A-E CERCLA/RCRA/UST STUDIES AND REMEDIAL DESIGN

CONTRACT NUMBER N68711-00-D-0005

Area of Concern (Site 31)
Time-Critical Removal Action Summary Report

Naval Weapons Station Seal Beach, Detachment Concord, California

DS.A001.10509

FINAL

JULY 22, 2003

Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132-5190

TETRA TECH, INC.

AECRU Contract Number N68711-00-D-0005
Delivery Order 001

Area of Concern 1 (Site 31)

Draft Final Time-Critical Removal Action Summary Report

Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

July 22, 2003

Prepared for

DEPARTMENT OF THE NAVY
Mr. Tony Tactay, Remedial Program Manager
Engineering Field Activity West
Naval Facilities Engineering Command
Daly City, California

Prepared by

TETRA TECH EM INC.
135 Main Street, Suite 1800
San Francisco, CA 94105
(415) 543-4880

Rik Lantz, Project Manager

DS.A001.10509

CONTENTS

Appendix

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AECRU	Indefinite Quantity Contract for Architectural-Engineering Services to Provide CERCLA/RCRA/UST Studies
AOC	Area of concern
bgs	Below ground surface
CCWD	Contra Costa Water District
cpm	Counts per minute
EPA	U.S. Environmental Protection Agency
HQ	Hazard quotient
mg/kg	Milligrams per kilogram
mREM/yr	Milli-Roentgen Equivalent Man (REM) per year
msl	Mean sea level
Navy	U.S. Department of the Navy
NWSSBD	Naval Weapons Station Seal Beach Detachment
NRC	U.S. Nuclear Regulatory Commission
PA	Preliminary assessment
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
ppb	Parts per billion
PRG	Preliminary remediation goal
QCSR	Quality control summary report
RAB	Restoration advisory board
RASS	Remedial action subsite
RCRA	Resource Conservation and Recovery Act
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SAP	Sampling and analysis plan
SLERA	Screening level ecological risk assessment
SVOC	Semivolatile organic compound
Tetra Tech	Tetra Tech EM Inc.
TCRA	Time-critical removal action
VOC	Volatile organic compound

1.0 INTRODUCTION

During the summer and fall of 2002, the U.S. Department of the Navy (Navy) conducted a time-critical removal action (TCRA) to address ecological risks associated with contaminated waste materials at Area of Concern 1 (AOC 1) at Naval Weapons Station Seal Beach Detachment (NWSSBD) Concord, in Concord, California. This document summarizes the TCRA that was completed at AOC 1 (Site 31). Figures that are referred to in this document follow the text.

AOC 1 is an undeveloped 17.2-acre site off of Port Chicago Highway, about 1 mile east of the eastern entrance to NWSSBD Concord (Figure 1). The site is the former location of a nitrogen-phosphorus-potassium (N-P-K) fertilizer plant operated from 1955 to 1976 by Union Oil Company of California. The Navy acquired the property in 1983 to expand the safety buffer for munitions handling at Pier 4. All buildings at the site were demolished and removed from the site in 1986, but some of the original paved roadways that connected the plant buildings remain. The site is an upland habitat, which is mostly vegetated with nonnative grasses and coyote bush, a native shrub. The property is currently vacant except for a Contra Costa County pump station located on the southern portion of the property, and is secured by a locked perimeter fence. Site features are illustrated in Figure 2.

The Navy became aware of potential contamination at AOC 1 when the Contra Costa Water District (CCWD) installed a pump station at the site in 1998. Samples collected to determine appropriate disposal of excavated soils showed that the soils were contaminated with lead, mercury, and selenium.

The Navy conducted a preliminary assessment (PA) at the site in two phases to further assess the degree of contamination associated with AOC 1 (Tetra Tech EM Inc. [Tetra Tech] 1999). The first phase, conducted in February 1999, consisted of reviewing agency files about the site and collecting 17 soil samples from nine locations at the site. The first phase of the PA revealed that the soil contamination affected a larger area than was originally suspected; therefore, the Navy conducted a supplemental PA (the second phase) in July 2000 and collected 79 additional soil samples from 28 locations. The supplemental PA investigation was documented in an Addendum to the PA (Tetra Tech 2001). Sampling locations are shown on Figure 2, and analytical results from the upper two feet of soil at AOC 1 are presented in Appendix A. Analytical results, including results for deeper samples, are presented in the Addendum to the PA (Tetra Tech 2001).

The two-phase PA identified three types of waste materials at the site: (1) cinder roadbed material, (2) ash-like material, and (3) waste gypsum. The cinder material is a dark purplish-gray to black, vitreous, vesicular, fine- to medium-grained gravel. The ash-like material is light colored, very fine, loose, silt-sized waste. The waste gypsum is white, fine-grained, sand-sized granular material. PA sampling showed that concentrations of metals and organic compounds in the waste gypsum were low and did not exceed preliminary remediation goals (PRG) for industrial soils (industrial PRGs) developed by the U.S Environmental Protection Agency (EPA) (EPA 2003a), but that both the cinder roadbed material and the ash were contaminated with high concentrations of lead, selenium, and mercury. Former industrial operations at the site are the likely source of these waste materials.

The cinder roadbed material was present in the area surrounding and directly underneath the pump station and is contaminated with lead and selenium (up to 11,400 milligrams per kilogram [mg/kg] lead and 875 mg/kg selenium). The ash-like material covered most of the eastern half of the site, and exhibited irregular concentrations of metals. Ash-like material in two areas (hereinafter referred to as "hot spots") in the north-central portion of AOC 1 contained lead, selenium, and mercury at concentrations up to 895 mg/kg, 68.3 mg/kg, and 113 mg/kg, respectively.

The Navy used a screening-level ecological risk assessment (SLERA) and a more focused assessment that used more realistic exposure assumptions, to evaluate ecological risks from contaminants present in soils at AOC 1. These assessments were presented in the Addendum to the PA (Tetra Tech 2001). The SLERA and the more focused assessment used food-chain modeling to assess ecological risks to three vertebrate species selected to represent distinct feeding guilds: the Western Meadowlark (*Sturnella neglecta*), the Northern Harrier (*Circus cyaneus*), and the gray fox (*Urocyon cinereoargenteus*). A hazard quotient (HQ) approach was used whereby estimated site-specific doses were compared to toxicological reference values (TRVs) developed by the Navy (Naval Facilities Engineering Command, Engineering Field Activity West [EFA WEST] 1998). The evaluation showed that the mercury and selenium in the wastes posed an unacceptable risk to the Western Meadowlark at AOC 1, as indicated by HQs that exceeded 1.0 (HQs of 1.85 for mercury and 3.71 for selenium were derived using the food chain modeling approach). A detailed discussion of methods and evaluation of ecological risks associated with site contaminants was presented in the Addendum to the PA (Tetra Tech 2001).

The Navy also conducted a screening level human health risk assessment (HHRA) for the industrial use scenario as part of the PA (Tetra Tech 1999) and the Addendum to the PA (Tetra Tech 2001). Cumulative cancer risks for industrial workers (1.1×10^{-4}) slightly exceeded EPA's target risk range. Concentrations of lead significantly exceeded the EPA Region 9 industrial PRG for lead (750 mg/kg). Concentrations of arsenic exceeded the industrial PRG for a carcinogenic endpoint (1.6 mg/kg) and slightly exceeded the industrial PRG for a non-carcinogenic endpoint (260 mg/kg). Nevertheless, the Navy does not believe that contaminants at AOC 1 pose a threat to human receptors because actual human exposure to contaminants at AOC 1 is significantly lower than the exposure assumptions used to derive the industrial PRGs. First, industrial PRGs for soils are derived based on a full day of exposure to an outdoors worker (EPA 2003a); actual workers visit AOC 1 only for short periods to perform periodic maintenance. Second, waste materials at the site are typically covered by vegetation or several inches of topsoil, factors that also reduce actual worker exposure to contaminants in the wastes at AOC 1. Although lead does not pose an unacceptable risk to human health for the reasons noted above, lead, mercury, and selenium are collocated at the site, and removal of the hot spots of mercury and selenium also removed soils contaminated with lead. Based on existing data for chemical concentrations in soil, the proposed removal action was expected to address concentrations of lead at the site that exceeded the EPA Region 9 industrial PRG for lead.

The Navy decided to promptly address ecological risks associated with metals-contaminated waste materials by conducting a TCRA to excavate and remove the most contaminated wastes from the site. An Action Memorandum documented the Navy's rationale for addressing ecological risks by conducting a TCRA, and outlined the details of the removal action (Naval Facilities Engineering

Command, Western Division [NAVFAC] 2002). This summary report has been prepared to verify that the Navy conducted the TCRA in accordance with the Action Memorandum.

The Navy plans to conduct a remedial investigation at AOC 1 to provide a more comprehensive evaluation of remaining ecological risks at AOC 1. The remedial investigation (RI) is in the scoping phase; the draft RI work plan is currently scheduled for submittal in April 2004.

2.0 TIME-CRITICAL REMOVAL ACTION

The Navy chose to conduct a TCRA at the site to address unacceptable risk posed to the Western Meadowlark. The primary objective of the TCRA was to reduce ecological risk associated with metals-contaminated waste materials to acceptable levels by excavating and removing contaminated debris and hot spots from the site. Specific goals of the TCRA were as follows:

- Remove all of the cinder material from the site, including as much of the material in the area near the pump station as possible without damaging the pump station or utilities leading to the pump station
- Remove the ash-like material from the hot spots until the remaining material no longer poses an unacceptable ecological risk

The TCRA consisted of the following five stages:

1. Radiological screening
2. Pre-removal delineation of the hot spot areas through delineation sampling
3. Excavation and removal of wastes
4. Confirmation sampling from the base and perimeter of the excavations, and
5. Restoration of the site.

Each of the five stages is described in the following sections.

2.1 RADIOLOGICAL SCREENING

During an April 25, 2002 remedial project managers (RPM) meeting, regulatory agencies expressed concern that the ash-like material present at AOC 1 resembles fly ash (very fine particle ash that results from coal combustion), and that some fly ash may contain unsafe levels of radioisotopes. Coal contains naturally occurring radioisotopes, including trace concentrations of uranium and its daughter products, which become more concentrated in fly ash by a simple volumetric change when the coal is burned. The regulatory agencies requested that the Navy evaluate whether radioisotope contamination is present at AOC 1 before initiating the TCRA. Based on information collected during the PA, such as review of previous site uses, aerial photographs, and site plans, there is no reason to believe that radiological activities of any kind were conducted at AOC 1 either by the Navy or by the former fertilizer plant. The purpose of performing the radiation screening survey

was to evaluate whether the material that resembled fly ash at AOC 1 contained a sufficient concentration of natural radioisotopes to result in unsafe concentrations in AOC 1.

A United States Geological Survey (USGS) publication on the radiological concerns associated with fly ash concludes that (1) "the vast majority of coal and the majority of fly ash are not significantly enriched in radioactive elements, or in associated radioactivity, compared to common soils or rocks" and (2) fly ash does not generally pose a health risk (USGS 1997). The same publication noted that an "extreme calculation" assuming high proportions of fly ash in concrete building products in a residence resulted in an enhanced dose of 3 percent of natural environmental radiation, and that the radioactivity of typical fly ash is not significantly different from that of conventional concrete additives or other building materials such as granite or red brick (USGS 1997).

To address agency concerns about the ash-like material at AOC 1, Naval Weapons Station Seal Beach Detachment Concord (NWSSBD) personnel conducted radiological screening on May 30, 2002 in the two hot spot areas at AOC 1 where ash-like material was present and slated for removal during the TCRA. Additionally, NWSSBD personnel conducted radiological screening of two bare soil areas in Remedial Action Subsite 4 (RASS 4), a location immediately east of AOC 1 where a similar ashy or semi-lithified soil has been observed. Radiological screening sample locations are shown on Figure 3.

As requested by the regulatory agencies, the Navy measured alpha, beta, and gamma radiation at all locations. Gamma emissions were field screened using an AN/PDR-27 low-range beta-gamma survey meter. This instrument provides a measure of the total radiation exposure at the site from all sources (cosmic and terrestrial). In addition, to obtain a more accurate measure of the radiation emitted by the soil in the area, the Navy spread a small amount of soil from each location on a clean surface and scanned the surface with DT-304 beta-gamma probe connected to an E-140N portable readout meter to measure beta-gamma radiation, and with an AN/PDR-56 alpha survey meter to measure alpha radiation. Results of the survey are listed in Table 1.

TABLE 1: AOC 1 RADIOLOGICAL SCREENING SURVEY RESULTS

Final Time-Critical Removal Action Summary Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

Location	Geographic coordinates (northing / easting)	In Situ Gamma (mREM per hour)	Soil Sample Beta and Gamma (cpm)	Soil Sample Alpha (cpm)
RAD 1 (AOC 1)	1,573,341.7 / 565,311.8	0.01	20 – 60	0
RAD 2 (AOC 1)	1,573,436.3 / 565,134.7	0	20 – 60	0
RAD 3 (RASS 4)	1,573,659.7 / 564,833.9	0	40 – 100	0
RAD 4 (RASS 4)	1,573,755.7 / 564,722.8	0.01	40 – 100	0

Notes:

RAD Radiological screening location
1 mREM 1/1,000 REM
REM Roentgen equivalent man, a unit for measuring biological effects of radiation absorbed in tissue.
cpm counts per minute

The U.S Nuclear Regulatory Commission (NRC) reports that average radiation exposure from natural sources to an individual in the United States is approximately 300 milliREM per year. (0.034 milliREM per hour) (NRC 2003). The gamma measurements presented above show that the radiation readings at AOC 1 are significantly below the NRC reported average. More telling are the beta-gamma measurements taken with the DT-304 beta-gamma probe. Readings taken in other areas at NWSSBD Concord measured 20 – 60 counts per minute (cpm) (Rudy Pontemayor, personal communication). These readings were established as the approximate background for the site. The measurements at the four locations were 20 – 60 cpm and 40 – 100 cpm. In all cases, including the background area, the readings fluctuated because radiation is a random event and it is therefore necessary to observe the meter reading and determine a nominal or range of readings at each location. The measurements taken at the four locations are equal to or slightly above the approximate background. Surveyors using the DT-304 probe are trained to observe the meter and to further investigate if the nominal reading is greater than 100 cpm above the average background. No readings greater than 100 cpm above background were detected. Finally, the alpha survey meter detected no alpha emissions.

In summary, alpha radiation was not detected, beta radiation detected was at or only slightly above background levels, and the gamma radiation was detected at levels well below NRC reported background levels. Based on this evaluation, there is no indication that the ash-like material at AOC 1is contaminated with radiological isotopes.

2.2 HOT SPOT DELINEATION

The entire eastern half of AOC 1 contains a thin (approximately 0.25- to 0.5-foot) layer of ash-like material that is buried by several inches of topsoil in most areas. Sampling conducted during the PA demonstrated that the material contains discontinuous zones of contamination by lead, mercury, and selenium. Two hot spots (areas that contained the highest concentrations of mercury and selenium) were identified in the north-central portion of AOC 1. In these areas, the ash-like material was contaminated with lead, selenium, and mercury at concentrations up to 895 mg/kg, 68.3 mg/kg, and 113 mg/kg, respectively. Statistical analysis for the Addendum to the PA has shown these hot spots to be statistical outliers, meaning that concentrations in these areas are statistically distinct from other values in the data set (defined as greater than 1.5 times the interquartile range of the data) (Tetra Tech 2001).

The hot spot areas were identified based on elevated concentrations in single samples that were spaced as much as 170 feet apart. To better define the lateral limits of the hot spots, the Navy collected composite samples from 25-ft grid squares surrounding the two sampling locations with the highest metals concentrations in the ash-like material (GB27 and SB08).

The Navy collected composite samples of the ash-like material from each grid square, using methods described in Section 2.1.1.1 of the sampling and analysis plan (SAP) (Tetra Tech 2002). The SAP was developed, reviewed, and approved in coordination with the regulatory agencies that oversee the environmental cleanup at NWSSBD Concord. The SAP employed standard quality control procedures for environmental investigations to ensure that the data are of high quality and are suitable for making remedial decisions about the site. A quality control summary report (QCSR)

documenting the quality of the data is included as Appendix B. The review of data quality documented in the QCSR in Appendix B indicates that the data gathered for the TCRA are of high overall quality and are suitable use for risk assessment and site characterization.

Each grid square was subdivided into four equal areas (12.5-foot by 12.5-foot subsquares) as shown on Figure 4, and a 3-foot boring was advanced in the center of each subsquare. Equal volumes of waste (or soils from the 0- to 0.5-foot depth interval, if waste was absent) from a single depth interval in the each of the four borings in the subsquares were mixed together thoroughly to create a single composite sample that represents the entire 25-foot by 25-foot grid square. In about half of the hot spot delineation area, the Geoprobe sampler could not penetrate a cement-like material that occurred at a depth of 1 foot below ground surface (bgs) or greater. In these locations, samples were collected from above the cement-like layer. The cement-like material prevented collection of a complete 3-foot soil core from all of grid squares C7, D7, F10, I12, and I13, and parts of grid squares D9, D10, E8, E10, E11, J11, J13, K11, K12, and K13 (Figure 4). The term "cement-like material" does not necessarily refer to a commercial product; 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.

Because the TCRA was conducted to address unacceptable ecological risks and because ecological receptors do not derive their food from a single point, composite samples were considered appropriate to characterize the limits of hot spots to address ecological risk. Composite samples from each grid square were analyzed for lead, selenium, and mercury.

The hot spot delineation samples were collected in three stages. The first tier of grid squares that immediately surround the two hot spots was sampled on June 4 and 5, 2002. Based on the analytical results for these samples, six additional grid squares south and east of the first tier of grid squares around the northernmost hot spot were sampled on June 20, 2002. To provide a complete data set of composite sample results from grid squares surrounding the excavations, a third set of grid squares farther south and east of the northern hot spot were sampled on December 9, 2002, after the excavation was completed.

Analytical results for these composite samples are presented in Table 2 and are presented along with confirmation sampling results on figures included in Section 2.4. Chain-of-custody forms and analytical results provided by the laboratory are included as Appendix C. Lithologic logs from the grid square borings are included as Appendix D.

