample wt/vol: 1030 (g/ml) ml Lab File ID: A718321.D

% Moisture: N/A Date Collected: 07/10/03

Extraction: SEPF Date Received: 07/11/03

Concentrated Extract Volume: 10000 (uL) Date Prepared: 07/17/03

Dilution Factor: 1.0 Date Analyzed: 07/19/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.049	U	0.049
319-85-7	beta-BHC	0.049	U	0.049
319-86-8	delta-BHC	0.049	U	0.049
58-89-9	gamma-BHC (Lindane)	0.049	U	0.049
76-44-8	Heptachlor	0.049	U	0.049
309-00-2	Aldrin	0.049	U	0.049
1024-57-3	Heptachlor epoxide	0.049	U	0.049
5103-74-2	gamma-Chlordane	0.049	U	0.049
5103-71-9	alpha-Chlordane	0.049	U	0.049
959-98-8	Endosulfan I	0.049	U	0.049
60-57-1	Dieldrin	0.097	U	0.097
72-55-9	4,4'-DDE	0.097	U	0.097
72-20-8	Endrin	0.097	U	0.097
33213-65-9	Endosulfan II	0.097	U	0.097
72-54-8	4,4'-DDD	0.097	U	0.097
1031-07-8	Endosulfan sulfate	0.097	U	0.097
50-29-3	4,4'-DDT	0.097	U	0.097
72-43-5	Methoxychlor	0.49	U	0.49
7421-93-4	Endrin aldehyde	0.097	U	0.097
53494-70-5	Endrin ketone	0.097	U	0.097
12674-11-2	Aroclor-1016	0.97	U	0.97
11104-28-2	Aroclor-1221	0.97	U	0.97
11141-16-5	Aroclor-1232	0.97	U	0.97
53469-21-9	Aroclor-1242	0.97	U	0.97
12672-29-6	Aroclor-1248	0.97	U	0.97
11097-69-1	Aroclor-1254	0.97	U	0.97
11096-82-5	Aroclor-1260	0.97	U	0.97
8001-35-2	Toxaphene	4.9	U	4.9

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW010

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC13

Matrix: (soil/water) WATER

Lab Sample ID: 0307142-06

Sample wt/vol: 1030 (g/ml) ml

Lab File ID: A718322.D

% Moisture: N/A

Date Collected: 07/10/03

Extraction: SEPF

Date Received: 07/11/03

Concentrated Extract Volume: 10000 (uL)

Date Prepared: 07/17/03

Dilution Factor: 1.0

Date Analyzed: 07/19/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
319-84-6	alpha-BHC	0.049	U	0.049
319-85-7	beta-BHC	0.049	U	0.049
319-86-8	delta-BHC	0.049	U	0.049
58-89-9	gamma-BHC (Lindane)	0.049	U	0.049
76-44-8	Heptachlor	0.049	U	0.049
309-00-2	Aldrin	0.049	U	0.049
1024-57-3	Heptachlor epoxide	0.049	U	0.049
5103-74-2	gamma-Chlordane	0.049	U	0.049
5103-71-9	alpha-Chlordane	0.049	U	0.049
959-98-8	Endosulfan I	0.049	U	0.049
60-57-1	Dieldrin	0.097	U	0.097
72-55-9	4,4'-DDE	0.097	U	0.097
72-20-8	Endrin	0.097	U	0.097
33213-65-9	Endosulfan II	0.097	U	0.097
72-54-8	4,4'-DDD	0.097	U	0.097
1031-07-8	Endosulfan sulfate	0.097	U	0.097
50-29-3	4,4'-DDT	0.097	U	0.097
72-43-5	Methoxychlor	0.49	U	0.49
7421-93-4	Endrin aldehyde	0.097	U	0.097
53494-70-5	Endrin ketone	0.097	U	0.097
12674-11-2	Aroclor-1016	0.97	U	0.97
11104-28-2	Aroclor-1221	0.97	U	0.97
11141-16-5	Aroclor-1232	0.97	U	0.97
53469-21-9	Aroclor-1242	0.97	U	0.97
12672-29-6	Aroclor-1248	0.97	U	0.97
11097-69-1	Aroclor-1254	0.97	U	0.97
11096-82-5	Aroclor-1260	0.97	U	0.97
8001-35-2	Toxaphene	4.9	U	4.9

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW01

Lab Name: LAUCKS TESTING LAB

Matrix: (soil/water) WATER

Sample wt/vol: 50 (g/ml) ml

% Moisture: N/A

Extraction: SEPF

Concentrated Extract Volume: 500 (uL)

Dilution Factor: 1.0

SDG No.: CNC11

Lab Sample ID: 0304458-02

Lab File ID: M509308.D

Date Collected: 04/22/03

Date Received: 04/25/03

Date Prepared: 04/29/03

Date Analyzed: 05/09/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	20	U	20
94-74-6	MCPA	20	U	20
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW01A

Lab Name: LAUCKS TESTING LAB

Matrix: (soil/water) WATER

Sample wt/vol: 50 (g/ml) ml

% Moisture: N/A

Extraction: SEPF

Concentrated Extract Volume: 500 (uL)

Dilution Factor: 1.0

SDG No.: CNC11

Lab Sample ID: 0304458-03

Lab File ID: M509309.D

Date Collected: 04/22/03

Date Received: 04/25/03

Date Prepared: 04/29/03

Date Analyzed: 05/09/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	20	U	20
94-74-6	MCPA	20	U	20
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW02

Lab Name: LAUCKS TESTING LAB

SDG No.: CNC11

Matrix: (soil/water) WATER

Lab Sample ID: 0304458-04

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M509310.D

% Moisture: N/A

Date Collected: 04/22/03

Extraction: SEPF

Date Received: 04/25/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 04/29/03

Dilution Factor: 1.0

Date Analyzed: 05/09/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	20	U	20
94-74-6	MCPA	20	U	20
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001A0C1MW003

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC12

Matrix: (soil/water) WATER

Lab Sample ID: 0305374-03

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M611312.D

% Moisture: N/A

Date Collected: 05/26/03

Extraction: SEPF

Date Received: 05/28/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 06/02/03

Dilution Factor: 1.0

Date Analyzed: 06/12/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	4.2	E	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001A0C1MW003DL

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC12

Matrix: (soil/water) WATER

Lab Sample ID: 0305374-03DL

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M611311.D

% Moisture: N/A

Date Collected: 05/26/03

Extraction: SEPF

Date Received: 05/28/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 06/02/03