The Navy delineated the limits of the excavation that would correspond with acceptable ecological risk by performing iterative ecological risk calculations, using the focused food chain models presented in the Addendum to the PA (Tetra Tech 2001). The delineation sample results were combined with the soils results from the two-phase PA investigation to create a complete set of all available data from the site. The PA data set consisted of all soils within 2 feet of the ground surface, for a total of 61 samples. Analytical results from the delineation samples (22 additional samples) were added to the data set, and 95th percentile upper confidence limit on the arithmetic mean (UCL_{95}) concentrations were calculated for selenium and mercury. The data set used to calculate UCL_{95} soil concentrations is presented in Appendix E.

Different removal scenarios were evaluated by calculating ecological risk associated with UCL_{95} soil concentrations for selenium and mercury, as described in the action memorandum (Naval Facilities Engineering Command, Western Division, [NAVFAC] 2002). Ecological risks for contaminants other than selenium and mercury were not calculated because only selenium and mercury were associated with unacceptable ecological risk (Tetra Tech 2001).

Ecological risk reduction achieved by removing grid squares with the highest concentrations was modeled by removing the data associated with these squares and the data from existing samples in the cinder area from the total data set for the site, calculating a revised UCL95 concentration from the modified data set, and recalculating ecological risk using the revised UCL95 concentrations. If the HQ for selenium or mercury still exceeded 1.0, data from the grid square with the next highest concentration of selenium and mercury were removed, and so on until the remaining ecological risk was acceptable (HQ less than 1.0). Using this iterative risk evaluation process, the Navy defined the grid squares that were associated with unacceptable ecological risk, and the lateral limits of those grid squares defined the lateral limits of the two hot spot excavations.

Limits of the excavations defined in this manner are illustrated on Figure 4. Using this iterative technique, the Navy determined that grid squares C8, C9, D8, D9, E10, and J12 contained concentrations of selenium and/or mercury that were associated with unacceptable ecological risk. These grid squares defined the limits of the hot spot excavations for the TCRA.

TABLE 2: HOT SPOT DELINEATION ANALYTICAL RESULTS

Final Time-Critical Removal Action Summary Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

Location	Sample Number	Sample Date	Lead (mg/kg)		Mercury (mg/kg)		Selenium (mg/kg)	
Industrial PRG			**750**		**310**		**5,100**	
B7	001AOC1SS001	5-Jun-02	158		0.1	J	21.2	J
B8	001AOC1SS002	4-Jun-02	17.2		0.1	J	3.4	UJ
B9	001AOC1SS003	4-Jun-02	63.3		1.5		7	J
B10	001AOC1SS009	20-Jun-02	10.0	J	0.018	UJ	1.5	J
C7	001AOC1SS008	5-Jun-02	36.8		0.23		4.3	UJ
C9*	001AOC1SS004	4-Jun-02	323		8.4		28.7	J
C10	001AOC1SS010	20-Jun-02	68.0	J	0.068	UJ	5.3	J
D7	001AOC1SS007	5-Jun-02	83.6		0.7		6.5	J
D8*	001AOC1SS006	4-Jun-02	292		2.8		22.3	J
D9*	001AOC1SS005	4-Jun-02	631		20.4		42.8	J
D10	001AOC1SS011	20-Jun-02	131	J	3.1		12.6	J
D11	001AOC1SS026	9-Dec-02	197		5.1		21.9	
E8	001AOC1SS014	20-Jun-02	33.4	J	0.28		3.8	J
E9	001AOC1SS013	20-Jun-02	78.1	J	0.79		12.1	J
E10*	001AOC1SS012	20-Jun-02	305	J	0.22		31	J
E11	001AOC1SS027	9-Dec-02	62.9		1.6		5.6	
F9	001AOC1SS023	9-Dec-02	12.0		0.063	J	1.1	
F10	001AOC1SS024	9-Dec-02	12.9		0.14	UJ	1.4	
F11	001AOC1SS025	9-Dec-02	19.4		0.11	J	2.4	
I11	001AOC1SS015	5-Jun-02	26.9		0.078	J	2.8	UJ
I12	001AOC1SS016	5-Jun-02	31.8		0.079		2.2	UJ
I13	001AOC1SS017	5-Jun-02	31.8		0.079	J	2.1	UJ
J11	001AOC1SS022	5-Jun-02	27.0		0.026	J	2.6	UJ
J13	001AOC1SS018	5-Jun-02	26.9		0.050	J	2.2	UJ
K11	001AOC1SS021	5-Jun-02	19.4		0.071	J	3.0	UJ
K12	001AOC1SS020	5-Jun-02	41.6		0.093	J	3.3	UJ
K13	001AOC1SS019	5-Jun-02	27.5		0.084	J	2.8	UJ

Notes:

Each sample is a composite from four locations within a single 25- by 25-foot grid cell.
Grid cell locations are shown on Figure 4.

* Shaded rows represent grid cells that were excavated and removed during TCRA.

J Estimated

U Not detected

UJ Not detected, estimated

UCL_{95} concentrations derived in this manner are presented in Table 3. Both pre-removal UCL_{95} concentrations cited in the addendum to the PA (Tetra Tech 2001) and pre-removal UCL_{95} concentrations derived including the additional delineation sample results are presented. Data that was removed from the data set to calculate the post-removal UCL_{95} are flagged in Appendix E.

TABLE 3: PRE- AND POST-REMOVAL UCL_{95} SOIL CONCENTRATIONS
Final Time-Critical Removal Action Summary Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

	UCL_{95} Soil Concentration (mg/kg)		
	Lead	**Mercury**	**Selenium**
Pre-removal (Tetra Tech 2001)	186.6	6.8	16.7
Pre-removal (w/additional delineation)	173.0	2.3	15.4
Post-removal	43.3	0.32	4.2

Notes:
Post-removal concentrations assume that soils from locations SB01, SB02, SB03, SB08, GB27, C9, D8, D9, and E 10 are removed.
Pre-removal soil concentrations do not match those presented in the Addendum to PA (Tetra Tech 2001) because additional data from hot spot delineation samples were used to calculate UCL_{95} shown above.

Ecological risk calculations using the focused food chain model presented in the Addendum to the PA (Tetra Tech 2001) as described in the action memorandum (NAVFAC 2002) are summarized in Table 4. Ecological risk assessment calculations are presented in Appendix F. Only risks to the Western Meadowlark are presented because the more focused ecological risk assessment presented in the addendum to the PA did not show unacceptable risk to the other ecological receptors modeled. Both pre-removal HQs cited in the addendum to the PA (Tetra Tech 2001) and pre-removal HQs derived including the additional delineation sample results are presented. The additional hot spot delineation samples that were added to the data set reduced the UCL_{95} for mercury from 6.8 to 2.3 mg/kg. As a result, the revised pre-removal HQ for mercury changed from 1.85 to 0.63.

TABLE 4: PRE- AND POST-REMOVAL ECOLOGICAL RISK HAZARD QUOTIENTS

Final Time-Critical Removal Action Summary Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

	Hazard Quotient for Western Meadowlark		
	Lead	**Mercury**	**Selenium**
Pre-removal (Tetra Tech 2001)	0.09	1.85	3.71
Pre-removal (w/additional delineation)	0.08	0.63	3.49
Post-removal	0.02	0.09	0.71

Notes:
Post-removal hazard quotients assume that soils from locations SB01, SB02, SB03, SB08, GB27, C9, D8, D9, and E 10 are removed.
Hazard quotients presented in Table 4 are based on the high toxicity reference value.

The hazard quotients presented in Table 4 demonstrate that the removal action was successful in addressing ecological risk using the assumptions of the focused food chain models presented in the Addendum to the PA (Tetra Tech 2001).

2.3 EXCAVATION AND REMOVAL OF WASTES

Mendelian Construction, Inc. (Mendelian), of San Francisco, California excavated and removed the wastes and soils from the site. Mendelian's report that describes construction details of the TCRA is included as Appendix I. Excavation of the cinder area and hot spots took place from June to September 2002, with minor follow-up excavation in March 2003. The cinders were present in a 0.5- to 1 foot-thick layer, which formed a continuous body that extended throughout the excavation area illustrated on Figure 5. Excavation of the area south of the pump station was constrained by the presence of the operating CCWD pump station, the southern fenceline of the property, and the subsurface water pipelines that lead from Port Chicago Highway to the southwest and southeast corners of the pump station. The excavation was advanced as close to these features as possible without causing structural damage, but some cinder material extends beyond the boundary of the excavations and was not removed. Areas where cinders were present in the sidewalls of the excavations are shown on Figure 5. The northern edge of this excavation area terminates approximately 10 feet south of the pump station fenceline (Mendelian No Date).

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 5 lateral feet of soil were excavated. Because the cinders have a distinctive reddish-purple or very dark gray gravelly appearance that is easily distinguished from site soils, the limit of the cinder deposits was visually determined in the field. A photograph showing the layer of cinder material in place is included as Figure 6.

The excavations were advanced vertically to the deeper of (1) 6 inches below the bottom of the waste or (2) 2 feet bgs. As a result, the excavation was at least 2 feet deep in all places, but the excavation is as much as 5.5 feet below the surface of the mound of earth surrounding the pump station. The cinders form a thin, more-or-less horizontal layer throughout the excavation area at a depth of approximately 6 inches bgs, and both the cinders and soil immediately underlying the cinders was excavated and removed from the site. In total, approximately 2,000 cubic yards (cy) of material were excavated from cinder area (Mendelian No Date). Groundwater did not accumulate in the excavation; therefore, no groundwater samples were collected from the excavation.

While excavating the area surrounding the pump station, two circular, vertical concrete pipes with diameters of 24 to 36 inches were discovered in the approximate center of the northern excavation area. Land surveyors established the coordinates of the pipes. Locations and coordinates of the two pipes are shown on Figure 5. The original use of these pipes is unknown. The area surrounding the pipes was excavated and removed; the concrete pipes were left in place. Photographs of the concrete pipes are included as Figure 7.

Contaminated ash-like material was excavated from the two hot spot areas in September 2002. The lateral limits of the excavations were defined by the hot spot delineation sampling described in Section 2.2. The delineation sampling showed that four grid cells from the northernmost hot spot and 1 grid cell from the southernmost hot spot required excavation and removal to address ecological risk. The hot spot excavation areas are illustrated in Figure 8. Soils in the hot spot areas were excavated to a depth of 2 feet bgs. In total, approximately 192 cy of material was removed from the hot spot areas.

The soil removal contractor inadvertently made two errors while conducting the soil removal. First, a small area east of the cinder excavation was mistakenly excavated, removed, and backfilled; this area is shown on Figure 5. The reason that this area was excavated is unclear, but appears to have been a field error. Second, the removal contractor did not completely excavate two grid squares in the hot spot area that were associated with ecological risk and were slated to be removed; Grid squares C9 and E10 were only partially excavated in September 2002. The remaining portions of these grid squares were excavated on March 4 and 5, 2003. The more recent excavation will be backfilled with clean fill soils from the same source used to backfill the rest of the excavations and revegetated with native grasses as discussed below in Section 2.5. Mendelian will document this additional removal, backfill, and revegetation in a revised close-out report, which will be included as an Appendix to the final version of this summary report prepared by the Navy.

Soils from the cinder excavation and from both hot spot excavations to be disposed of were segregated into piles of approximately 250 to 300 cy and a composite sample was collected from each pile to characterize the soil pile for disposal. Based on the analytical results, the soils were classified as Class 2 non-hazardous waste, Class 1 non-Resource Conservation and Recovery Act (RCRA) hazardous waste, or Class 1 RCRA hazardous waste. Soils classified as Class 2 nonhazardous waste was disposed of at the Altamont Landfill in Livermore, California. Soils classified as Class 1RCRA or non-RCRA hazardous waste were disposed of at the Kettleman Hills facility in Kettleman City, California. Analytical results reported by the laboratory and waste

manifests documenting proper disposal of the wastes are included in the project close-out report prepared by Mendelian (Mendelian No Date).

2.4 CONFIRMATION SAMPLING

To verify that the removal action adequately addressed the contaminated soils, the Navy collected confirmation samples from the base and sidewalls of the excavations, as described in Section 2.1.1.2 of the SAP (Tetra Tech 2002). Confirmation sample locations are shown on Figures 5 and 8. Chain-of-custody forms and analytical results provided by the laboratory for the cinder excavation and the hot spot excavations samples are included as Appendices F and G, respectively.

The sidewall samples were collected at an approximate frequency of one sample per 100 linear feet of excavation sidewall. To bias the samples toward higher contaminant concentrations, the samples were collected from lithologic intervals that contained waste or exhibited visual evidence of contamination. For example, if cinders or ash-like material were visible in the excavation sidewall, a discrete sample of the waste was collected, rather than the soil above or below the waste.

Samples were also collected from the base of the excavations at an approximate frequency of 1 sample per 1,500 square feet of excavation, as described in the SAP (Tetra Tech 2002). Because the wastes were excavated and removed, wastes were not present at the bottom of the excavations and the samples were collected either from discolored areas, if present, or randomly to achieve an approximately even distribution of confirmation samples. Because the hot spot excavations covered a smaller area than the cinder excavation, the density of confirmation samples in this area was higher: eight sidewall samples for 300 linear feet of sidewall, and three base samples from approximately 3,100 square of excavation area.

Table 5 presents confirmation sampling results for the cinder excavation. Analytical results for the confirmation samples for lead, selenium, and mercury are shown on Figures 9, 10, and 11. Samples from the base of the cinder excavation (samples CEB01 through CEB14) demonstrate that the removal reduced concentrations of lead selenium, and mercury by 2 to 3 orders of magnitude. The confirmation sample results also show that metals concentrations on the bottom of the excavation are below the preliminary remediation goals (PRG) for lead in industrial soils (EPA 2003a), except at location CEB09. No samples from the base of the cinder excavation exceeded the industrial PRG for mercury and compounds of 310 mg/kg (EPA 2003b) or the industrial PRG for selenium of 5,100 mg/kg (EPA 2003b). The excavation bottom has been backfilled with at least 2 feet of clean fill material.

TABLE 5: CONFIRMATION SAMPLE RESULTS FOR CINDER EXCAVATION

Final Time-Critical Removal Action Summary Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

Location	Sample Number	Sample Date	Lead (mg/kg)		Mercury (mg/kg)		Selenium (mg/kg)	
Industrial PRG			**750**		**310**		**5,100**	
Confirmation samples from cinder excavation base:								
CEB01	001CEB01	30-Jul-02	10	J	0.057		4	
CEB02	001CEB02	30-Jul-02	7.4	J	0.048	J	2	UJ
CEB03	001CEB03	30-Jul-02	22	J	0.076		4.2	
CEB04	001CEB04	30-Jul-02	10.4	J	0.029	J	2.2	
CEB05	001CEB05	30-Jul-02	9.5	J	0.09		6.5	
CEB06	001CEB06	30-Jul-02	26.4	J	0.22		5.3	
CEB07	001CEB07	30-Jul-02	11.9	J	0.13		2.1	UJ
CEB08	001AOC1SB056	11-Sep-02	14.6		0.54		1.8	J
CEB09	001AOC1SB057	11-Sep-02	1,040		21.5		78.4	J
CEB10	001AOC1SB058	11-Sep-02	459		12.6		37.3	J
CEB11	001AOC1SB059	11-Sep-02	7.3		0.07		1.5	J
CEB12	001AOC1SB060	11-Sep-02	13.6		0.19		2.5	J
CEB13	001AOC1SB061	11-Sep-02	13.7		0.32		3.1	J
CEB14	001AOC1SB062	11-Sep-02	6.8		0.025		2.7	J
Confirmation samples from cinder excavation perimeter:								
CEP01[a]	001CEP01	30-Jul-02	82,500	J	4,740		6,140	
CEP02[a]	001CEP02	30-Jul-02	58,900	J	1,600		5,540	
CEP03[a]	001CEP03	30-Jul-02	106,000	J	2,580		8,540	
CEP04[a]	001CEP04	30-Jul-02	96,500	J	2,670		7,540	
CEP05[b]	001CEP05	30-Jul-02	78,900	J	1,600		6,660	
CEP06[a]	001CEP06	30-Jul-02	94,600	J	3,140		6,370	
CEP07[b]	001CEP07	30-Jul-02	30,300	J	1,560		2,420	
CEP08	001CEP08	30-Jul-02	3,340	J	92.9		220	
CEP09	001CEP09	30-Jul-02	2,660	J	50.5		145	
CEP10	001AOC1SB079	9-Sep-02	330		9		43	J
CEP11	001AOC1SB080	11-Sep-02	180		0.54		4.6	J
CEP12	001AOC1SB066	11-Sep-02	169		1.8		19.9	J
CEP13	001AOC1SB067	11-Sep-02	448		7.1		40.9	J
CEP14	001AOC1SB068	11-Sep-02	245		3.4		32.3	J
CEP15	001AOC1SB069	11-Sep-02	971		14		103	J

Notes:

Shaded rows represent areas where discrete cinder layer was visible in excavation sidewall. Sample locations are shown on Figure 5.

a Physical obstructions or property boundary prevents further excavation in these areas.

b Samples were collected inadvertently; area was subsequently excavated and removed during TCRA.

J Estimated

PRG Preliminary remedial goal (EPA 2003a, 2003b)

U Not detected

UJ Not detected, estimated

Confirmation sampling results from the perimeter of the excavation show that the cinders that remain in place are contaminated with high concentrations of lead, selenium, and mercury. Samples CEP01 through CEP04 and CEP06 are from areas where the cinders extend beneath structures and pipelines, or beyond the Navy's property boundary; additional excavation to address cinders that remain in these areas is not feasible. Samples CEP08 and CEP09 are from areas where the subsurface pipeline or property boundary prevent further excavation. Samples CEP05 and CEP07 were inadvertently collected from areas that were later excavated; the results for these samples are reported in Table 5 for completeness only and do not represent contaminated materials that were left in place. Samples from areas where cinders or physical obstructions that prevent further excavation are not present (CEP 10 through CEP15) contained lead and selenium concentrations that are much lower than PRGs for industrial soils, except for location CEP15, where the lead concentration (971 mg/kg) exceeded the PRG for industrial soils (750 mg/kg) (EPA 2003a).

Table 6 presents confirmation sampling results for the two hot spots north of the pump station. Figures 12, 13, and 14 present analytical results for lead, selenium, and mercury in the delineation samples and the confirmation samples from the hot spot excavations. No physical obstructions or property boundaries were present that limited the extent of the hot spot excavations. Results presented in Table 6 and Figures 12, 13, and 14 show that the TCRA successfully removed the most contaminated waste materials from these two locations. Soils at the base and perimeter of the hot spot excavations did not exceed industrial PRGs for lead, selenium, or mercury, except at locations HSNP2 and HSNP4, where the wastes in the perimeter of the excavation exceeded the industrial PRG for lead of 750 mg/kg (EPA 2003a).

2.5 SITE RESTORATION

Clean fill was imported to AOC 1 from a location in Contra Costa County that was not impacted by industrial activities. The fill material was tested for a full suite of analytes (metals, volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls, and chlorinated herbicides). Contaminant concentrations in the fill material are low; analytical results for the imported fill material as reported in the project close-out report (Mendelian No Date) are included as Figure 15. Trace concentrations of polycyclic aromatic hydrocarbons (PAH) and pesticides were detected in one of the fill samples, and metals were detected in both samples. Concentrations of most metals, including lead, selenium, and mercury, did not exceed background concentrations for the NWSSBD Concord Inland Area (Tetra Tech 1997).

The excavations were backfilled with clean fill, which was emplaced in the excavations in 8-inch lifts and compacted to 90 percent of maximum dry density. The final backfilled excavation surface was regraded to match the pre-excavation surface and planted with native grass seed and coyote bush. The grasses and coyote bush were watered periodically until established.

TABLE 6: CONFIRMATION SAMPLE RESULTS FOR HOT SPOT EXCAVATIONS

Final Time-Critical Removal Action Summary Report, Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

Location	Sample Number	Sample Date	Lead (mg/kg)		Mercury (mg/kg)		Selenium (mg/kg)	
Industrial PRG			**750**		**310**		**3,500**	
Confirmation samples from base of northern hot spot excavation:								
HSNB1	001AOC1SB029	27-Sep-02	507	J	7.8		46.2	J
HSNB2	001AOC1SB030	27-Sep-02	282	J	6.1		18.6	J
HSNB3	001AOC1SB040	27-Sep-02	41.6	J	0.4		5.9	J
Confirmation samples from perimeter of northern hot spot excavation:								
HSNP1	001AOC1SB031	27-Sep-02	198	J	28.2		16.9	J
HSNP2	001AOC1SB032	27-Sep-02	1,970	J	21.6		185	J
HSNP3	001AOC1SB033	27-Sep-02	78	J	1.2		6.2	J
HSNP4	001AOC1SB034	27-Sep-02	852	J	7.2		55.4	J
HSNP5	001AOC1SB035	27-Sep-02	81.4	J	1.2		6.3	J
HSNP6	001AOC1SB036	27-Sep-02	22.8	J	0.18		2.2	J
HSNP7	001AOC1SB037	27-Sep-02	29.1	J	0.22		2.1	J
HSNP8	001AOC1SB038	27-Sep-02	18.9	J	0.4		2.6	J
Confirmation samples from base of southern hot spot excavation:								
HSSB1	001AOC1SB039	23-Sep-02	19.6		0.053	UJ	2	
Confirmation samples from perimeter of southern hot spot excavation:								
HSSP1	001AOC1SB041	23-Sep-02	6.8		0.057	UJ	1.6	
HSSP2	001AOC1SB042	23-Sep-02	22.2		0.059		2.5	
HSSP3	001AOC1SB043	23-Sep-02	9.4		0.05	UJ	1.5	
HSSP4	001AOC1SB044	23-Sep-02	8.6		0.054	UJ	1.8	

Notes:

Sample locations are shown on Figure 8.

J	Estimated
mg/kg	Milligrams per kilogram
PRG	Preliminary remedial goal (US EPA 2003a, b)
U	Not detected
UJ	Not detected, estimated

3.0 PUBLIC INFORMATION AND COMMUNITY RELATIONS

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) specify that the lead agency must meet two public notice requirements for TCRAs (Title 40 *Code of Federal Regulations* 300.415[n]). First, a notice of availability must be published in a major local newspaper. Second, a 30-day public comment period must be provided, and a written response to comments must be prepared.

The Navy is the lead agency for the environmental work at AOC 1. The Navy made documents pertinent to the TCRA available to the public at the information repository at the Contra Costa Public Library, and published a notice of the availability of these documents in the Sunday, March 10, 2002 issue of the Contra Costa Times. A copy of the public notice is included as Figure 16. In addition, on March 6, 2002, the Navy mailed approximately 650 fact sheets describing the planned removal action and the proposed plan to accomplish the TCRA to members of the public and the Concord Restoration Advisory Board (RAB). The fact sheet is included as Figure 17.

The Navy received three sets of public comments on the fact sheet and public notice, and prepared a written response to these comments. The response to public comments was sent to each of the commenters and to the NWSSBD Concord RAB on August 28, 2002. The written response to these public comments is included as Appendix J.

The Navy also conducted a RAB presentation on May 6, 2002, to explain the reasons for conducting the soil removal, to discuss the details of the proposed TCRA, and to listen to and address any community concerns regarding the proposed action.

The Navy has met all statutory requirements public notice for removals by publishing a public notice of the TCRA in the Contra Costa Times, mailing 650 fact sheets to members of the public and the Concord RAB, and preparing a written response to public comments.

4.0 SUMMARY

The Navy conducted a TCRA at AOC 1 from June to September 2002 to address ecological risk associated with metals in waste cinders and ash-like material at AOC 1. Approximately 2000 cubic yards of cinders, ash-like material, and soils were excavated and removed. Approximately 70 additional cubic yards of contaminated soils that were inadvertently left in place during the first phase of excavation were removed on March 4 and 5, 2003. Soils classified as Class 2 nonhazardous waste (915 tons) were disposed of at the Altamont Landfill in Livermore, California. Soils classified as Class 1 RCRA or non-RCRA hazardous waste (3,065 tons) were disposed of at the Kettleman Hills facility in Kettleman City, California. Manifests documenting proper disposal of these soils are included in removal contractor's close-out report (Mendelian No Date). Following excavation and removal of contaminated soils and wastes, the excavations were backfilled with clean fill, regraded to match the pre-excavation surface, and planted with native grasses and coyote bush.

Ecological risks associated with soils that remain on-site were evaluated using the same assumptions used in the focused ecological risk assessment presented in the PA addendum (Tetra Tech 2001). The evaluation shows that TCRA successfully addressed risks to ecological receptors.

The Navy has met all NCP public notice requirements for removal actions by publishing a public notice in the Contra Costa Times and by responding to public comments in writing. The Navy also distributed a fact sheet describing the TCRA to the public and the Concord RAB, and conducted a RAB presentation to explain the purpose of the TCRA and plans for implementing the removal.

In summary, the Navy successfully completed a TCRA to address ecological risks associated with waste materials present near the surface at AOC 1. The Navy plans to conduct a remedial investigation at AOC 1 to provide a more comprehensive evaluation of remaining ecological risks at AOC 1. The Remedial Investigation is in the scoping phase, and is scheduled to begin during Fall 2003.

5.0 REFERENCES

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

Naval Facilities Engineering Command [NAVFAC], Engineering Field Activity West (EFA WEST). 1998. "Development of Toxicity Reference Values for Conducting Ecological Risk Assessments at Naval Facilities in California, Interim Final Technical Memorandum." EFA WEST, Naval Facilities Engineering Command, U.S. Department of the Navy. San Bruno, California. September.

NAVFAC, Western Division. 2002. "Final Action Memorandum for Area of Concern 1, Naval Weapons Station Seal Beach Detachment Concord, Concord, California." DS.0144.17543. May 28.

Tetra Tech EM Inc (Tetra Tech). 1997. "Draft Final Remedial Investigation Report Inland Area Sites 13, 17, 22, 24A, WPNSUPPFAC Detachment Concord." October.

Tetra Tech. 1999. "Area of Concern 1, Pump Station Area, Preliminary Assessment Report, Naval Weapons Station Seal Beach Detachment Concord, Concord, California." May 20.

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

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."

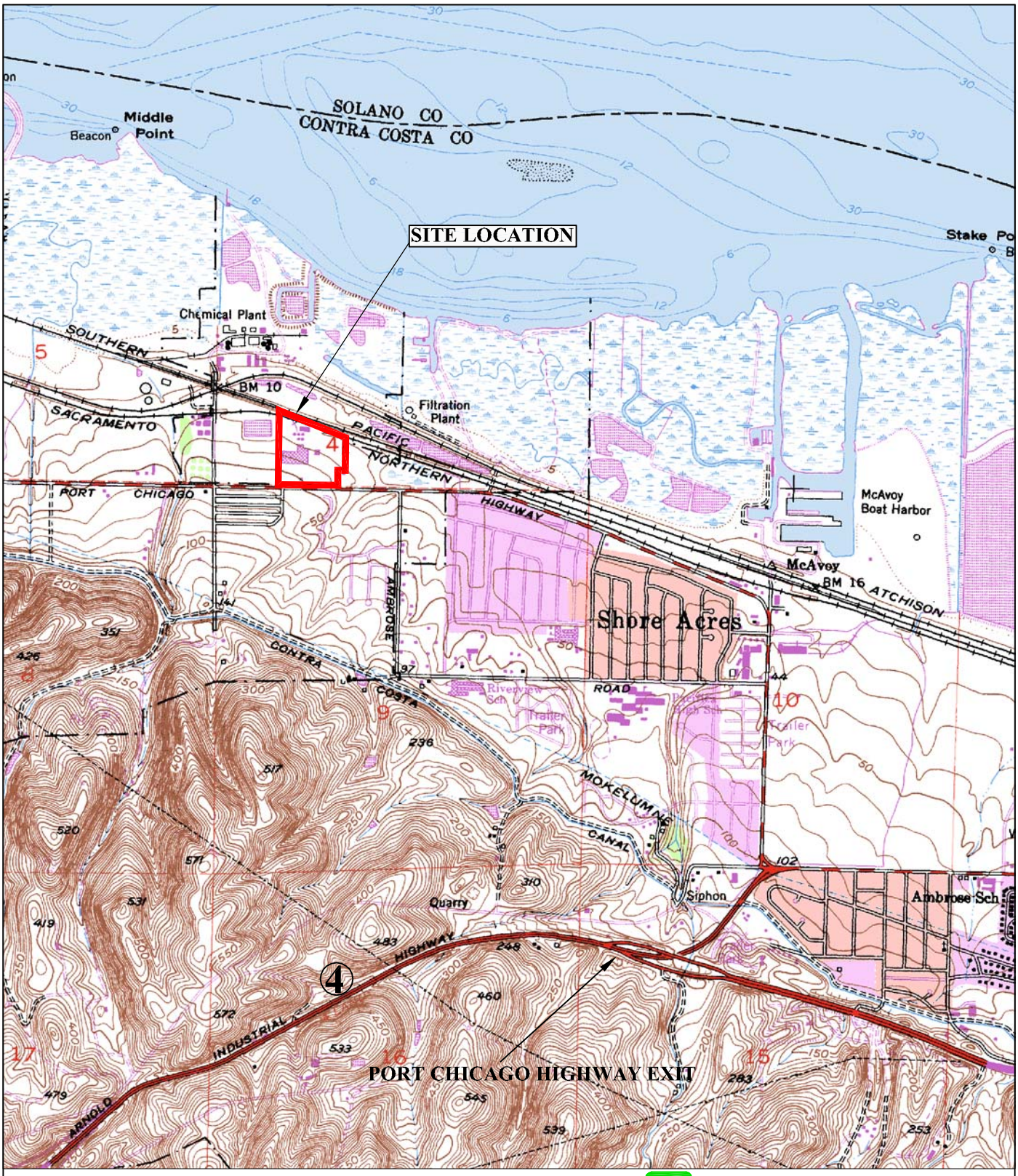
U.S. Environmental Protection Agency (EPA). 2003a. "Region 9 Preliminary Remediation Goals." Accessed on January 27. On-Line Address: http://www.epa.gov/region9/waste/sfund/prg/index.html

EPA. 2003b. "Notice: Slight Revision to the PRG 2002 Table." February 10.

United States Geological Survey. 1997. "Radioactive Elements in Coal and Fly Ash: Abundance, Forms, and Environmental Significance." Fact Sheet FS-163-97. On-Line Address: http://greenwood.cr.usgs.gov/energy/factshts/163-97/FS-163-97.html

U.S. Nuclear Regulatory Commission. 2003. "Fact Sheet on Biological Effects of Radiation." On-Line Address: http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/bio-effects-radiation.html

FIGURES



Tetra Tech EM Inc.

0 1000 2000

SCALE IN FEET

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 1
AREA OF CONCERN 1
SITE LOCATION MAP

SOURCE: MODIFIED FROM USGS, HONKER BAY, CALIFORNIA, QUADRANGLE 1953, PHOTOREVISED 1980.

LEGEND:

- SAMPLE LOCATION (JULY 2000)
- SAMPLE LOCATION (FEBRUARY 1999)
- SAMPLE LOCATION WHERE NO WASTE WAS ENCOUNTERED
- REFUSAL OF GEOPROBE BORING
- FORMER BUILDINGS SHOWN ON 1974 AERIAL PHOTOGRAPH
- EXCAVATIONS
- TELEPHONE POLES

N

125 0 125 Feet

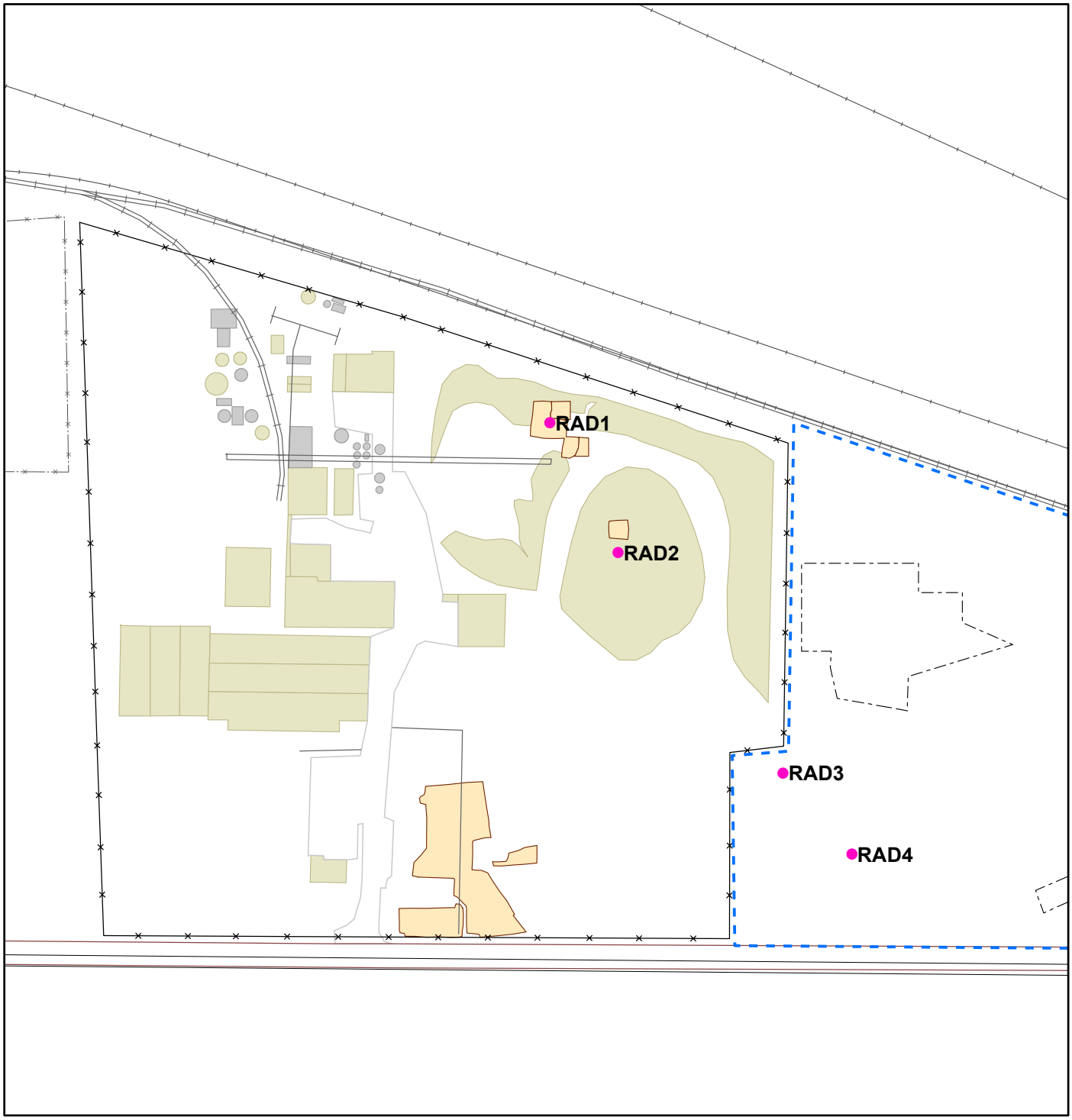
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 2

AREA OF CONCERN 1 (AOC1)
SITE FEATURES MAP

03-05-2003 v:\concord\projects\aecru\aoc1\aoc1_map.apr TtEMI-SF aleksandr.zhuk



LEGEND:

- RADIOLOGICAL SURVEY LOCATION
- EXCAVATION
- AOC1 FENCE LINE

N

0 100 200 300 400
Feet

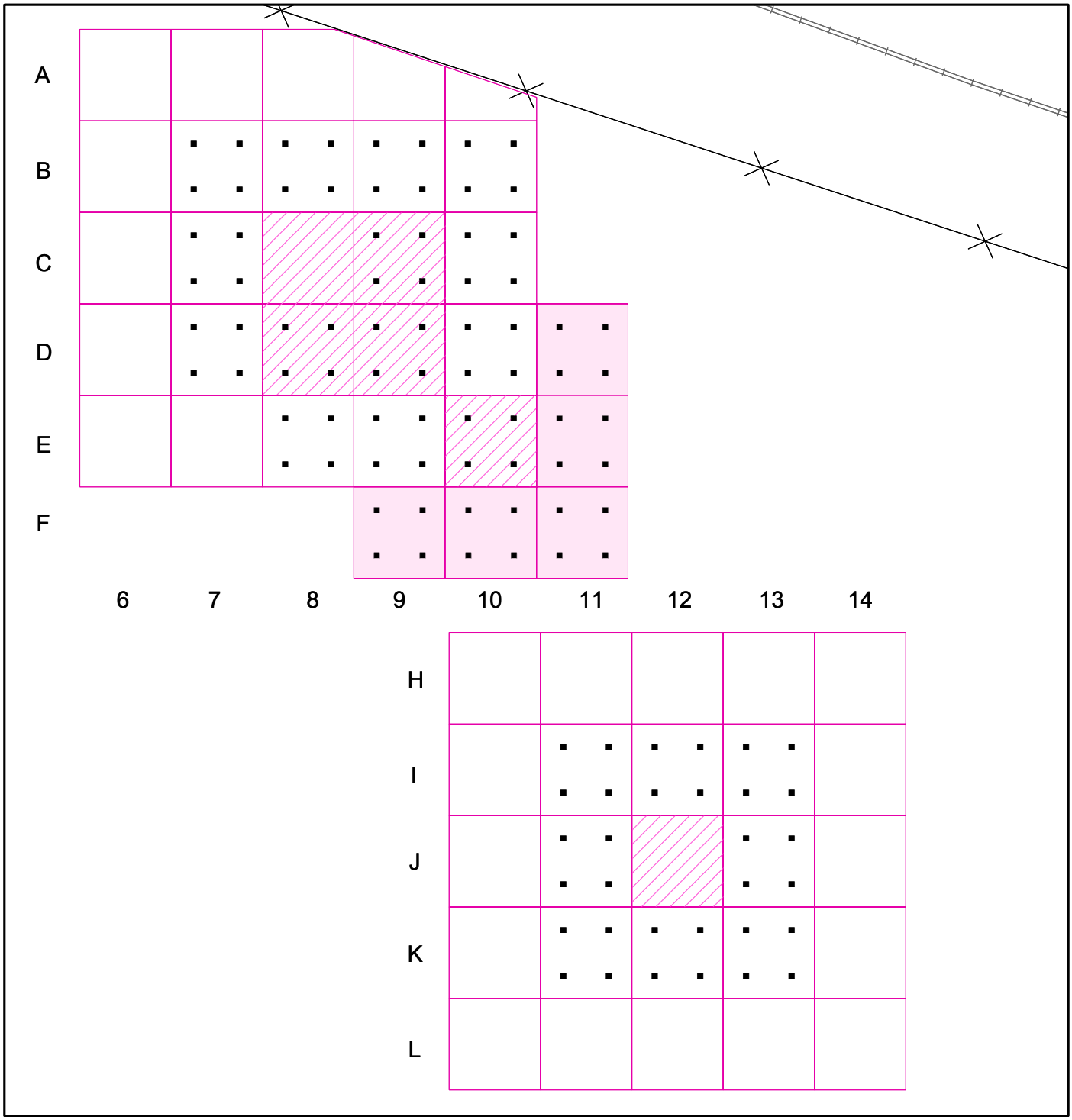
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 3

RADIOLOGICAL SURVEY LOCATIONS, MAY 30, 2002

2003-02-25 V:\Concord\Projects\AECRU\AOC1\FIGURE_2.mxd TtEMI-SF Aleksandr Zhuk



LEGEND:

- HOT SPOT DELINEATION SOIL SAMPLING LOCATION
- 25'x25' GRID CELLS CENTERED AROUND SAMPLING LOCATIONS GB27 AND SB08
- GRID CELL FOR ADDITIONAL HOT SPOT DELINEATION
- AREA EXCAVATED DURING TCRA
- FENCE LINE
- RAILROAD TRACK

N

0 20 40 60 80

Feet

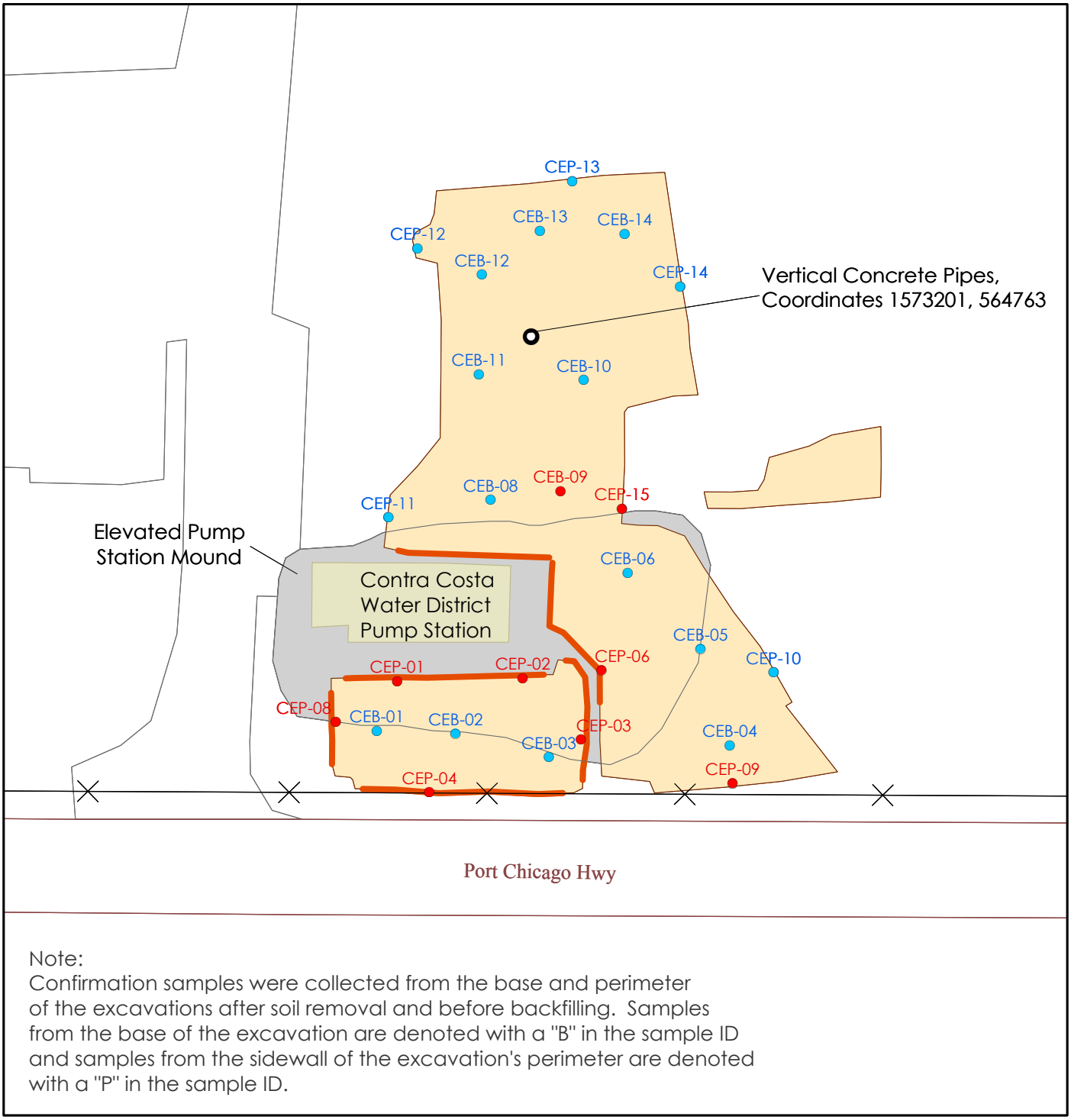
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 4

HOT SPOT DELINEATION SAMPLE LOCATIONS

2003-02-25 V:\Concord\Projects\AECRU\AOC1\FIGURE_3.mxd TtEMI-SF Aleksandr Zhuk



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.

LEGEND:

- SAMPLING LOCATION
- CONFIRMATION SAMPLE RESULTS EXCEEDED EPA REGION 9 PRG FOR INDUSTRIAL SOILS
- EXCAVATION
- FENCE LINE
- CINDER VISIBLE IN EXCAVATION SIDEWALL

N

0 25 50 75 100
Feet

Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 5

LATERAL LIMITS OF CINDER EXCAVATION

2003-07-09 V:\Concord\Projects\AECRU\AOC1\FIGURE_5.mxd TtEMI-SF kevin.ernst

DS.A001.10506

FIGURE 6. PHOTOGRAPH OF CINDER EXCAVATION SIDEWALL

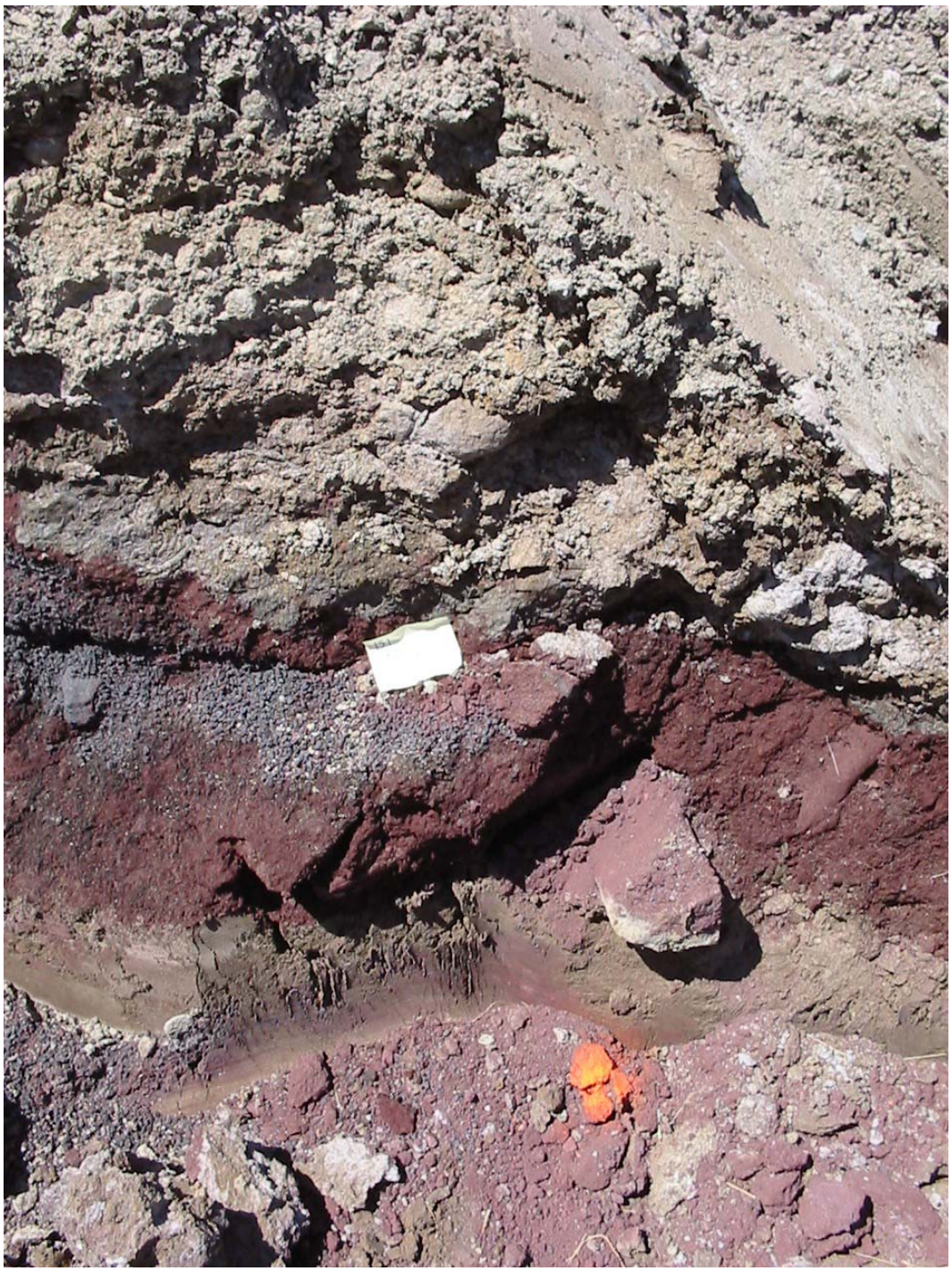
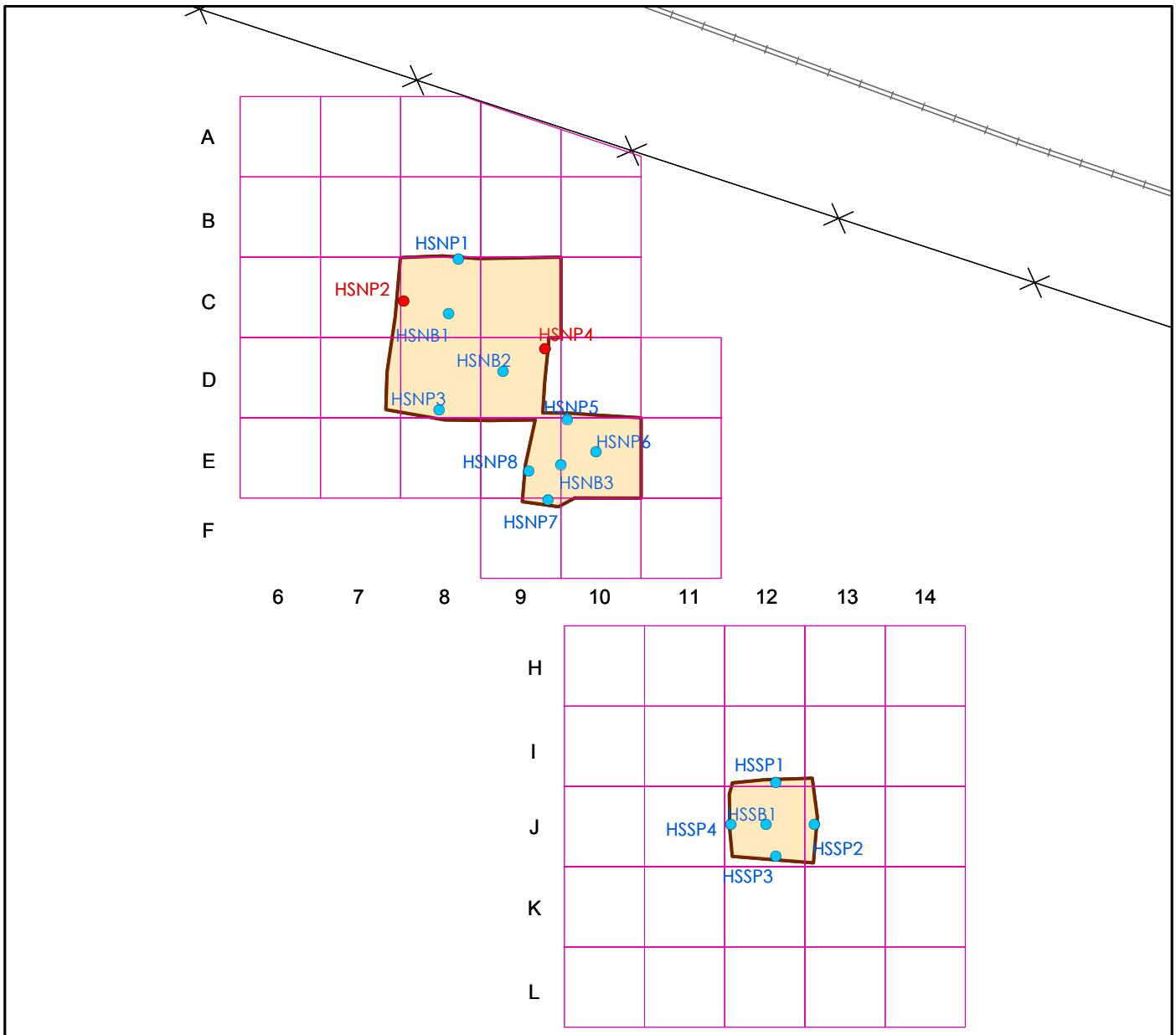


FIGURE 7. PHOTOGRAPHS OF CONCRETE PIPES DISCOVERED IN CINDER EXCAVATION

View facing north.

View facing northeast.