Dilution Factor: 10.0

Date Analyzed: 06/12/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	4.3	DP	0.80
1918-00-9	Dicamba	0.80	U	0.80
93-65-2	MCPP	400	U	400
94-74-6	MCPA	400	U	400
120-36-5	Dichlorprop	0.80	U	0.80
94-75-7	2,4-D	0.80	U	0.80
93-72-1	2,4,5-TP	0.80	U	0.80
93-76-5	2,4,5-T	0.80	U	0.80
94-82-6	2,4-DB	0.80	U	0.80
88-85-7	Dinoseb	0.80	U	0.80

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001A0C1MW003RE

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC12

Matrix: (soil/water) WATER

Lab Sample ID: 0305374-03RE

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M619315.D

% Moisture: N/A

Date Collected: 05/26/03

Extraction: SEPF

Date Received: 05/28/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 06/16/03

Dilution Factor: 1.0

Date Analyzed: 06/19/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	3.0	P	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	37	JP	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001A0C1MW004

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC12

Matrix: (soil/water) WATER

Lab Sample ID: 0305374-04

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M611313.D

% Moisture: N/A

Date Collected: 05/26/03

Extraction: SEPF

Date Received: 05/28/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 06/02/03

Dilution Factor: 1.0

Date Analyzed: 06/12/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET CLIENT SAMPLE ID

01A0C1MW004RE

Lab Name: LAUCKS TESTING LABS SDG No.: CNC12

Matrix: (soil/water) WATER Lab Sample ID: 0305374-04RE

Sample wt/vol: 50 (g/ml) ml Lab File ID: M619316.D

% Moisture: N/A Date Collected: 05/26/03

Extraction: SEPF Date Received: 05/28/03

Concentrated Extract Volume: 500 (uL) Date Prepared: 06/16/03

Dilution Factor: 1.0 Date Analyzed: 06/19/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW005

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC13

Matrix: (soil/water) WATER

Lab Sample ID: 0307142-01

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M724305.D

% Moisture: N/A

Date Collected: 07/10/03

Extraction: SEPF

Date Received: 07/11/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 07/17/03

Dilution Factor: 1.0

Date Analyzed: 07/24/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW006

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC13

Matrix: (soil/water) WATER

Lab Sample ID: 0307142-02

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M724306.D

% Moisture: N/A

Date Collected: 07/10/03

Extraction: SEPF

Date Received: 07/11/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 07/17/03

Dilution Factor: 1.0

Date Analyzed: 07/24/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	7.9	PE	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET CLIENT SAMPLE ID

001AOC1MW006DL

Lab Name: LAUCKS TESTING LABS SDG No.: CNC13

Matrix: (soil/water) WATER Lab Sample ID: 0307142-02DL

Sample wt/vol: 50 (g/ml) ml Lab File ID: M724319.D

% Moisture: N/A Date Collected: 07/10/03

Extraction: SEPF Date Received: 07/11/03

Concentrated Extract Volume: 500 (uL) Date Prepared: 07/17/03

Dilution Factor: 5.0 Date Analyzed: 07/25/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	7.1	DP	0.40
1918-00-9	Dicamba	0.40	U	0.40
93-65-2	MCPP	200	U	200
94-74-6	MCPA	200	U	200
120-36-5	Dichlorprop	0.40	U	0.40
94-75-7	2,4-D	0.40	U	0.40
93-72-1	2,4,5-TP	0.40	U	0.40
93-76-5	2,4,5-T	0.40	U	0.40
94-82-6	2,4-DB	0.40	U	0.40
88-85-7	Dinoseb	0.40	U	0.40

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW007

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 50 (g/ml) ml

% Moisture: N/A

Extraction: SEPF

Concentrated Extract Volume: 500 (uL)

Dilution Factor: 1.0

SDG No.: CNC13

Lab Sample ID: 0307142-03

Lab File ID: M724307.D

Date Collected: 07/10/03

Date Received: 07/11/03

Date Prepared: 07/17/03

Date Analyzed: 07/24/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	5.0	PE	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW007DL

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC13

Matrix: (soil/water) WATER

Lab Sample ID: 0307142-03DL

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M724320.D

% Moisture: N/A

Date Collected: 07/10/03

Extraction: SEPF

Date Received: 07/11/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 07/17/03

Dilution Factor: 5.0

Date Analyzed: 07/25/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	4.7	DP	0.40
1918-00-9	Dicamba	0.40	U	0.40
93-65-2	MCPP	200	U	200
94-74-6	MCPA	200	U	200
120-36-5	Dichlorprop	0.40	U	0.40
94-75-7	2,4-D	0.40	U	0.40
93-72-1	2,4,5-TP	0.40	U	0.40
93-76-5	2,4,5-T	0.40	U	0.40
94-82-6	2,4-DB	0.40	U	0.40
88-85-7	Dinoseb	0.40	U	0.40

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW008

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC13

Matrix: (soil/water) WATER

Lab Sample ID: 0307142-04

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M724308.D

% Moisture: N/A

Date Collected: 07/10/03

Extraction: SEPF

Date Received: 07/11/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 07/17/03

Dilution Factor: 1.0

Date Analyzed: 07/24/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.39	P	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW009

Lab Name: LAUCKS TESTING LABS

SDG No.: CNC13

Matrix: (soil/water) WATER

Lab Sample ID: 0307142-05

Sample wt/vol: 50 (g/ml) ml

Lab File ID: M724311.D

% Moisture: N/A

Date Collected: 07/10/03

Extraction: SEPF

Date Received: 07/11/03

Concentrated Extract Volume: 500 (uL)

Date Prepared: 07/17/03

Dilution Factor: 1.0

Date Analyzed: 07/24/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE ID

001AOC1MW010

Lab Name: LAUCKS TESTING LABS

Matrix: (soil/water) WATER

Sample wt/vol: 50 (g/ml) ml

% Moisture: N/A

Extraction: SEPF

Concentrated Extract Volume: 500 (uL)

Dilution Factor: 1.0

SDG No.: CNC13

Lab Sample ID: 0307142-06

Lab File ID: M724312.D

Date Collected: 07/10/03

Date Received: 07/11/03

Date Prepared: 07/17/03

Date Analyzed: 07/24/03

CONCENTRATION UNITS:

CAS NO.	COMPOUND	ug/L	Q	RL
75-99-0	Dalapon	0.080	U	0.080
1918-00-9	Dicamba	0.080	U	0.080
93-65-2	MCPP	40	U	40
94-74-6	MCPA	40	U	40
120-36-5	Dichlorprop	0.080	U	0.080
94-75-7	2,4-D	0.080	U	0.080
93-72-1	2,4,5-TP	0.080	U	0.080
93-76-5	2,4,5-T	0.080	U	0.080
94-82-6	2,4-DB	0.080	U	0.080
88-85-7	Dinoseb	0.080	U	0.080

RL = Reporting Limit

APPENDIX E
QUALITY CONTROL SUMMARY REPORT

CONTENTS

TABLES

ACRONYMS AND ABBREVIATIONS

AOC-1	Area of Concern 1
ASTM	American Society for Testing and Materials
CCV	Continuing calibration verification
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRDL	Contract-required detection limit
CRQL	Contract-required quantitation limit
EPA	U.S. Environmental Protection Agency
GC	Gas chromatography
GC/ECD	Gas chromatography and electron capture detector
GC/MS	Gas chromatography and mass spectroscopy
GPC	Gel-permeation chromatography
ICV	Initial calibration verification
IDL	Instrument detection limit
LCS	Laboratory control sample
MS	Matrix spike
MSD	Matrix spike duplicate
NWSSB	Naval Weapons Station Seal Beach
PARCC	Precision, accuracy, representativeness, completeness, and comparability
PCB	Polychlorinated biphenyl
QA	Quality assurance
QA/QC	Quality assurance and quality control
QC	Quality control
QCSR	Quality control summary report
r	Correlation coefficient
% R	Percent recovery
RAGS	Risk Assessment Guidance for Superfund
RPD	Relative percent difference
RRF	Relative response factor
RRT	Relative retention time
%RSD	Percent relative standard deviation

SDG	Sample delivery group
SVOC	Semivolatile organic compound

1.0 INTRODUCTION

This data validation report presents results of the quality control (QC) review of chemical data collected from the Area of Concern 1 (AOC-1) between April 22, 2003 and July 10, 2003 at Naval Weapons Station Seal Beach Detachment Concord, Concord, California (NWSSB Concord). This report consists of six sections plus a reference list. Following this introduction, Section 2.0 provides an overview of the data validation process. Section 3.0 and Section 4.0 present the data validation methodology and the validated results for cursory and full review. Section 5.0 summarizes the precision, accuracy, representativeness, completeness, and comparability (PARCC) evaluation, and Section 6.0 presents conclusions based on the overall evaluation of the chemical data.

2.0 VALIDATION METHODOLOGY

Data validation is a systematic process for reviewing and qualifying data against a set of criteria to assure that they are adequate for their intended use. Analytical data are reviewed and evaluated against PARCC parameters during validation. The laboratory analytical data were validated according to procedures outlined in the draft sampling and analysis plan (SAP) (Tetra Tech 2002) and the associated analytical methods. The Navy data validation presentation procedure is in accordance with the Navy Installation Restoration Laboratory Quality Assurance Guide (NFESC 1999) and U.S. Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) National Functional Guidelines for Organic and Inorganic Data Review (EPA 1994a, 1994b).

Data were validated in two stages: (1) a cursory review (level C) of the analytical reports and the quality assurance and quality control (QA/QC) information for 100 percent of the chemical data, and (2) a full review (level D) of the analytical reports, the QA/QC information, and the associated raw data for 10 percent of the chemical data. The cursory review evaluated the most critical QA/QC information such as holding times, calibration requirements, and spiking accuracy. The full review evaluated additional QA/QC criteria and used the raw data to check calculations and analyte identifications. At both stages of validation, qualifiers were assigned to the results in the electronic database in accordance with EPA guidelines, the SAP, and the associated analytical methods.

The overall objective of data validation was to assure that the quality of the chemical data set was adequate for its intended purpose, as defined by the PARCC parameters in EPA guidance (EPA 1997). The following tasks were used to assess PARCC parameters:

- Reviewing precision and accuracy of laboratory QC data
- Reviewing precision and accuracy of field QC data
- Reviewing the overall analytical process, including holding times, calibrations, analytical or matrix performance, and analyte identification and quantitation

- Assigning qualifiers to data affected when QA/QC criteria were not achieved
- Reviewing and summarizing the implications of the frequency and severity of qualifiers in the validated data

A total of 14 water samples were collected at AOC-1 between April 22, 2003 and July 10, 2003. Of the fourteen water samples, two were field duplicates, three were equipment rinsate blanks, and one was a source blank. Chemical analyses on all matrices were subjected to the same QA requirements and standardized methods. The chemical analytical program included the following analyses and methods:

- Semivolatile organic compounds (SVOC) by CLP method for organic analysis (OLM04.2) (EPA 1999), modified for low-level analysis
- SVOC by SW-846 EPA Method 8270C (EPA 1996)
- Pesticides and polychlorinated biphenyls (PCBs) by CLP (EPA 1999), modified for low-level analysis
- Pesticides by SW-846 EPA Method 8081A (EPA 1996)
- PCBs by SW-846 EPA Method 8082 (EPA 1996)
- Herbicides by SW-846 EPA Method 8151C (EPA 1996)
- Metals by CLP method for inorganic analysis (ILM04.1) (EPA 2000)
- Mercury by EPA drinking water Method 1631C (EPA 1984, 2001)
- Total dissolved solids by Methods for the Chemical Analysis of Water and Wastes (MCAWW) Method 160.1 (EPA 1983)
- Total suspended solids by MCAWW Method 160.2 (EPA 1983)

Sample containers, holding times, and preservation requirements are listed in Table 2-1.

TABLE 2-1: SAMPLE CONTAINER, HOLDING TIME, AND PRESERVATIVE REQUIREMENTS FOR WATER SAMPLES
Quality Control Summary Report, NWSSB Concord, California

Parameter	Method[a]	Sample Container	Sample Volume	Preservative	Holding Time[b]
SVOC	CLP and SW-846 8270C	G	2 L	Cool 4 °C	7 days/40 days
Pesticides/PCB	CLP, SW-846 8081A/8082	G	2 L	Cool 4 °C	7 days/40 days
Herbicides	SW-846 8151A	G	2 L	Cool 4 °C	14 days/40 days
Metals	CLP	P	500 mL	HNO_3 to pH<2, Cool 4 °C	6 months
Mercury	EPA 1631	P	500 mL	HNO_3 to pH<2, Cool 4 °C	28 days
Total dissolved solids	MCAWW 160.1	P	250 mL	Cool 4 °C	7 days
Total suspended solids	MCAWW 160.2	P	250 mL	Cool 4 °C	7 days

Notes:

a Complete method references are presented in the SAP.

b "x" days/"y" days refer to the maximum number of days from sampling to extraction and the maximum number of days from extraction to analysis.

CLP Contract laboratory program
G Amber glass with Teflon®-lined lid, sized according to sample volume
L Liter
mL Milliliter
P Polyethylene
PCB Polychlorinated biphenyl
SVOC Semivolatile organic compound

3.0 CURSORY REVIEW

Cursory review of the analytical included evaluating the following parameters, as applicable: holding times, initial and continuing calibrations, laboratory and field blanks, accuracy, laboratory precision, analytical or matrix performance, and overall assessment of the data. Cursory review components and the results of each specific review are discussed in Sections 3.1 through 3.6 of this appendix. Section 3.7 discusses results that were reported below the contract-required quantitation limit (CRQL) for organic analyses or contract-required detection limit (CRDL) for inorganic analyses. Tables that summarize the data validation findings are found in Section 3.1 through 3.6. Only analytes with qualified data are included in these tables.