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

LEGEND:

- SAMPLING LOCATION
- CONFIRMATION SAMPLE RESULTS EXCEEDED EPA REGION 9 PRG FOR INDUSTRIAL SOILS
- EXCAVATION
- 25'x25' GRID CELLS CENTERED AROUND SAMPLING LOCATIONS AOC1GB27 AND AOC1SB08
- FENCE LINE
- RAILROAD TRACK

N

0 25 50 75 100
Feet

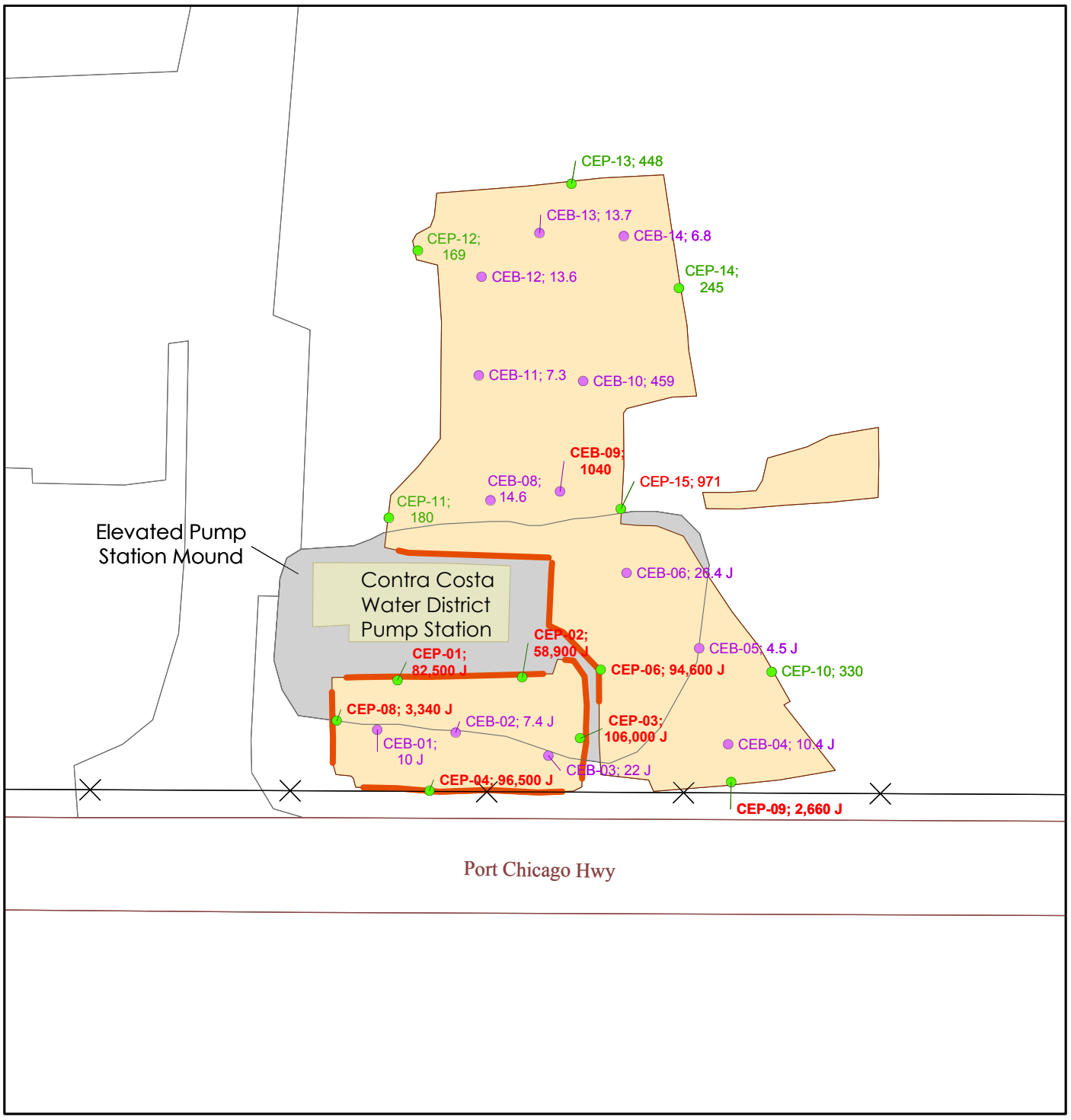
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 8

LATERAL LIMITS OF HOT SPOT EXCAVATIONS

2003-06-24 V:\Concord\Projects\AECRU\AOC1\FIGURE_8.mxd TtEMI-SF kevin.ernst



LEGEND:

CEB-06; 26.4 J SAMPLE ID AND LEAD CONCENTRATION (MG/KG)

CEP-09; 2,660 J RESULTS EXCEEDING USEPA REGION 9 PRG FOR INDUSTRIAL SOILS

EXCAVATION BASE SAMPLING LOCATION

EXCAVATION PERIMETER SAMPLING LOCATION

EXCAVATION

FENCE LINE

CINDER VISIBLE IN EXCAVATION SIDEWALL

N

0 25 50 75 100

Feet

Tetra Tech EM Inc.

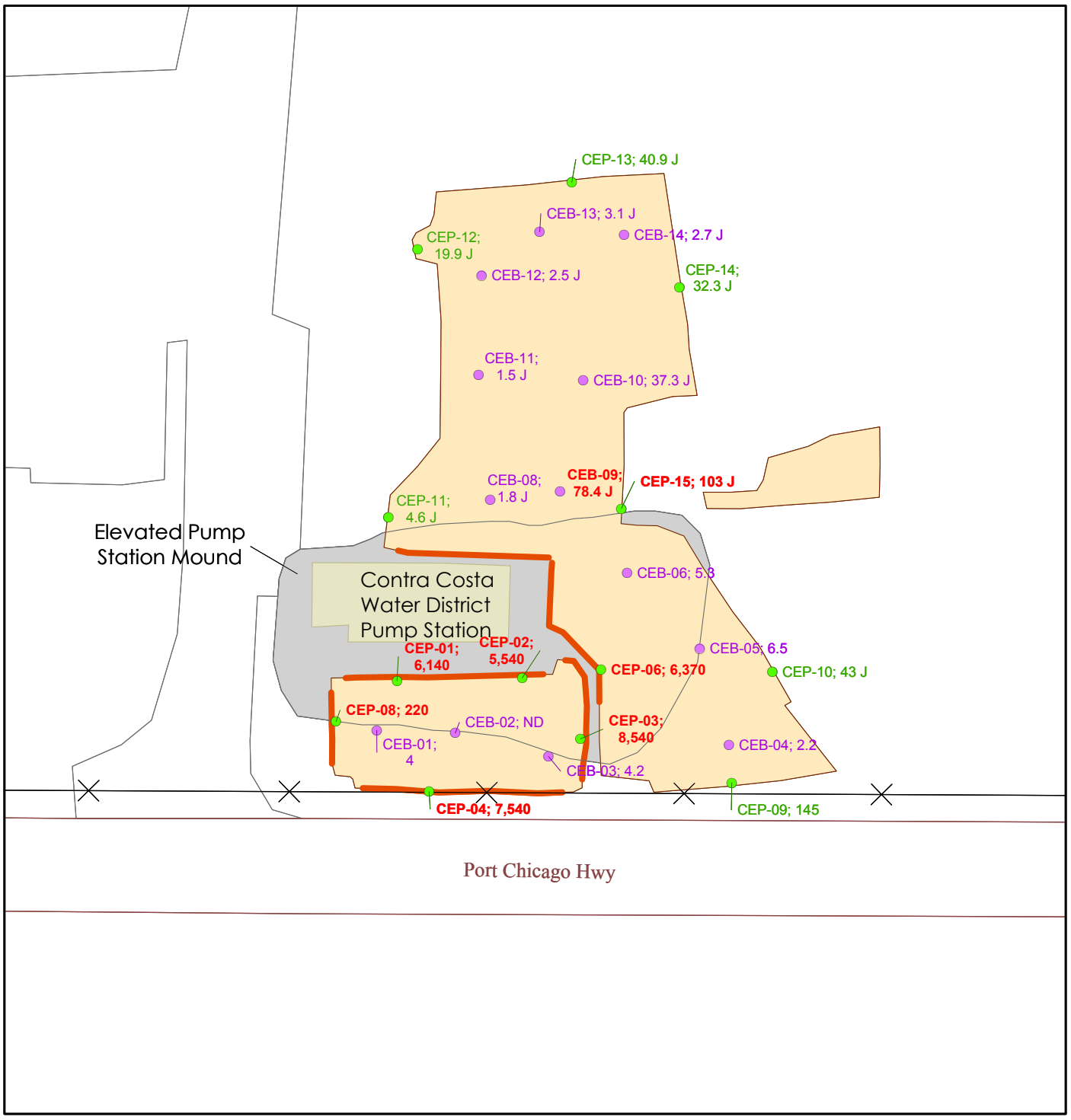
NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 9

LEAD CONCENTRATIONS IN CINDER EXCAVATION CONFIRMATION SAMPLES

DS.A001.10506

2003-07-09 V:\Concord\Projects\AECRUAOC1\metals_results_figs\Cinder_Exc_Lead.mxd TtEMI-SF kevin.ernst



LEGEND:

CEB-09; 78.4 J SAMPLE ID AND SELENIUM CONCENTRATION (MG/KG)

CEP-06; 6,370 RESULTS EXCEEDING USEPA REGION 9 PRG FOR INDUSTRIAL SOILS

EXCAVATION BASE SAMPLING LOCATION

EXCAVATION PERIMETER SAMPLING LOCATION

EXCAVATION

FENCE LINE

CINDER VISIBLE IN EXCAVATION SIDEWALL

N

0 25 50 75 100

Feet

Tetra Tech EM Inc.

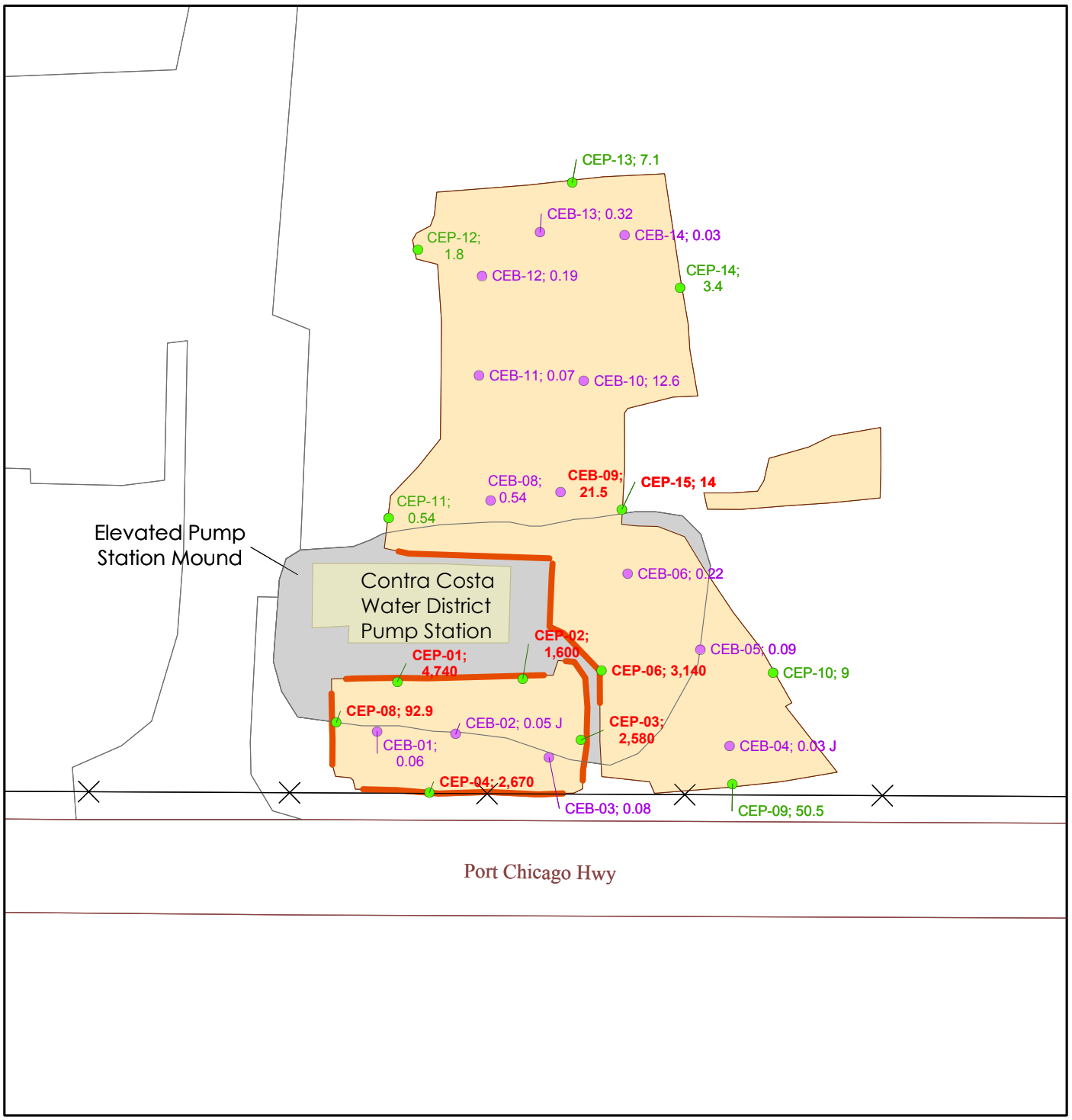
NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 10

SELENIUM CONCENTRATIONS IN CINDER EXCAVATION CONFIRMATION SAMPLES

2003-07-09 V:\Concord\Projects\AECRUAOC1\metals_results_figs\Cinder_Exc_Selenium.mxd TtEMI-SF kevin.ernst

DS.A001.10506



LEGEND:

CEP-15; 14	SAMPLE ID AND MERCURY CONCENTRATION (MG/KG)
CEP-06; 3,140	RESULTS EXCEEDING USEPA REGION 9 PRG FOR INDUSTRIAL SOILS
	EXCAVATION BASE SAMPLING LOCATION
	EXCAVATION PERIMETER SAMPLING LOCATION
	EXCAVATION
	FENCE LINE
	CINDER VISIBLE IN EXCAVATION SIDEWALL

N

0 25 50 75 100
Feet

Tetra Tech EM Inc.

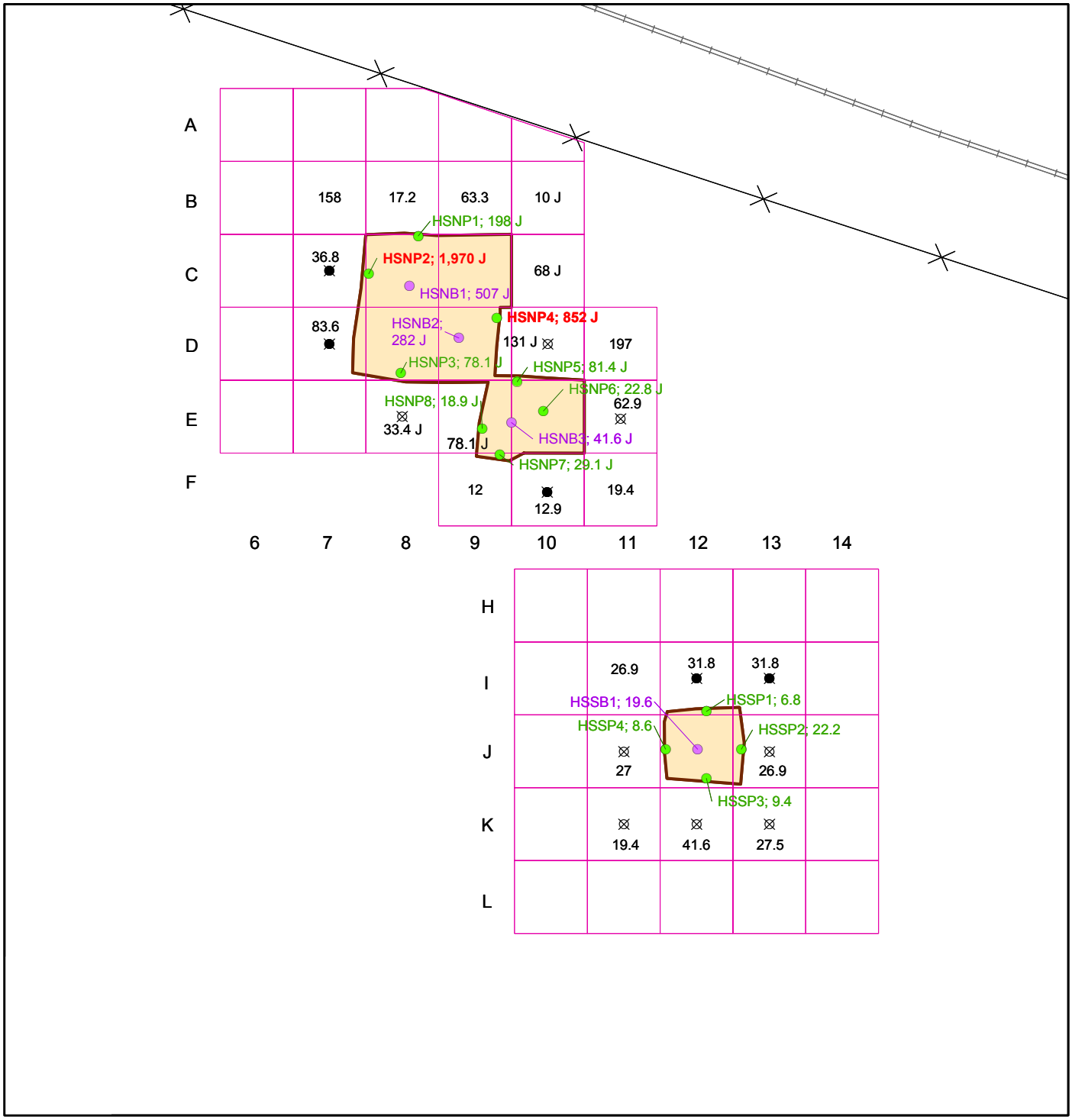
NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 11

MERCURY CONCENTRATIONS IN CINDER EXCAVATION CONFIRMATION SAMPLES

2003-07-09 V:\Concord\Projects\AECRUAOC1\metals_results_figs\Cinder_Exc_Mercury.mxd TtEMI-SF kevin.ernst

DS.A001.10506



LEGEND:

HSNB2; 282 J — SAMPLE ID AND LEAD CONCENTRATIONS (MG/KG)

HSNP4; 852 J — RESULTS EXCEEDING USEPA REGION 9 PRG FOR INDUSTRIAL SOILS

EXCAVATION BASE SAMPLING LOCATION

EXCAVATION PERIMETER SAMPLING LOCATION

GEOPROBE BORING REFUSAL (SOME BORINGS)

GEOPROBE BORING REFUSAL (ALL BORINGS)