3.1 HOLDING TIMES

One objective of data validation was to assess the validity of the chemical data set based upon compliance with technical holding times. Technical holding times were defined as the maximum time allowable between sample collection and, as applicable, sample extraction, preparation, and analysis. The Clean Water Act authorized the EPA to establish the technical requirements for water holding times and preservation set forth in 40 Code of Federal Regulations (CFR) 136 (Federal Register 1984). According to EPA, technical holding times for soils (and other nonaqueous matrices) are under investigation and have not been formally established (EPA 1994a, 1994b). For methods not covered by 40 CFR 136, the holding times used for validation purposes were either recommended in the specific analytical methods, such as SW-846 and CLP, or were specified in the SAP. Table 3-1 summarizes all applicable technical holding time requirements by analysis and matrix.

TABLE 3-1: HOLDING TIME REQUIREMENTS

Quality Control Summary Report, NWSSB Concord, California

Analysis	Matrix	Holding Time[a] Requirement	All Data Estimated Data (Jh)	Detected Data Qualified as "Jh" (Estimated) and Nondetected Data Qualified as "Rh" (Rejected)
SVOCs, Pesticides/PCBs, TDS and TSS	Water	Extraction in 7 days	Exceeded by ≤ 7 days (E)	Exceeded by > 7 days (E)
		Analysis in 40 days[b]	Exceeded by ≤ 40 days (A)	Exceeded by > 40 days (A)
Herbicides	Water	Analysis in 14 days	Exceeded by ≤ 14 days	Exceeded by > 14 days
Metals	Water	Preparation and analysis in 6 months	Exceeded by ≤ 6 months	Exceeded by > 6 months
Mercury	Water	Preparation and analysis in 28 days	Exceeded by ≤ 28 days	Exceeded by > 28 days

Notes:

a Holding times are specified from the date of sample collection.

b The maximum number of days from extraction to analysis.

A	Analysis	SVOC	Semivolatile organic compound
E	Extraction	TDS	Total dissolved solids
PCB	Polychlorinated biphenyl	TSS	Total suspended solids

Source: Federal Register 1984; EPA 1994a, 1994b, and 1996; and the specified analytical methods

Samples extracted, prepared, or analyzed outside of specified holding times were qualified as "Jh," indicating that the results were estimated values (EPA 1994a, 1994b). When these holding times were grossly exceeded (more than double the specified holding time), nondetected results were qualified as "Rh," indicating that the results were rejected, while detected results were qualified as estimated (Jh). Of the data collected at AOC-1 between April 22, 2003 and July 10, 2003, no results were estimated or rejected due to holding time violations.

3.2 CALIBRATION

Requirements for laboratory instrument calibration were established to help assure that analytical instruments produce acceptable qualitative and quantitative data for target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an analytical run by producing a linear curve. Continuing calibration demonstrates that the instrument is capable of repeating the performance established in the initial calibration (EPA 1994a, 1994b). Table 3-2 summarizes all applicable calibration requirements by analysis and includes criteria for estimating and rejecting analytical results when calibration requirements are violated.

TABLE 3-2: CALIBRATION REQUIREMENTS

Quality Control Summary Report, NWSSB Concord, California

Analysis	Calibration Requirements	Detected Data Qualified as "Jc" (Estimated)	Nondetected Data Qualified as "Jc" (Estimated)	Detected Data Qualified as "Jc" (Estimated) and Nondetected Data Qualified as "Rc" (Rejected)
SVOCs	IC: %RSD ≤ 20.0%	IC: %RSD > 20.0%	IC: %RSD > 20.0 %	RRF < 0.05
	CC: %D ≤ ± 25.0%	CC: %D > ± 25.0%	CC: %D > 25.0%	
Herbicides	IC: %RSD ≤ 20.0%	IC: %RSD > 20.0%	IC: %RSD > 20.0 %	RRF < 0.05
	CC: %D ≤ ± 15.0%	CC: %D > ± 15.0%	CC: %D > 15.0%	
Metals	ICV: 90-110%	ICV: 75-89% or 111-125%	ICV: 75-89%	ICV: < 75% or > 125%
	CCV: 90-110%	CCV: 75-89% or 111-125%	CCV: 75-89%	CCV: < 75% or > 125%
Mercury	ICV: 80-120%	ICV: 65-79% or 120-135%	ICV: 65-79%	ICV: < 65% or > 135%
	CCV: 80-120%	CCV: 65-79% or 120-135%	CCV: 65-79%	CCV: < 65% or > 135%
Pesticides	IC: %RSD ≤ 20.0%	IC: %RSD > 20.0%	IC: %RSD > 20.0 %	RRF < 0.05
	CC: %D ≤ ± 25.0%	CC: %D > ± 25.0%	CC: %D > 25.0%	
PCBs	IC: %RSD ≤ 20.0%	IC: %RSD > 20.0%[a]	IC: %RSD > 20%	NA
	CC: %D ≤ ± 25.0%	CC: %D > ± 25.0%	CC: %D > 25.0%	

Notes:

CC	Continuing calibration
CCV	Continuing calibration verification
IC	Initial calibration
ICV	Initial calibration verification
NA	Not applicable
%D	Percent difference
%RSD	Percent relative standard deviation
PCB	Polychlorinated biphenyl
RRF	Relative response factor
SVOC	Semivolatile organic compound

Source: EPA 1994a, 1994b, 1996; and the specified analytical methods

Initial calibration review for organic analysis included evaluating percent relative standard deviation (%RSD), relative response factors (RRF), and retention times. The %RSD indicates the analytical system's linearity over an established concentration range. The RRF indicates the sensitivity of the analytical system to a particular target analyte. Retention time reflects the analytical system's stability. Retention time stability is particularly important in analysis for pesticides, and PCBs, where compounds are positively identified when a peak falls within the specified retention time "windows" on two dissimilar columns. The review of continuing calibration included an evaluation of percent difference (%D), RRFs, and retention times. The %D measures the analytical system's precision and was calculated by comparing the daily RRF to the RRF established in the initial calibration.

Initial calibration review for metals analyses included evaluating criteria for the initial calibration verification (ICV) percent recoveries (%R). The ICV %R is used to verify that the analytical system is within established calibration criteria at the beginning of an analytical run (EPA 1994a). Continuing calibration review included evaluating the criteria for continuing calibration verification (CCV) %R. The CCV %R is used to verify that the analytical system is within the established calibration throughout the analytical run.