EXCAVATION

25'x25' GRID CELLS CENTERED AROUND SAMPLING LOCATIONS AOC1GB27 AND AOC1SB08

FENCE LINE

RAILROAD TRACK

N

0 25 50 75 100

Feet

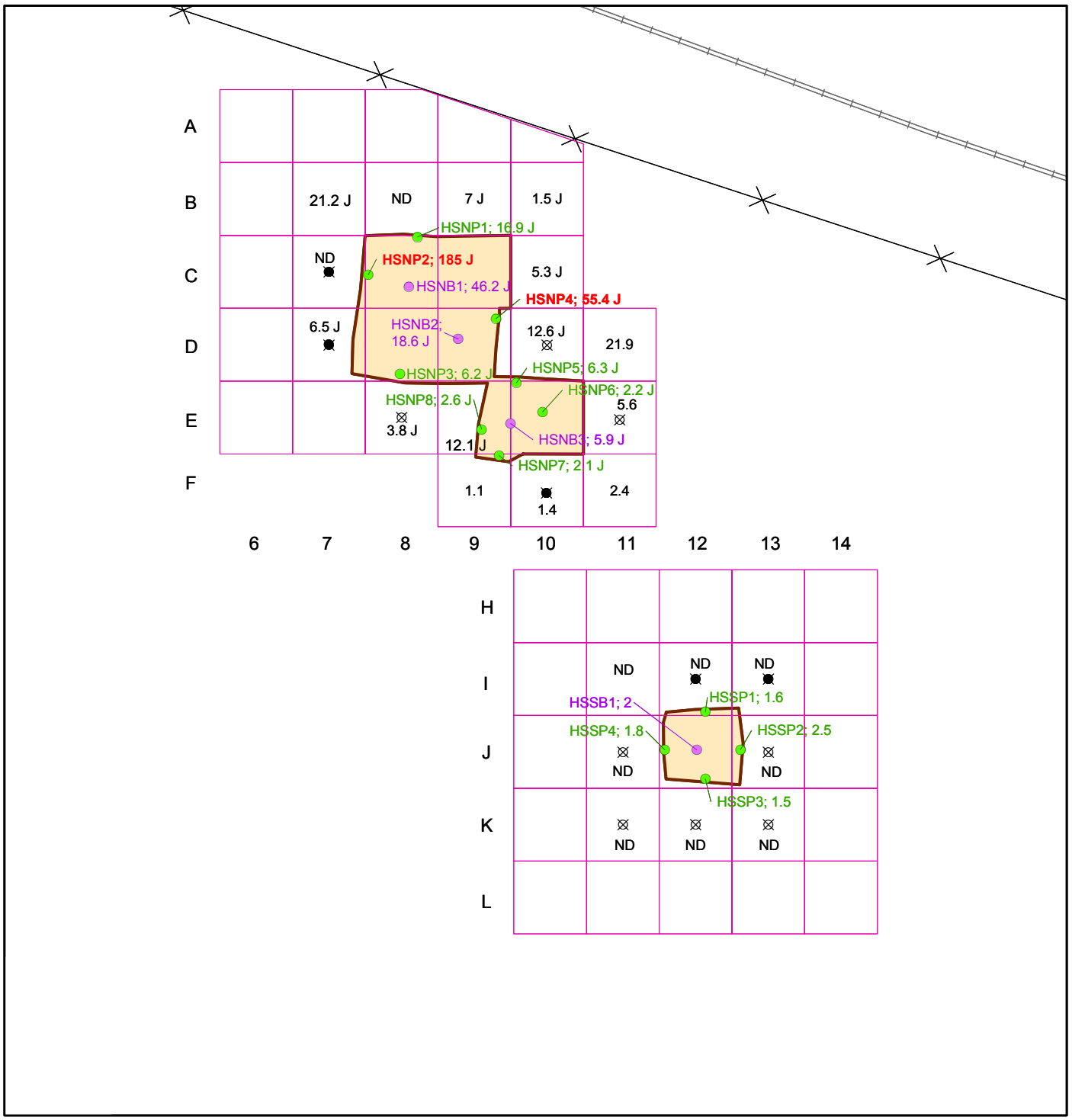
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 12

LEAD CONCENTRATIONS IN HOT SPOT AREA

2003-07-11 V:\Concord\Projects\AECRU\AOC1\metals_results_figs\Hotspots_Lead.mxd TtEMI-SF kevin.ernst



LEGEND:

HSNP1; 16.9 J	SAMPLE ID AND SELENIUM CONCENTRATIONS (MG/KG)
HSNP2; 185 J	RESULTS EXCEEDING USEPA REGION 9 PRG FOR INDUSTRIAL SOILS
	EXCAVATION BASE SAMPLING LOCATION
	EXCAVATION PERIMETER SAMPLING LOCATION
	GEOPROBE BORING REFUSAL (SOME BORINGS)
	GEOPROBE BORING REFUSAL (ALL BORINGS)
	EXCAVATION
	25'x25' GRID CELLS CENTERED AROUND SAMPLING LOCATIONS AOC1GB27 AND AOC1SB08
	FENCE LINE
	RAILROAD TRACK

N

0 25 50 75 100
Feet

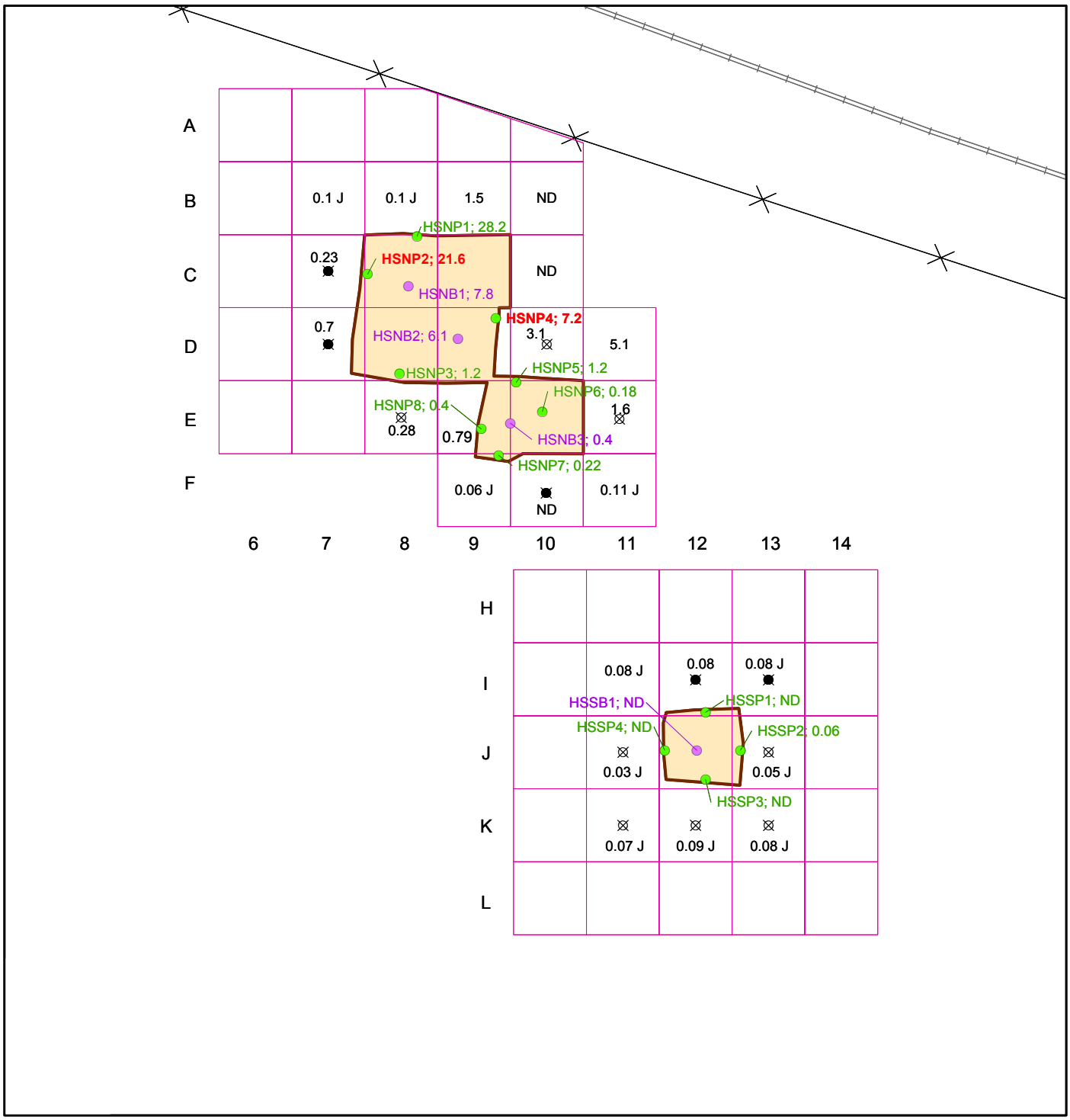
Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 13

SELENIUM CONCENTRATIONS IN HOT SPOT AREA

2003-07-11 V:\Concord\Projects\AECRU\AOC1\metals_results_figs\Hotspots_Selenium.mxd TtEMI-SF kevin.ernst



LEGEND:

HSNB2; 6.1	SAMPLE ID AND LEAD CONCENTRATIONS (MG/KG)
HSNP4; 7.2	RESULTS EXCEEDING USEPA REGION 9 PRG FOR INDUSTRIAL SOILS
	EXCAVATION BASE SAMPLING LOCATION
	EXCAVATION PERIMETER SAMPLING LOCATION
	GEOPROBE BORING REFUSAL (SOME BORINGS)
	GEOPROBE BORING REFUSAL (ALL BORINGS)
	EXCAVATION
	25'x25' GRID CELLS CENTERED AROUND SAMPLING LOCATIONS AOC1GB27 AND AOC1SB08
	FENCE LINE
	RAILROAD TRACK

N

0 25 50 75 100

Feet

Tetra Tech EM Inc.

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA

FIGURE 14

MERCURY CONCENTRATIONS IN HOT SPOT AREA

2003-07-11 V:\Concord\Projects\AECRU\AOC1\metals_results_figs\Hotspots_Mercury.mxd TtEMI-SF kevin.ernst

FIGURE 15. ANALYTICAL RESULTS FOR IMPORTED FILL MATERIAL (MENDELIAN NO DATE)

Table 1. Import Fill Analytical Results

Analytical Results for Import Fill Soil
Interim Removal Action (IRA)
Concord Naval Weapons Station (NWS) Area of Concern (AOC)1, Site 31

			Source: Contra Costa Soil	Contra Costa Soil
		Specification	Date sampled: 08/13/2002	08/09/2002
Parameter	Units	Limit	sample ID: NWS-TS-05	NWS-SF09
Title 22 Metals				
Mercury (Hg)	(mg/kg)	0.21	0.077	0.048
Antimony (Sb)	(mg/kg)	1.6	<2.5	<5.0
Arsenic (As)	(mg/kg)	23	<2.5	7.8
Barium (Ba)	(mg/kg)	630	130	120
Beryllium (Be)	(mg/kg)	0.15	0.25	0.34
Cadmium (Cd)	(mg/kg)	0.48	<0.25	<0.5
Chromium (Cr)	(mg/kg)	67	24	23
Cobalt (Co)	(mg/kg)	25	11	9.4
Copper (Cu)	(mg/kg)	66	27	21
Lead (Pb)	(mg/kg)	38	13	13
Molybdenum (Mo)	(mg/kg)	DL	<035	<0.5
Nickel (Ni)	(mg/kg)	101	33	31
Selenium (Se)	(mg/kg)	DL	<2.5	<5.0
Silver (Ag)	(mg/kg)	DL	<2.0	<2.5
Thallium (Ti)	(mg/kg)	3.5	<2.5	<5.0
Vanadium (V)	(mg/kg)	102	36	34
Zinc (Zn)	(mg/kg)	105	57	56
VOCs	(mg/kg)	ND	ND	ND
SVOCs		ND		ND
Anthracene	(mg/kg)		0.14	
Benzo(a)anthracene	(mg/kg)		0.12	
Benzo(a)pyrene	(mg/kg)		0.12	
Chrysene	(mg/kg)		0.15	
Flouranthene	(mg/kg)		0.22	
Phenanthrene	(mg/kg)		0.44	
Pyrene	(mg/kg)		0.4	
Pesticides/PCBs		ND		ND
Aldrin	(mg/kg)		0.0028	
4,4'-DDE	(mg/kg)		0.004	
Chlorinated Herbicides	(mg/kg)	ND	ND	ND

Analytical Methods
Title 22 Metals by EPA Methods 6000/7000 series. Volatile Organic Compounds (VOCs) by EPA Method 8260. Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270. Organochlorine Pesticides by EPA Method 8081, and Polychlorinated Biphenyls (PCBs) by EPA Method 8082. Chlorinated Herbicieds by EPA Method 8151.

Notes:
Specification limits were presented in Section 3.3 of Specification 02302.
ND means not detected above the reporting limit for any of the individual compounds under the method
DL means detection limit

J:\Mendelian\1591\Reports\Table1-fill.xls

FIGURE 16. AOC 1 TCRA PUBLIC NOTICE, CONTRA COSTA TIMES, MARCH 10, 2002

Public Notice:

Action Memorandum for Time-Critical Removal of Contaminated Soil at Area of Concern 1

Naval Weapons Station Seal Beach Detachment-Concord

Public comment period: March 10 to April 9, 2002

The Navy has prepared an action memorandum for a time-critical removal of mercury- and selenium-contaminated soil and wastes at Area of Concern (AOC) 1 in the northeastern portion of Naval Weapons Station Seal Beach Detachment, in Concord, California. AOC 1 is the former location of a fertilizer plant that operated from 1955 through 1983. The Navy acquired the property in 1983 and demolished and removed all buildings within it in 1986. The property is currently vacant, except for a Contra Costa County freshwater pump station, and is secured by a locked perimeter fence.

Past industrial activities at AOC 1 have left behind wastes (primarily gypsum and ash) that are contaminated with metals. An assessment of ecological risks at AOC 1 showed that concentrations of mercury and selenium in wastes and soil at the site are high enough to potentially cause health problems for animals that use the site, such as the Western Meadowlark. The Navy intends to excavate and dispose of the wastes and soil that are most contaminated with these metals to reduce the ecological risk. Lead was also detected at elevated concentrations that could pose a risk to humans if they were exposed to site wastes and soil in an industrial exposure setting. Although this level of exposure does not currently occur (the site is fenced and unoccupied), the Navy's removal action will also remove lead-contaminated wastes and soil from the site.

The removal action is scheduled to begin at the end of June 2002 and conclude at the end of July 2002. The U. S. Environmental Protection Agency (EPA) and the State of California Department of Toxic Substances Control (DTSC) provide oversight of the Navy's cleanup program.

The Navy invites the public to review and comment on the action memorandum during the public comment period, that begins on **March 10, 2002** and ends on **April 9, 2002.** A copy of the draft action memorandum is available for public review at the information repository located at the Concord Library. To ensure the protection of public health and the environment, the action memorandum complies with U.S. EPA and Navy guidance for time-critical removal actions under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

The action memorandum is available for review at the following location:

Concord Library
2900 Salvio Street
Concord, CA 94519
Phone (925) 646-5455

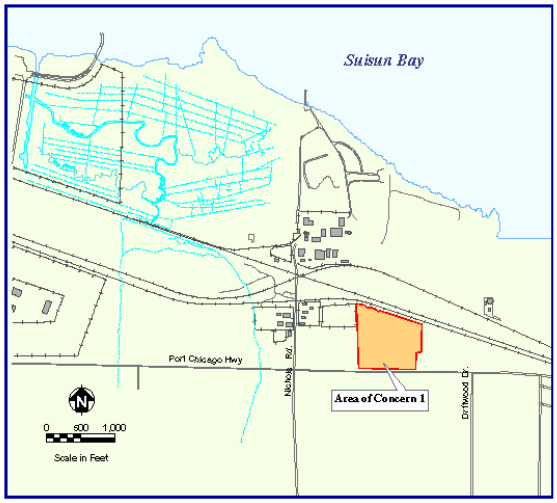
Send comments on the action memorandum, postmarked no later than April 9, 2002, to:

Mr. Gil Rivera, Code: 052GAR
Department of the Navy, EFA West
Naval Facilities Engineering Command
Pacific Plaza
2001 Junipero Serra Boulevard, Suite 600
Daly City, CA 94014-1976
(650) 746-7451 (phone) (650) 746-7375 (fax)
E-mail: RiveraGA@efawest.navfac.navy.mil

FIGURE 17. AOC 1 SOIL REMOVAL FACT SHEET

Naval Weapons Station Seal Beach
Detachment Concord
AOC 1 Soil Removal Fact Sheet

This fact sheet provides information on a time-critical removal action to be conducted by the Navy at Area of Concern 1 (AOC 1) at the Naval Weapons Station Seal Beach Detachment – Concord (Naval Weapons Station Concord). The purpose of the removal action is to excavate and dispose of soil and waste that is contaminated with mercury, selenium, and lead. AOC 1 is inhabited by a variety of wildlife, such as the Western Meadowlark, the Northern Harrier, and the gray fox that may come into contact with the contaminated soil and waste. By excavating and disposing of the contaminated soil and waste, the Navy is protecting wildlife in the area by limiting their exposure to the contaminants.



Area of Concern 1
Location of Proposed Remedial Action

Site Background

AOC 1 is an undeveloped 17-acre site located on Port Chicago Highway in the northeast part of Naval Weapons Station Concord (see figure). AOC 1 is the former location of a fertilizer plant that operated from 1955 to 1976. The Navy acquired the property in 1983 and demolished and removed all buildings within AOC 1 in 1986. The property is currently vacant, except for a Contra Costa County fresh water pump station, and is secured by a locked perimeter fence.

Soil sampling conducted as part of a base-wide environmental investigation confirmed the presence of varying levels of mercury, selenium, and lead in soil, ash, and gypsum waste materials at the ground surface or buried at shallow depths at AOC 1. Mercury and selenium are chemicals that can build up to harmful concentrations in animal tissues and potentially cause health problems to animals. An assessment of ecological risks at AOC 1 showed that concentrations of mercury and selenium are high enough to potentially cause health problems for animals that use the site, such as the Western Meadowlark. Therefore, the Navy intends to excavate and dispose of the soil and waste that is most contaminated with these metals. Lead was also detected at elevated concentrations that may pose a risk to humans in an industrial setting. Although this level of exposure does not occur (the site is fenced and unoccupied), the Navy's removal action will also remove lead-contaminated soil and waste from the site.

Soil Removal Action

The Navy has determined that the appropriate action for AOC 1 is to conduct a time-critical removal action to promptly address the ecological risks associated with mercury, selenium, and lead in soil and waste material at the site. Current plans call for excavating up to 3,460 cubic yards of contaminated soil and waste, backfilling these areas with clean soil, revegetating the site to enhance wildlife habitat, and disposing of the excavated soil and waste at a licensed off-site disposal facility. Hazardous soils will be treated off-site before disposal. All work will be conducted in accordance with a Site-Specific Health and Safety Plan. The State of California Department of Toxic Substances Control and the US Environmental Protection Agency (EPA) provide oversight of the Navy's cleanup program. To ensure protection of public health and the environment, the removal action complies with EPA guidance for time critical removal actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

While the work at the site is being done, vehicle traffic will increase along Port Chicago Highway and other local roads. The removal contractor will file a traffic plan with the Contra Cost County Public Works Department.

DS.0144.17546

FIGURE 17. AOC 1 SOIL REMOVAL FACT SHEET (CONTINUED)

Public Comment Period

The Navy has prepared a Draft Action Memorandum detailing the time-critical removal action planned for AOC 1. The Navy invites the public to review and comment on the Action Memorandum during the 30-day public comment period, which runs from March 10 to April 9, 2002. The Action Memorandum is available to the public:

Concord Library
2900 Salvio Street
Concord, CA 94519
Phone (925) 646-5455
Hours: Monday: 12:00 noon to 9:00 pm
Tuesday, Wednesday: 10:00am to 6:00pm
Thursday: 12:00 noon to 9:00pm
Friday, Saturday: 1:00-5:00pm
Sunday: Closed

Please send comments, postmarked by April 16, 2002 to:
Mr. Gil Rivera
Department of the Navy, Engineering Field Activity West
2001 Junipero Serra Boulevard, Suite 600
Daly City, CA 94014-1976

The Navy welcomes your input. If you have questions or concerns, please call Mr. Gil Rivera at (650) 746-7451, or you may e-mail him at RiveraGA@efawest.navfac.navy.mil.

Mr. Gil Rivera
Department of the Navy
Engineering Field Activity West
2001 Junipero Serra Boulevard, Suite 600
Daly City, CA 94014-1976

APPENDIX A
PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE AT AOC 1

PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE
AT AREA OF CONCERN 1, NWSSBD CONCORD, CALIFORNIA

Sample Location	**SB01**	**SB01**	**SB02**	**SB02**	**SB03**	**SB04**	**SB04**	**SB05**	**SB06**	**SB06**	**SB08**	**GB23**	**GB23**	**GB24**	**GB24**	**GB25**	**GB25**	**GB26**	**GB27**	**GB27**	**GB28**	**GB28**
Previous ID	**AOC 1**	**AOC 1**	**AOC 2**	**AOC 3**	**AOC 3**	**AOC 4**	**AOC 4**	**AOC 5**	**AOC 6**	**AOC 6**	**AOC 8**											
(depth, ft below grade)	0.7 - 1	1 - 1.5	0.25 - 0.5	0 - 0.5	1 - 1.5	0.5 - 1	1 - 1.5	0.25 - 0.5	0.25 - 0.75	0.75 - 1.25	0 - 0.5	0 - 0.5	0.5 - 1	0 - 0.5	1 - 1.5	0 - 0.5	0.75 - 1.25	1.5 - 2	1 - 1.5	1.5 - 2	0.5 - 1	1 - 1.5
Material	cinders	clayey silt	weathered pavement	gray silt (gypsum?)	silty clay	gray silt (gypsum?)	silty clay	gravel road base	gravel raod base	silty clay	silty clay (ash?)	soil	soil	waste	soil	waste	soil	waste	waste	soil	soil/waste	soil
Metals (mg/kg)																						
Aluminum	14,700	13,700	15,400	349	20,400	1,160	16,400	26,900	28,600	15,100	22,900	10,500	14,100	12,500	11,900	13,500	25,000	17,600	14,900	16,700	32,700	12,100
Antimony	21.6	--	2.3	2.5	--	3.2	2.4	--	--	--	--	--	--	2.5	--	2	0.89 J	--	2.9	2.2 J	1.5 J	--
Arsenic	55.3	5.4	22.4	--	31.6	11.8	148	4	2.8	5.4	28.6	27.4	33.8	10.4 J	22.4 J	23.7	41.4	50.4	70.1	110	287	139
Barium	168	151	129	91.7	146	113	163	15.1 J	--	152	206	126	207	139	130	133	173	190	119	148	250	126
Beryllium	--	--	--	0.046 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	2.7	--	1.2	8	8.4	3.7	11.3	--	--	--	3.7	5.3	1.9	4.4 J	8.0 J	4.6	26.6	4.3	17.9	36.8	64.9	9.9
Calcium	26,100	2,080	8,220	288,000	29,200	313,000	43,800	12,800	17,900	2,550	13,300	6,150	3,760	130,000	80,300	168,000	10,200	26,200	68,400	38,800	49,900	2,930
Chromium	36.3 J	28.1 J	36.9 J	28.4 J	37.9 J	78 J	86.2 J	40 J	37.1 J	34.1 J	46.3 J	26.4	28.9	125	48	124	95	44.8	62.2	76.2	103	26.9
Cobalt	10.4 J	20.6	9.7 J	--	10.5 J	--	10.8 J	38.9	27.6	16.7	8.9 J	18	10.9 J	4.0 J	9.1 J	--	7.8 J	13.9	4.9 J	5.5 J	12.3 J	10.1 J
Copper	61.4 J	17.8 J	38.1 J	--	42.5 J	--	88.7 J	133 J	156 J	16.6 J	27.4 J	27.2 J	18.2 J	27.8	23.9	21.9	193	27.2	110	129	283	18.5
Iron	21,400	15,400	21,200	190	21,900	603	15,300	45,000	38,700	19,900	20,100	13,900	16,100	14,400	15,500	7,190	16,800	24,800	17,800	17,300	27,700	15,300
Lead	11,400	39.5	4,300	114	170	47.2	29.7	18.1	1.9	8	895	25	7.9	35.1	12.9	45	7.7 J	11.2	933	354	45.9 J	7.6
Magnesium	4,690	1,930	4,470	60.7 J	3,430	43.3 J	988 J	16,100	17,300	2,540	2,290	1,560	1,690	2,730	6,790	--	1,280	6,930	1,390	1,360	2,320	1,740
Manganese	407 J	896 J	264 J	--	322 J	--	407 J	1,360 J	695 J	712 J	200 J	395	228	69.2 J	382 J	29.6	326	498	116	157	450	300
Mercury	54.8	--	2.8	--	3.5	0.1 J	--	1.2	1.1	--	113	--	--	--	--	--	--	--	21.4	9.8	--	--
Molybdenum	--	--	--	--	--	--	--	--	--	--	--	--	--	8.4	--	10.4	3.3 J	--	2.9	4.2 J	1.9 J	--
Nickel	32.1 J	21.4 J	30.7 J	--	26.3 J	--	18.3 J	31.4 J	28.9 J	28.2 J	27.8 J	21.6	17.7	8.3 J	36.4	3.2 J	14.0 J	55.1 J	14.6	16.0 J	36.7	27.7
Potassium	986 J	799 J	994 J	139 J	1,520	217 J	1,920	907 J	711 J	955 J	1,640	1,540	1,340	11,900 J	1,890 J	8,820 J	6,390 J	1,520 J	1,740 J	1,850 J	3,140 J	869 J
Selenium	875 J	3.3 J	215 J	14.4 J	20.5 J	2.6 J	9.3 J	0.85 J	--	--	44.7 J	1.7	--	3.6	1.4	12.9	3.5 J	--	68.3	27.3 J	3.4 J	0.42 J
Silver	10.4	--	--	--	--	--	--	--	--	--	--	--	--	0.67 J	--	3.2	--	--	1.5 J	--	--	--
Sodium	619	--	392 J	--	265 J	--	361 J	--	--	--	--	--	--	6,270	--	10,800	2480	--	--	--	--	--
Thallium	--	--	--	1.4	--	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	52.5	43.2	52.4	7 J	56	23.8	86.3	118	94.8	54.1	62.1	42.4	46	77	41.1	67.2	220	51.2	61.3	76.8	199	42.1
Zinc	106	59.2	92.8	20.7	194	51.2	92	90.1	52.2	38.4	131	93.4	53.5	96.8 J	195 J	77.2	628	94.6	250	345	700	127
Volatile Organic Compounds (µg/kg)																						
4-methyl-2-pentanone	--	--	NA	--	--	--	NA	NA	NA	NA	NA	NA	--	NA	--	NA	--	--	--	--	--	--
Acetone	95 J	60 J	NA	240 J	--	--	NA	NA	NA	NA	NA	NA	--	NA	--	NA	--	--	--	--	--	--
Toluene	--	--	NA	--	1	5 J	NA	NA	NA	NA	NA	NA	--	NA	--	NA	--	--	--	--	2 J	--
Semivolatile Organic Compounds (µg/kg)																						
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	76 J	--	NA	--	--	--	NA	76 J	--	NA	NA
Benzo(a)pyrene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	54 J	--	NA	NA
Benzo(b)fluoranthene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	87 J	--	NA	NA
Benzo(k)fluoranthene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	48 J	--	NA	NA
Chrysene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	86 J	--	NA	NA
Fluoranthene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	130 J	43 J	NA	NA
Phenanthrene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	77 J	--	NA	NA
Phenol				--	--	--	--	--	--	--	--	--	--	--	630	--	--	NA	--	--	NA	NA
Pyrene				--	--	--	--	--	--	--	--	--	--	--	380	400	370	NA	100 J	390	NA	NA
Total PAHS				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	660	43	NA	NA
Pesticides/PCBs																						
4,4'-DDE	--	--	NA	--	--	--	NA	NA	NA	NA	NA	3 J	--	NA	--	--	--	NA	2 J	--	NA	NA
4,4'-DDT	--	--	NA	--	--	--	NA	NA	NA	NA	NA	8 J	--	NA	--	4 J	--	NA	12 J	6 J	NA	NA
Aldrin	--	--	NA	--	--	--	NA	NA	NA	NA	NA	1 J	--	NA	--	3	--	NA	--	--	NA	NA
Alpha-chlordane	--	--	NA	--	--	--	NA	NA	NA	NA	NA	--	--	NA	--	2 J	--	NA	--	--	NA	NA
Aroclor-1248	--	--	NA	--	--	--	NA	NA	NA	NA	NA	35 J	26 J	NA	--	--	--	NA	--	--	NA	NA
Aroclor-1254	--	--	NA	--	--	--	NA	NA	NA	NA	NA	--	--	NA	--	58	--	NA	--	--	NA	NA
Dieldrin	--	--	NA	--	--	--	NA	NA	NA	NA	NA	2 J	--	NA	--	3 J	--	NA	4 J	--	NA	NA
Gamma-chlordane	--	--	NA	--	--	--	NA	NA	NA	NA	NA	2	2 J	NA	--	3	--	NA	--	1 J	NA	NA

Notes:
-- = not detected
J = estimated concentration
NA = not analyzed
DL = detection limit
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE
AT AREA OF CONCERN 1, NWSSBD CONCORD, CALIFORNIA

Sample Location	GB29	GB29	GB30	GB30	GB32	GB32	GB33	GB33	GB34	GB34	GB35	GB35	GB35	GB36	GB36	GB37	GB37	GB38	GB38	GB39	GB39
Previous ID																					
(depth, ft below grade)	0 - 0.5	0.75 - 1.25	0.75 - 1	1.5 - 2	0.5 - 1	1 - 1.5	0.5 - 1	1 - 1.5	0.25 - 0.5	0.5 - 1	0.5 - 1	1 - 1.5	1.5 - 2	0.5 - 1	1 - 1.5	0.75 - 1.25	1.25 - 1.75	0.5 - 1	1 - 1.5	0.5 - 1	1 - 1.5
Material	waste	soil	soil/waste	soil/waste	waste/soil	waste/soil	waste	soil	waste	soil	waste	waste/soil	waste/soil	waste	soil	waste	soil	waste	soil	waste	soil
Metals (mg/kg)																					
Aluminum	14,500	14,500	18,000	18,800	19,900	16,000	14,800	25,800	16,500	13,000	18,900	10,100	17,500	23,300	14,400	19,100	27,100	17,800	14,400	14,400	23,700
Antimony	0.78 J	--	--	--	0.88 J	1.4 J	0.30 J	--	--	--	--	2.5	--	--	--	--	--	--	--	--	--
Arsenic	48.7	86	66.0 J	55.3 J	71.4	46.7	87.6	112	155	65.5	34.2 J	50.5	121	77.2	76.9	83.2	77.5 J	53.3	40.9	55.9	37.1 J
Barium	110	131	140	160	132	142	131	172	165	147	168	106	171	162	157	157	338	148	159	153	201
Beryllium	--	--	--	--	--	--	--	0.20 J	--	--	--	--	--	--	--	--	--	--	--	--	0.34 J
Cadmium	9.2	17.3	14.2 J	11.9 J	18.5	12.7	42.6	5.6 J	9.7 J	5.5 J	6.4 J	9.2 J	10.6 J	31.4 J	13.6 J	13.3 J	0.86 J	13.5 J	5.9 J	20.8 J	4.4 J
Calcium	70,500	13,400	5,910	60,500	60,700	126,000	15,500	3,710	48,500	10,500	42,100	188,000	4,300	5,480	2,220	33,300	4,220	8,010	4,070	97,600	5,310
Chromium	72.1	30.8	35.5	80.1	73.7	83	40.2	47.6	49	30.5	61	101	35.6	58	30.5	98.7	49.8	40.1	33.5	138	39
Cobalt	3.8 J	7.7 J	12.6	8.6 J	9.9 J	2.9 J	7.6 J	11.8 J	11.5 J	8.6 J	11.9 J	3.0 J	36.3 J	5.6 J	13.5 J	6.8 J	14.4	6.9 J	14.1 J	3.7 J	30.0 J
Copper	78.3	50.1	27.9	46.3	57.2	87.6	32.9	16.9	47.2	22	34.1	29.3	18.5	278	17.2	113	16	67.5	27.9	63.6	14.9
Iron	11,800	15,300	21,500	16,900	16,900	9,040	16,000	28,400	16,200	16,500	24,300	8,630	19,000	18,000	17,300	16,800	30,100	16,700	16,200	11,400	24,000
Lead	18.7	17.7	7.3	26.5	32.5	43.5	8.7	7.2 J	25.9 J	8.6 J	51.5 J	27.8 J	8.4 J	10.6 J	6.8 J	17.4 J	7.9	15.2 J	8.0 J	28.3 J	9.1 J
Magnesium	844 J	1,280	5,130	2,340	2,150	687 J	1,350	4,890	1,560	1,650	1,830	726 J	2,450	1,320	1,560	1,190	5,110	1,470	1,800	926 J	3,090
Manganese	106	253	388 J	246 J	327	82.7	297	342 J	365 J	170 J	605 J	76.0 J	1,000 J	162 J	459 J	157 J	386 J	175 J	343 J	112 J	943 J
Mercury	--	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	2.1	--	--	2.8	3	4.3	1.3	--	--	--	--	5.1	--	--	--	1.6	--	1.7	--	4.7	--
Nickel	10.2 J	17.5	58.9	23.7	24.5 J	8.6 J	34.9 J	60.8	21.7	22.3	29.1	7.6 J	50.3	18.3	33.1	20.5	59.1	23	26	14	39.5
Potassium	1,500 J	1,260 J	1,240 J	2,390 J	1,830 J	2,420 J	1,030 J	881 J	1,340 J	797 J	1,530 J	1,320 J	1,190 J	2,450 J	867 J	1,810 J	967 J	1,210 J	796 J	1,570 J	648 J
Selenium	3.3	1.5	1.3	3.4	2.4	3.3	0.58 J	0.95 J	1.9	0.58 J	4.7	4.2	2.5 J	0.81 J	0.61 J	1.8	--	1.4	0.61 J	3.6	1.3 J
Silver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.4 J	--
Sodium	--	--	--	--	--	3210	--	419 J	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	62.5	54.9	45	62.6	60.7	40.4	48.2	64.8	55.4	45.6	86.5	66.5	53.3	132	45.9	74.5	66.4	57.7	51.3	61.5	52.6
Zinc	97.3	204	236 J	160 J	236	107	1010	179 J	127 J	107 J	144 J	79.8 J	189 J	324 J	170 J	182 J	44.4 J	212 J	84.3 J	210 J	168 J
Volatile Organic Compounds (µg/kg)																					
4-methyl-2-pentanone	NA	--	--	5 J	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	5 J	--	4 J
Acetone	NA	--	--	5 J	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	5 J	--	4 J
Toluene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	--	--	--
Semivolatile Organic Compounds (µg/kg)																					
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	350	390	NA	NA	360	450	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHS	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs																					
4,4'-DDE	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	--	--	NA	NA	8 J	3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-chlordane	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma-chlordane	NA	NA	NA	NA	NA	NA	--	--	NA	NA	1 J	--	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
-- = not detected
J = estimated concentration
NA = not analyzed
DL = detection limit
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE
AT AREA OF CONCERN 1, NWSSBD CONCORD, CALIFORNIA