Samples that were analyzed for organics when calibration requirements were not met, or for inorganics when correlation coefficient criteria were not met were qualified as "Jc," indicating that the results were estimated (EPA 1994b). Samples with nondetected results that were analyzed when RRF requirements for organic data were not met, or %R criteria were not met for inorganic data, were not met were qualified as "Rc," indicating that the results were rejected, while detected results were estimated (Jc) (EPA 1994b). Table 3-3 summarizes site analytical data that were qualified as a result of calibration violations (Jc and Rc). Of all organic data collected at AOC-1 between April 22, 2003 and July 10, 2003, 0.33 percent was qualified as estimated, and 0.17 percent of the data was rejected as a result of calibration violations. The estimated and rejected data was as a result of calibration problems in the analysis of the semivolatile compound atrazine. No calibration violations were noted for the inorganic data.

TABLE 3-3: DATA QUALIFICATION: CALIBRATION VIOLATIONS
Quality Control Summary Report, NWSSB Concord, California

Analysis	Matrix	Number of Analytes Reported	Number (percent) of Analytes Estimated (Jc)	Number (percent) of Analytes Rejected (Rc)
CLP Semivolatiles				
Atrazine	Water	4	4	0
Total	Water	260	4 (1.54%)	0 (0.00%)
SW- 846 Semivolatiles				
Atrazine	Water	8	0	2
Total	Water	520	0 (0.00%)	2 (0.38%)
Full Summary	ALL	1,198	4 (0.33%)	2 (0.17%)

3.3 LABORATORY AND FIELD BLANKS

Laboratory and field blank samples were analyzed to evaluate the existence and magnitude of contamination resulting from sample collection or laboratory activities (EPA 1994a, 1994b). Blanks prepared and analyzed in the laboratory consisted of calibration blanks and method and preparation blanks. Field blanks consisted of equipment rinsate blanks and trip blanks. If a problem with any blank existed, all associated data were carefully evaluated to assess whether the sample data were affected. Table 3-4 summarizes the purpose of each laboratory and field blank:

TABLE 3-4: LABORATORY AND FIELD BLANK PURPOSES
Quality Control Summary Report, NWSSB Concord, California

Blank Type	Purpose of Blank
Calibration blank	Evaluate analytical instruments for possible laboratory contamination
Method and preparation blank	Evaluate extraction or preparation procedures for possible laboratory contamination
Equipment rinsate blank	Evaluate decontamination procedures as a possible route for field contamination
Source blank	Evaluate source water used in equipment rinsate blanks for possible contamination

At a minimum, a calibration or a method and preparation blank was analyzed once every analytical period for each instrument. Method and preparation blanks were extracted (or prepared) at a frequency of 1 per extraction or preparation batch per matrix or per 20 samples, whichever was greater (EPA 1994c). Equipment rinsate blanks for a specified set of sample analyses were collected weekly for each sampling task because each sampling task employed different sample collection devices. Equipment rinsate blanks were analyzed for the same analytes of concern as the samples collected with the equipment.

When laboratory blank contamination was identified, sample results were compared to an action level of five times the highest level found in the associated laboratory blank. Only detected results of less than the action level for the laboratory blank contaminant were considered nondetected either at the level of the original result or at the CRQL (organic samples only), whichever was higher (EPA 1994a). The data were qualified as "UJb," indicating that the results were nondetected and reflected a detection or quantitation limit that may have been raised as a result of the low-level laboratory blank contamination.

After laboratory blank contamination was assessed, field blanks were evaluated. Where field blank contamination was identified, sample results were compared to an action level of five times the highest concentration found in the associated field blank, except for common laboratory compounds, which were compared to an action level of 10 times the highest concentration found in the associated field blank. Only detected results less than the action level for the field blank contaminant were considered nondetected either at the level of the original result or at the CRQL (organic samples only), whichever was higher (EPA 1994a). The data were qualified as "UJf"

indicating that the results were considered nondetected and reflecting a detection or quantitation limit that may have been raised by the low-level field blank contamination.

Table 3-5 summarizes analytical data collected at AOC-1 between April 22, 2003 and July 10, 2003 qualified as a result of blank contamination (UJb and UJf). Of all analytical data from the site, 3.98 percent was qualified as nondetected as a result of laboratory contamination and 0.75 percent was qualified as nondetected as a result of field contamination. The quality of the analytical data was not compromised by laboratory or field contamination.

TABLE 3-5: DATA QUALIFICATION: BLANK CONTAMINATION
Quality Control Summary Report, NWSSB Concord, California

Analysis	Matrix	Number of Analytes Reported	Number (percent) of Analytes Estimated (UJb)	Number (percent) of Analytes Estimated (UJf)
CLP Semivolatiles				
bis(2-Ethylhexyl) phthalate	Water	4	1	0
Total	Water	260	1 (0.38%)	0 (0.00%)
SW-846 Semivolatiles				
bis(2-Ethylhexyl) phthalate	Water	8	1	0
Total	Water	520	1 (0.19%)	0 (0.00%)
CLP Metals				
Aluminum	Water	14	5	
Antimony	Water	14	3	0
Arsenic	Water	14	2	1
Barium	Water	14	3	0
Cadmium	Water	14	10	0
Chromium	Water	14	4	0
Cobalt	Water	14	1	0
Copper	Water	14	1	1
Iron	Water	14	2	0
Lead	Water	14	1	0
Magnesium	Water	14	1	0
Manganese	Water	14	3	2
Mercury	Water	24	10	7
Molybdenum	Water	14	9	0
Nickel	Water	14	1	0
Selenium	Water	14	3	0
Silver	Water	14	2	0
Sodium	Water	14	1	0
Zinc	Water	14	0	3
Total	Water	346	62 (17.92%)	12 (3.47%)
Full Summary	All	1,608	64 (3.98%)	12 (0.75%)

Note: CLP Contract laboratory program

3.4 ACCURACY

One objective of data validation was to assess the accuracy of the chemical data set. Laboratory accuracy was evaluated using recoveries of surrogate spikes, matrix spikes (MS), and laboratory control samples (LCS) or blank spikes. Table 3-6 summarizes all applicable accuracy requirements by analysis and includes the criteria for estimating or rejecting analytical results when accuracy requirements are not met. For organic analyses using surrogate spikes, laboratory accuracy could be evaluated for individual samples. Matrix effects, however, frequently present unique problems in evaluating laboratory accuracy for organic analysis (EPA 1994a, 1994b). In some cases, professional judgment was used in qualifying the data. Any such decisions were clearly identified and documented in the data validation reports.

Organic data affected by surrogate recoveries outside QC limits were qualified as "Ja" indicating that the results were estimated, or in severe cases "Ra," indicating that the results were rejected (EPA 1994a). Of all the organic data collected at AOC-1 between April 22, 2003 and July 10, 2003, no results were estimated or rejected.

Data affected by matrix spike or blank spike problems were qualified "Je", indicating that the results were estimated, or "Re," indicating severe accuracy problems that resulted in rejected data.

Data affected by matrix spike or blank spike problems were qualified "Je", indicating that the results were estimated, or "Re," indicating severe accuracy problems that resulted in rejected data. Table 3-7 summarizes AOC-1 analytical organic and inorganic data qualified as a result of accuracy criteria violations in MSs and LCSs (Je and Re). Of all analytical data collected at AOC-1 between April 22, 2003 and July 10, 2003, only 0.19 percent was qualified as estimated due to MS and LCS violations, and 0.75 percent was rejected due to accuracy violations. The rejected data was a result of problems with hexachlorocyclopentadiene recoveries. Hexaclorocyclopentadiene routinely displays poor or intermittent recoveries.

3.5 ANALYTICAL AND MATRIX PERFORMANCE

In addition to data quality requirements discussed, further laboratory QA/QC criteria were evaluated in the cursory review. These additional criteria were primarily concerned with analytical and matrix performance; they are summarized in Table 3-8 for organic analyses.

For SVOC analyses, internal standard performance was evaluated. Internal standard performance criteria evaluate whether gas chromatography and mass spectroscopy (GC/MS) sensitivity and response are stable during every analytical run. Matrix effects, however, frequently present unique problems in evaluating analytical performance because they may affect internal standard performance. Internal standard requirements are based on a comparison of the sample's internal standard area with the same internal standard area found in the daily calibration standard. Internal standard area counts in the sample must be within 50 to 150 percent, and internal standard retention times must not vary by more than plus or minus 30 seconds from the internal standard in the associated daily calibration standard (EPA 1994a).

TABLE 3-6: ACCURACY REQUIREMENTS

Quality Control Summary Report, NWSSB Concord, California

Analysis	Matrix	Accuracy Requirements	Detected Data Qualified as "Ja" (Estimated)	Detected and Nondetected Data Qualified as "Ja" (Estimated)	Detected Data Qualified as "Ja" (Estimated) and Nondetected Data Qualified as "Ra" (Rejected)
SVOCs	Water	Any SMC: 20-130%	Any SMC: > 130%	Any SMC: < 20%	Any SMC: < 10%
Pesticides/ PCBs	Water	TCX: 30-150% DCB: 30-150%	TCX or DCB: > 150% (two or more surrogates)	TCX or DCB: < 30% (two or more surrogates)	TCX or DCB: < 10% (one or more surrogates)
Herbicides	Water	2,4-DCPA: 60 – 140%	2,4-DCPA: >140%	2,4-DCPA: < 60%	2,4-DCPA: < 10%
SVOCs	1,2,4-Trichlorobenzene	10 to 80	> 80%	NA	< 10%
	Acenaphthene	46 to 118	> 118%	NA	< 46%
	2,4-Dinitrotoluene	24 to 96	> 96%	NA	< 24%
	Pyrene	26 to 127	> 127%	NA	< 26%
	N-Nitroso-di-n-propylamine	41 to 116	> 116%	NA	< 41%
	1,4-Dichlorobenzene	36 to 97	> 97%	NA	< 36%
	Pentachlorophenol	9 to 103	> 103%	NA	< 9%
	Phenol	12 to 110	> 110%	NA	< 12%
	2-Chlorophenol	27 to 123	> 123%	NA	< 27%
	4-Chloro-3-methylphenol	23 to 97	> 97%	NA	< 23%
	4-Nitrophenol	10 to 80	> 80%	NA	< 10%
Pesticides/ PCBs	Gamma-BHC	56 to 123	> 123%	NA	< 56%
	Heptachlor	40 to 131	> 131%	NA	< 40%
	Aldrin	40 to 120	> 120%	NA	< 40%
	Dieldrin	52 to 126	>126%	NA	< 52%
	Endrin	56 to 121	> 121%	NA	< 56%
	4,4'-DDT	38 to 127	> 127%	NA	< 38%
	Aroclor 1260	50 to 150	> 150%	NA	< 50%
Herbicides	All SMC	50 to 150	> 150%	$\geq$ 10% < 50%	< 10%
Metals	All analytes	75 to 125	> 125%	$\geq$ 30% < 75%	< 30%

Notes:

BFB	Bromofluorobenzene	SMC	System monitoring compound
DCB	Decachlorobiphenyl	SVOC	Semivolatile organic compound
DCPA	Dimethyl tetrachloroterephthalate	TCX	Tetrachloro-m-xylene
PCB	Polychlorinated biphenyl		

TABLE 3-7: DATA QUALIFICATION: MS/MSD ACCURACY AND PRECISION VIOLATIONS

Quality Control Summary Report, NWSSB Concord, California

Analysis	Matrix	Number of Analytes Reported	Number (percent) of Analytes Estimated (Je)	Number (percent) of Analytes Rejected (Re)
CLP Semivolatiles				
Hexachlorocyclopentadiene	Water	4	0	4
Total	Water	260	0 (0.00%)	4 (1.54%)
SW-846 Semivolatiles				
Hexachlorocyclopentadiene	Water	8	0	8
Total	Water	520	0 (0.00%)	8 (1.54%)
CLP Metals				
Potassium	Water	14	3	0
Total	Water	346	3 (0.87%)	0 (0.00%)
Full Summary	ALL	1,608	3 (0.19%)	12 (0.75%)

Note: CLP Contract laboratory program

TABLE 3-8: ANALYTICAL AND MATRIX PERFORMANCE REQUIREMENTS FOR ORGANIC ANALYSIS

Quality Control Summary Report, NWSSB Concord, California

Analysis	Performance Requirements	Detected Data Qualified as "Ji" (Estimated)	Detected and Nondetected Data Qualified as "Ji" or "Ji" (Estimated)	Detected Data Qualified as "Ji" or "Jj" (Estimated) and Nondetected Data Qualified as " Ri" or "Rj" (Rejected)
SVOC	Sample IS: 50-150%	Sample IS: > 150%	Sample IS: < 50%	Sample IS: < 25%
	GPC %R: 80-110%	GPC %R: > 110%	GPC %R: < 80%	GPC %R: < 10%

Notes:
GPC Gel permeation cleanup
IS Internal standard
% Percent recovery
SVOC Semivolatile organic compound

Organic data affected by internal standard criteria violations were qualified as "Ji," indicating that the results were estimated. Organic data with any internal standard areas less than 25 percent of the internal standard's area in the associated daily standard were qualified as "Ri" or "Ji." "Ri" indicated that nondetected results were rejected, and "Ji" indicated that detected results were estimated. Of all data collected at AOC-1 between April 22, 2003 and July 10, 2003, no results were estimated or rejected due to internal standard violations.

For inorganic analysis, ICPES serial dilutions were evaluated. ICPES serial dilution analysis was used to determine whether matrix interferences existed and if the accuracy of the analytical data was affected. The criterion for acceptability is %D less than 10 percent when the results of a five-fold dilution are compared to the results from the undiluted sample. This criterion applies only when the concentration of the element in the undiluted sample is at least 50 times the instrument detection limit (IDL).

Inorganic data with violations of the ICPES serial dilution criteria were qualified as "Jj". Table 3-9 summarizes data qualified as a result of analytical and matrix performance criteria violations (Jj) for inorganics. Of all inorganic analytical data collected at AOC-1 between April 22, 2003 and July 10, 2003, 4.88 percent was qualified as estimated.

TABLE 3-9: DATA QUALIFICATION: ICPES SERIAL DILUTION VIOLATIONS
Quality Control Summary Report, NWSSB Concord, California

Analysis	Matrix	Number of Analytes Reported	Number (percent) of Analytes Estimated (Jj)
CLP Metals			
Potassium	Water	14	10
Sodium	Water	14	10
Total	Water	346	20 (5.78%)
Full Summary	All	410	20 (4.88%)

Note: CLP Contract laboratory program

3.6 PRECISION

Another objective of data validation was to assess the precision of the chemical data set. Laboratory precision was evaluated by the relative percent differences (RPD) of the MSs and matrix spike duplicates (MSD) in organic analyses and by the RPDs of the sample and sample duplicates in inorganic analyses. For organic analyses, RPDs were used to evaluate overall precision and were not used specifically to qualify data. For inorganic analyses, sample and sample duplicate RPDs were used to indicate the laboratory's analytical precision within a sample delivery group (SDG) for that matrix. Inorganic sample and sample duplicates were reviewed according to the following criteria (EPA 1994b):

- An RPD criterion of plus or minus 20 percent was used for water sample values of greater than 5 times the CRDL
- An RPD criterion of plus or minus 35 percent was used for soil sample values of greater than 5 times the CRDL
- An absolute difference of plus or minus the CRDL was used for water sample values of less than 5 times the CRDL
- An absolute difference of plus or minus 2 times the CRDL was used for soil sample values of less than 5 times the CRDL

Inorganic data affected by sample and sample duplicate RPDs outside QC limits were qualified as "Jd," indicating that the results were estimated (EPA 1994b). Data were not rejected based on precision criteria violations. Table 3-10 summarizes site analytical data qualified because of precision criteria violations (Jd). Of all analytical data collected at AOC-1 between April 22, 2003 and July 10, 2003, 0.62 percent was qualified as estimated because of precision criteria violations.

TABLE 3-10: DATA QUALIFICATION: PRECISION CRITERIA VIOLATIONS
Quality Control Summary Report, NWSSB Concord, California

Analysis	Matrix	Number of Analytes Reported	Number (percent) of Analytes Estimated (Jd)
CLP Metals			
Selenium	Water	14	6
Total	Water	346	6 (1.73%)
Solids			
Total suspended solids	Water	11	4
Total	Water	22	4 (18.18%)
Full Summary	All	1,608	10 (0.62%)

Note: CLP Contract laboratory program

3.7 RESULTS BELOW THE CRQL AND CRDL

For organic analyses, the analytical instruments can make reliable qualitative identification of compounds at concentrations below the CRQL. For metals analysis, the ICP can make reliable qualitative identification of analytes above the IDL but below the CRDL. Detected results below the CRQL and CRDL are considered quantitatively uncertain. Sample results below the CRQL and CRDL were reported by the laboratory with a "J" qualifier (organic data) or a "B" qualifier (inorganic data) and were subsequently qualified in data validation as "Jg," indicating that the results were estimated. Of all data collected at AOC-1 between April 22, 2003 and July 10, 2003, no organic results were qualified as estimated because of detected results reported below the CRQL, and 12.93 percent of the inorganic data was reported qualified as estimated because of detected results below the CRDL.

4.0 FULL REVIEW

A full review was conducted on ten percent of the site chemical data. Full review includes all elements of a cursory review, previously presented in Section 3.0. Full review organic methods included evaluating the following additional items, as applicable: method compliance, instrument performance check samples, cleanup performance check samples, system performance, target analyte identification, analyte quantitation, detection and quantitation limit verification, and overall assessment of the data. Criteria for data qualification during the full review are described in EPA guidelines (EPA 1994a, 1994b), the SAP, and associated analytical methods. Sections 4.1 through 4.4 discuss the full review components and the results of each specific assessment.

4.1 ADDITIONAL ANALYTICAL AND MATRIX PERFORMANCE

In addition to the cursory review of data quality requirements discussed in Section 3.0, full review includes additional verification against established QA/QC criteria. The additional full review requirements are primarily concerned with analytical and matrix performance. For organic analysis, the following requirements were evaluated, as applicable: instrument performance check samples and cleanup performance check samples for florisil cartridges and gel-permeation chromatography (GPC) (as applicable to SVOCs, pesticides, and PCBs).

For SVOC analysis, GC/MS instrument performance check samples were analyzed to assure mass resolution, identification and, to some degree, sensitivity. Specifically, minimum and maximum ion abundance requirements must be met for bromofluorobenzene and decafluorotriphenylphosphine. Gas chromatography with electron capture detector (GC/ECD) instrument performance check samples (for pesticides and PCBs) were analyzed to assure adequate resolution and instrument sensitivity. Analytical requirements for the target analytes and surrogates include the criteria for RPD (between the true and actual values), and chromatographic resolution.

For pesticide, PCB, and SVOC analyses, cleanup check samples were analyzed to verify the recovery of target analytes through the cleanup processes. The GPC cleanup process removes matrix interferences from sample extracts prior to analysis. A blank spike is run through the GPC column and the %R is calculated to check the clean up process. GPC is checked weekly (EPA 1994a, 1996).

For inorganic analyses, ICPES interference check samples were evaluated. The ICPES interference check sample verifies the validity of the laboratory's inter-element background correction factors. High levels of the elements aluminum, iron, calcium, and magnesium can affect sample results if the inter-element and background correction factors have not been optimized. Use of inappropriate correction factors may result in false positives, false negatives, or biased results.

4.2 ANALYTE IDENTIFICATION

Qualitative criteria have been established to minimize erroneous identification of compounds. An erroneous identification can be either a false positive (reporting a compound present when it is not) or a false negative (not reporting a compound that is present). For SVOC analysis, the standard's mass spectra, retention time, and the sample mass retention time were compared to identify the analyte. For positive identification, the compound's mass spectra must meet the following criteria: contain all the standard ions with relative intensities greater than 10 percent, agree within plus or minus 20 percent of the standard ion's relative intensities, and not contain any unaccounted ions with relative intensities greater than 10 percent. In addition, the retention time must be within plus or minus 0.06 relative retention time (RRT) unit of the standard component's retention time (EPA 1994a, 1996).

Pesticides, PCBs, and herbicides were positively identified when a peak fell within the specified retention time "windows" on two dissimilar columns. Surrogates and MS/MSDs also were strictly evaluated to identify any retention time shifts. An RPD value between the two columns is generated to check single peak results. Detected results with RPDs greater than 50 percent were qualified as "Jj," indicating that the results were estimated. Misidentified results below the CRQL were raised to the quantitation limit and considered nondetected. Table 4-1 summarizes pesticide, PCB, and herbicides results estimated due to analyted identification problems. Of all the organic analytical data only 0.25 percent were qualified as estimated due to RPD violations.

TABLE 4-1: DATA QUALIFICATION: COMPOUND IDENTIFICATION VIOLATIONS
Quality Control Summary Report, NWSSB Concord, California

Analysis		Matrix	Number of Analytes Reported	Number (percent) of Analytes Estimated (Jj)
Herbicides				
Dalapon		Water	12	3
	Total	Water	120	3 (2.50%)
Full Summary		ALL	1,198	3 (0.25%)

4.3 ANALYTE QUANTITATION

All applicable raw data were reviewed to verify positive results and the reported detection or quantitation limits. One hundred percent of the calculations were evaluated and recalculated for reproducibility. Raw data reviewed included, as applicable, the following sources: extraction and preparation logbooks, cleanup logbooks, spike and standard preparation logbooks, instrument printouts, strip chart recordings, chromatograms, and quantitation reports. The following data sources were also evaluated, as applicable: sample dilutions, concentrations, analytical split samples, cleanup activities, and percent moisture. Review of the raw data showed that the chemical analytical results from this site were properly quantitated.

4.4 ANALYTE REPORTING LIMITS

Analyte reporting limits for sediment samples are directly affected by dilutions and percent moisture. All sediment sample results were corrected for percent moisture and were reported with detection or quantitation limits slightly raised after correction for percent moisture. In addition, detection or quantitation limits for both soil and water samples were raised by the dilution factor when samples required dilution for analysis. Sample dilution was necessary when high levels of an analyte were present or when matrix problems occurred during sample extraction or analysis. Review of the site chemical data set identified a very small number of organic sample concentrations that required dilution; therefore, very few reporting detection or quantitation limits were raised.

5.0 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPLETENESS, AND COMPARABILITY EVALUATION SUMMARY

Data were compared to PARCC parameters during data validation. The following paragraphs discuss the overall data quality, including the PARCC parameters, as determined by the data validation.

5.1 PRECISION

Precision is a measure of the reproducibility of an experimental value without regard to the true or reference value. The primary indicators of site data precision were the RPD of the MS/MSD in organic analyses and the RPD of the sample and sample duplicate in inorganic analyses. The following summarizes this investigation's data precision:

- For organic data, MS/MSD RPDs were within QC criteria, indicating that the methods were consistently precise.
- Metals sample and sample duplicate RPDs were within QC criteria, except for some of the selenium and total dissolved solid results, indicating that these methods were consistently precise.

5.2 ACCURACY

Accuracy assesses the closeness of an experimental value to the true or reference value. The primary accuracy indicators were the recoveries of surrogate spikes, MS, and LCS spikes. The following summarizes the accuracy of this investigation's data:

- For organic analysis, with the exception of hexachlorocyclopentadiene, the surrogate spike, MS, and LCS spike recoveries were good, indicating that the methods were consistently accurate.
- For metals, the LCS spike and MS recoveries all within QC criteria, indicating that this method was accurate at levels above the CRDL.

5.3 REPRESENTATIVENESS

Representativeness refers to the ability of sample data to reflect true environmental conditions. Factors that affect representativeness include sampling locations, frequency, collection procedures, and possible compromises to sample integrity (such as cross-contamination) that can occur during collection, transport, and analysis. Selection of representative sampling sites is important to assure that the medium sampled is typical of the site. Correct sample collection, transport, and analytical procedures are important to assure that samples closely resemble the medium sampled and to minimize contamination.

For the site, the sampling locations, frequency, and collection protocols were described in the SAP (Tetra Tech 2000). These protocols followed standard accepted methods of site characterization and were approved by the regulatory agencies. Therefore, with respect to accepted site characterization approaches, existing guidance, and regulatory compliance, the sampling program for this site met all relevant requirements for data representativeness.

5.4 COMPLETENESS

Completeness is defined as the percentage of analytical results considered valid. Valid data are identified as acceptable or qualified as estimated (J) during the data validation process. Data qualified as rejected (R) are considered unusable and not valid.

For the site, rejected and unusable data were qualified during the cursory review for the following reasons: exceeded holding time, calibration problems, low surrogate spike recovery, low LCS or MS recovery, or low internal standard areas. The full review of 10 percent of the site data did not yield any additional rejected data.

The assessment of completeness consisted of comparing the amount of acceptable, usable results to the total number of results. The SAP set a completeness goal of 90 percent for field samples and laboratory samples. The site data evaluated in this data validation report was found to be 99 percent complete. Ninety-nine percent of data collected at AOC-1 between April 22, 2003 and July 10, 2003, therefore, are valid and usable for site characterization, human health, and ecological risk assessment purposes.

5.5 COMPARABILITY

Comparability is a qualitative assessment of how well one data set compares to another. The important determinants of comparability include the uniformity of sampling activities, analytical procedures, data reporting, and data validation. The use of EPA protocol, specific and well-documented ASTM and EPA analytical methods, approved laboratories, and the standardized process of data review and validation give the site data a high degree of analytical comparability. The use of well-established analytical protocols assures that the data are comparable.

6.0 CONCLUSIONS FOR DATA QUALITY AND DATA USABILITY

Although some qualifiers were added to the data, a final review of the data set with respect to the EPA data quality parameters discussed in Section 5.0 indicates that the data are of high overall quality. The data meet all the requirements of the PARCC data quality indicators as described in EPA (1997) guidance for SAPs. Therefore, these data are usable for risk assessment. The overall assessment of the sampling program, QA/QC data, data review, and data validation results presented in Sections 3.0 and 4.0 shows the site data are of acceptable PARCC. All supporting documentation and data are available upon request, including cursory and full validation reports and the database that holds all sample results.

EPA's "Risk Assessment Guidance for Superfund" (RAGS) was used to evaluate the usability of the validated data (EPA 1989). Exhibit 5-5 in RAGS states that data qualified as estimated (J) based on data validation reports should be used in quantitative risk assessments. Although this guidance is specifically for human health risk assessments, the same data usability criteria were used for the site. Only data qualified as rejected (R) are considered unusable for risk assessment purposes. Accordingly, all J-qualified data, but no R-qualified data, were used for human health risk assessment as well as site characterization and ecological risk assessment purposes.

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