Sample Location	GB42	GB42	GB43	GB43	GB44	GB44	GB45	GB45	GB46	GB46	GB47	GB47	GB48	GB48	GB49	GB49	GB52	GB52
Previous ID																		
(depth, ft below grade)	0.5 - 1	1 - 1.5	0.25 - 0.75	0.75 - 1.25	0.25 - 0.5	0.5 - 1	0.25 - 1	1.5 - 2	0.25 - 0.75	0.75 - 1.25	0.25 - 0.75	0.75 - 1.25	0.25 - 0.75	0.75 - 1.25	0.5 - 1	1 - 1.5	0.5 - 1	1 - 1.5
Material	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil
Metals (mg/kg)																		
Aluminum	11,900	22,200	22,000	17,300	12,300	11,100	17,800	21,500	11,800	9,860	15,500	18,600	11,300	13,000	12,500	9,970	13,900	12,800
Antimony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	11	7.7	73.5	76.4	19.3	6.2	13	4.9	12.5	7.6	10	6.3 J	13.7 J	7.2 J	19.3 J	7.8 J	10.2 J	8.9 J
Barium	177	138	170	129	155	189	162	225	139	136	165	139	156	179	152	142	166	168
Beryllium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.1	--	29.2	10	3.4	1.4	5.7	9.2	2.5	1.2	5.1	4.0 J	4.6 J	2.6 J	3.6 J	5.4 J	2.2 J	0.86 J
Calcium	2,890	4,240	4,700	2,530	2,550	2,250	2,860	2,790	5,070	2,300	2,820	3,510	2,340	2,090	5,070	3,310	9,880	3,970
Chromium	29.8	43.8	51.5	34.2	31.4	27.4	51.3	37.4	26.9	22.2	33.8	30.4	24	24.8	30.3	23.5	45.7	28.8
Cobalt	11.2	5.1 J	20.4	21.7	14.9	10.1 J	7.5 J	19.7	7.3 J	9.5 J	17.5	10.4 J	9.6 J	10.8 J	5.7 J	7.9 J	11.5	9.5 J
Copper	18.0 J	14.7 J	113 J	22.5 J	32.9 J	18.2 J	37.9 J	13.3 J	19.6 J	14.2 J	25.9 J	15.7	25.3	16.3	336	70	34.7	35.6
Iron	17,800	25,600	20,300	20,000	16,100	16,700	17,500	22,800	13,400	12,800	15,100	19,900	13,400	14,200	16,200	13,100	22,500	17,500
Lead	11.1	6.3	21.2	7.7	33.7	8	23.8	7.8	11.9	6.7	14.2	6.1	32.7	10.7	273	53.9	98.8	299
Magnesium	1,740	3,670	1,600	2,200	1,490	1,590	1,280	3,310	1,350	1,420	1,440	2,610	1,380	1,500	1,660	1,530	6,820	2,570
Manganese	288	182	321	1130	429	226	207	886	175	267	522	360 J	347 J	396 J	156 J	227 J	503 J	335 J
Mercury	--	--	--	--	0.69	--	--	--	--	--	--	--	0.76	--	4.3	1.3	--	1.7
Molybdenum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	19.7	30.9	22.6	45	21.1	19.7	19.2	46.4	18.7	17.1	19	26.7	18.2	17.9	15.2	21.1	43	20.5
Potassium	1110	778 J	2170	1120	1230	945 J	1220	696 J	898 J	739 J	916 J	833 J	746 J	721 J	790 J	637 J	928 J	736 J
Selenium	1.2	--	1.8	1.3	3	--	2.3	--	--	--	1.5	--	2.6	--	20.5	4.6	2.7	9.1
Silver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	47.4	54.4	82.5	54.4	48.1	44.7	65.6	53.7	38.9	36.2	59.6	47.8	44.8	44.5	51	37.8	41.9	46.4
Zinc	60.5	35.8	305	291	108	73.5	97.8	136	70.7	48.5	95.7	125 J	93.1 J	99.5 J	147 J	246 J	197 J	140 J
Volatile Organic Compounds (µg/kg)																		
4-methyl-2-pentanone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	0.8 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (µg/kg)																		
Benzo(a)anthracene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Benzo(a)pyrene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Benzo(b)fluoranthene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Benzo(k)fluoranthene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Chrysene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Fluoranthene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Phenanthrene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Phenol	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Pyrene	340	360	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	350	400	NA	NA	NA	NA
Total PAHS	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Pesticides/PCBs																		
4,4'-DDE	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
4,4'-DDT	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Aldrin	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Alpha-chlordane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Aroclor-1248	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Aroclor-1254	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Dieldrin	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Gamma-chlordane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA

Notes:
-- = not detected
J = estimated concentration
NA = not analyzed
DL = detection limit
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

APPENDIX A
PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE AT AOC 1

PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE
AT AREA OF CONCERN 1, NWSSBD CONCORD, CALIFORNIA

Sample Location	**SB01**	**SB01**	**SB02**	**SB02**	**SB03**	**SB04**	**SB04**	**SB05**	**SB06**	**SB06**	**SB08**	**GB23**	**GB23**	**GB24**	**GB24**	**GB25**	**GB25**	**GB26**	**GB27**	**GB27**	**GB28**	**GB28**
Previous ID	**AOC 1**	**AOC 1**	**AOC 2**	**AOC 3**	**AOC 3**	**AOC 4**	**AOC 4**	**AOC 5**	**AOC 6**	**AOC 6**	**AOC 8**											
(depth, ft below grade)	0.7 - 1	1 - 1.5	0.25 - 0.5	0 - 0.5	1 - 1.5	0.5 - 1	1 - 1.5	0.25 - 0.5	0.25 - 0.75	0.75 - 1.25	0 - 0.5	0 - 0.5	0.5 - 1	0 - 0.5	1 - 1.5	0 - 0.5	0.75 - 1.25	1.5 - 2	1 - 1.5	1.5 - 2	0.5 - 1	1 - 1.5
Material	cinders	clayey silt	weathered pavement	gray silt (gypsum?)	silty clay	gray silt (gypsum?)	silty clay	gravel road base	gravel raod base	silty clay	silty clay (ash?)	soil	soil	waste	soil	waste	soil	waste	waste	soil	soil/waste	soil
Metals (mg/kg)																						
Aluminum	14,700	13,700	15,400	349	20,400	1,160	16,400	26,900	28,600	15,100	22,900	10,500	14,100	12,500	11,900	13,500	25,000	17,600	14,900	16,700	32,700	12,100
Antimony	21.6	--	2.3	2.5	--	3.2	2.4	--	--	--	--	--	--	2.5	--	2	0.89 J	--	2.9	2.2 J	1.5 J	--
Arsenic	55.3	5.4	22.4	--	31.6	11.8	148	4	2.8	5.4	28.6	27.4	33.8	10.4 J	22.4 J	23.7	41.4	50.4	70.1	110	287	139
Barium	168	151	129	91.7	146	113	163	15.1 J	--	152	206	126	207	139	130	133	173	190	119	148	250	126
Beryllium	--	--	--	0.046 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	2.7	--	1.2	8	8.4	3.7	11.3	--	--	--	3.7	5.3	1.9	4.4 J	8.0 J	4.6	26.6	4.3	17.9	36.8	64.9	9.9
Calcium	26,100	2,080	8,220	288,000	29,200	313,000	43,800	12,800	17,900	2,550	13,300	6,150	3,760	130,000	80,300	168,000	10,200	26,200	68,400	38,800	49,900	2,930
Chromium	36.3 J	28.1 J	36.9 J	28.4 J	37.9 J	78 J	86.2 J	40 J	37.1 J	34.1 J	46.3 J	26.4	28.9	125	48	124	95	44.8	62.2	76.2	103	26.9
Cobalt	10.4 J	20.6	9.7 J	--	10.5 J	--	10.8 J	38.9	27.6	16.7	8.9 J	18	10.9 J	4.0 J	9.1 J	--	7.8 J	13.9	4.9 J	5.5 J	12.3 J	10.1 J
Copper	61.4 J	17.8 J	38.1 J	--	42.5 J	--	88.7 J	133 J	156 J	16.6 J	27.4 J	27.2 J	18.2 J	27.8	23.9	21.9	193	27.2	110	129	283	18.5
Iron	21,400	15,400	21,200	190	21,900	603	15,300	45,000	38,700	19,900	20,100	13,900	16,100	14,400	15,500	7,190	16,800	24,800	17,800	17,300	27,700	15,300
Lead	11,400	39.5	4,300	114	170	47.2	29.7	18.1	1.9	8	895	25	7.9	35.1	12.9	45	7.7 J	11.2	933	354	45.9 J	7.6
Magnesium	4,690	1,930	4,470	60.7 J	3,430	43.3 J	988 J	16,100	17,300	2,540	2,290	1,560	1,690	2,730	6,790	--	1,280	6,930	1,390	1,360	2,320	1,740
Manganese	407 J	896 J	264 J	--	322 J	--	407 J	1,360 J	695 J	712 J	200 J	395	228	69.2 J	382 J	29.6	326	498	116	157	450	300
Mercury	54.8	--	2.8	--	3.5	0.1 J	--	1.2	1.1	--	113	--	--	--	--	--	--	--	21.4	9.8	--	--
Molybdenum	--	--	--	--	--	--	--	--	--	--	--	--	--	8.4	--	10.4	3.3 J	--	2.9	4.2 J	1.9 J	--
Nickel	32.1 J	21.4 J	30.7 J	--	26.3 J	--	18.3 J	31.4 J	28.9 J	28.2 J	27.8 J	21.6	17.7	8.3 J	36.4	3.2 J	14.0 J	55.1 J	14.6	16.0 J	36.7	27.7
Potassium	986 J	799 J	994 J	139 J	1,520	217 J	1,920	907 J	711 J	955 J	1,640	1,540	1,340	11,900 J	1,890 J	8,820 J	6,390 J	1,520 J	1,740 J	1,850 J	3,140 J	869 J
Selenium	875 J	3.3 J	215 J	14.4 J	20.5 J	2.6 J	9.3 J	0.85 J	--	--	44.7 J	1.7	--	3.6	1.4	12.9	3.5 J	--	68.3	27.3 J	3.4 J	0.42 J
Silver	10.4	--	--	--	--	--	--	--	--	--	--	--	--	0.67 J	--	3.2	--	--	1.5 J	--	--	--
Sodium	619	--	392 J	--	265 J	--	361 J	--	--	--	--	--	--	6,270	--	10,800	2480	--	--	--	--	--
Thallium	--	--	--	1.4	--	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	52.5	43.2	52.4	7 J	56	23.8	86.3	118	94.8	54.1	62.1	42.4	46	77	41.1	67.2	220	51.2	61.3	76.8	199	42.1
Zinc	106	59.2	92.8	20.7	194	51.2	92	90.1	52.2	38.4	131	93.4	53.5	96.8 J	195 J	77.2	628	94.6	250	345	700	127
Volatile Organic Compounds (µg/kg)																						
4-methyl-2-pentanone	--	--	NA	--	--	--	NA	NA	NA	NA	NA	NA	--	NA	--	NA	--	--	--	--	--	--
Acetone	95 J	60 J	NA	240 J	--	--	NA	NA	NA	NA	NA	NA	--	NA	--	NA	--	--	--	--	--	--
Toluene	--	--	NA	--	1	5 J	NA	NA	NA	NA	NA	NA	--	NA	--	NA	--	--	--	--	2 J	--
Semivolatile Organic Compounds (µg/kg)																						
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	76 J	--	NA	--	--	--	NA	76 J	--	NA	NA
Benzo(a)pyrene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	54 J	--	NA	NA
Benzo(b)fluoranthene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	87 J	--	NA	NA
Benzo(k)fluoranthene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	48 J	--	NA	NA
Chrysene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	86 J	--	NA	NA
Fluoranthene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	130 J	43 J	NA	NA
Phenanthrene				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	77 J	--	NA	NA
Phenol				--	--	--	--	--	--	--	--	--	--	--	630	--	--	NA	--	--	NA	NA
Pyrene				--	--	--	--	--	--	--	--	--	--	--	380	400	370	NA	100 J	390	NA	NA
Total PAHS				--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	660	43	NA	NA
Pesticides/PCBs																						
4,4'-DDE	--	--	NA	--	--	--	NA	NA	NA	NA	NA	3 J	--	NA	--	--	--	NA	2 J	--	NA	NA
4,4'-DDT	--	--	NA	--	--	--	NA	NA	NA	NA	NA	8 J	--	NA	--	4 J	--	NA	12 J	6 J	NA	NA
Aldrin	--	--	NA	--	--	--	NA	NA	NA	NA	NA	1 J	--	NA	--	3	--	NA	--	--	NA	NA
Alpha-chlordane	--	--	NA	--	--	--	NA	NA	NA	NA	NA	--	--	NA	--	2 J	--	NA	--	--	NA	NA
Aroclor-1248	--	--	NA	--	--	--	NA	NA	NA	NA	NA	35 J	26 J	NA	--	--	--	NA	--	--	NA	NA
Aroclor-1254	--	--	NA	--	--	--	NA	NA	NA	NA	NA	--	--	NA	--	58	--	NA	--	--	NA	NA
Dieldrin	--	--	NA	--	--	--	NA	NA	NA	NA	NA	2 J	--	NA	--	3 J	--	NA	4 J	--	NA	NA
Gamma-chlordane	--	--	NA	--	--	--	NA	NA	NA	NA	NA	2	2 J	NA	--	3	--	NA	--	1 J	NA	NA

Notes:
-- = not detected
J = estimated concentration
NA = not analyzed
DL = detection limit
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE
AT AREA OF CONCERN 1, NWSSBD CONCORD, CALIFORNIA

Sample Location	GB29	GB29	GB30	GB30	GB32	GB32	GB33	GB33	GB34	GB34	GB35	GB35	GB35	GB36	GB36	GB37	GB37	GB38	GB38	GB39	GB39
Previous ID																					
(depth, ft below grade)	0 - 0.5	0.75 - 1.25	0.75 - 1	1.5 - 2	0.5 - 1	1 - 1.5	0.5 - 1	1 - 1.5	0.25 - 0.5	0.5 - 1	0.5 - 1	1 - 1.5	1.5 - 2	0.5 - 1	1 - 1.5	0.75 - 1.25	1.25 - 1.75	0.5 - 1	1 - 1.5	0.5 - 1	1 - 1.5
Material	waste	soil	soil/waste	soil/waste	waste/soil	waste/soil	waste	soil	waste	soil	waste	waste/soil	waste/soil	waste	soil	waste	soil	waste	soil	waste	soil
Metals (mg/kg)																					
Aluminum	14,500	14,500	18,000	18,800	19,900	16,000	14,800	25,800	16,500	13,000	18,900	10,100	17,500	23,300	14,400	19,100	27,100	17,800	14,400	14,400	23,700
Antimony	0.78 J	--	--	--	0.88 J	1.4 J	0.30 J	--	--	--	--	2.5	--	--	--	--	--	--	--	--	--
Arsenic	48.7	86	66.0 J	55.3 J	71.4	46.7	87.6	112	155	65.5	34.2 J	50.5	121	77.2	76.9	83.2	77.5 J	53.3	40.9	55.9	37.1 J
Barium	110	131	140	160	132	142	131	172	165	147	168	106	171	162	157	157	338	148	159	153	201
Beryllium	--	--	--	--	--	--	--	0.20 J	--	--	--	--	--	--	--	--	--	--	--	--	0.34 J
Cadmium	9.2	17.3	14.2 J	11.9 J	18.5	12.7	42.6	5.6 J	9.7 J	5.5 J	6.4 J	9.2 J	10.6 J	31.4 J	13.6 J	13.3 J	0.86 J	13.5 J	5.9 J	20.8 J	4.4 J
Calcium	70,500	13,400	5,910	60,500	60,700	126,000	15,500	3,710	48,500	10,500	42,100	188,000	4,300	5,480	2,220	33,300	4,220	8,010	4,070	97,600	5,310
Chromium	72.1	30.8	35.5	80.1	73.7	83	40.2	47.6	49	30.5	61	101	35.6	58	30.5	98.7	49.8	40.1	33.5	138	39
Cobalt	3.8 J	7.7 J	12.6	8.6 J	9.9 J	2.9 J	7.6 J	11.8 J	11.5 J	8.6 J	11.9 J	3.0 J	36.3 J	5.6 J	13.5 J	6.8 J	14.4	6.9 J	14.1 J	3.7 J	30.0 J
Copper	78.3	50.1	27.9	46.3	57.2	87.6	32.9	16.9	47.2	22	34.1	29.3	18.5	278	17.2	113	16	67.5	27.9	63.6	14.9
Iron	11,800	15,300	21,500	16,900	16,900	9,040	16,000	28,400	16,200	16,500	24,300	8,630	19,000	18,000	17,300	16,800	30,100	16,700	16,200	11,400	24,000
Lead	18.7	17.7	7.3	26.5	32.5	43.5	8.7	7.2 J	25.9 J	8.6 J	51.5 J	27.8 J	8.4 J	10.6 J	6.8 J	17.4 J	7.9	15.2 J	8.0 J	28.3 J	9.1 J
Magnesium	844 J	1,280	5,130	2,340	2,150	687 J	1,350	4,890	1,560	1,650	1,830	726 J	2,450	1,320	1,560	1,190	5,110	1,470	1,800	926 J	3,090
Manganese	106	253	388 J	246 J	327	82.7	297	342 J	365 J	170 J	605 J	76.0 J	1,000 J	162 J	459 J	157 J	386 J	175 J	343 J	112 J	943 J
Mercury	--	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	2.1	--	--	2.8	3	4.3	1.3	--	--	--	--	5.1	--	--	--	1.6	--	1.7	--	4.7	--
Nickel	10.2 J	17.5	58.9	23.7	24.5 J	8.6 J	34.9 J	60.8	21.7	22.3	29.1	7.6 J	50.3	18.3	33.1	20.5	59.1	23	26	14	39.5
Potassium	1,500 J	1,260 J	1,240 J	2,390 J	1,830 J	2,420 J	1,030 J	881 J	1,340 J	797 J	1,530 J	1,320 J	1,190 J	2,450 J	867 J	1,810 J	967 J	1,210 J	796 J	1,570 J	648 J
Selenium	3.3	1.5	1.3	3.4	2.4	3.3	0.58 J	0.95 J	1.9	0.58 J	4.7	4.2	2.5 J	0.81 J	0.61 J	1.8	--	1.4	0.61 J	3.6	1.3 J
Silver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.4 J	--
Sodium	--	--	--	--	--	3210	--	419 J	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	62.5	54.9	45	62.6	60.7	40.4	48.2	64.8	55.4	45.6	86.5	66.5	53.3	132	45.9	74.5	66.4	57.7	51.3	61.5	52.6
Zinc	97.3	204	236 J	160 J	236	107	1010	179 J	127 J	107 J	144 J	79.8 J	189 J	324 J	170 J	182 J	44.4 J	212 J	84.3 J	210 J	168 J
Volatile Organic Compounds (µg/kg)																					
4-methyl-2-pentanone	NA	--	--	5 J	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	5 J	--	4 J
Acetone	NA	--	--	5 J	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	5 J	--	4 J
Toluene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	--	--	--
Semivolatile Organic Compounds (µg/kg)																					
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	350	390	NA	NA	360	450	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHS	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs																					
4,4'-DDE	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	--	--	NA	NA	8 J	3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-chlordane	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	--	--	NA	NA	--	4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma-chlordane	NA	NA	NA	NA	NA	NA	--	--	NA	NA	1 J	--	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
-- = not detected
J = estimated concentration
NA = not analyzed
DL = detection limit
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

PRELIMINARY ASSESSMENT ANALYTICAL RESULTS FOR SOILS FROM 0 TO 2 FEET BELOW GROUND SURFACE
AT AREA OF CONCERN 1, NWSSBD CONCORD, CALIFORNIA

Sample Location	GB42	GB42	GB43	GB43	GB44	GB44	GB45	GB45	GB46	GB46	GB47	GB47	GB48	GB48	GB49	GB49	GB52	GB52
Previous ID																		
(depth, ft below grade)	0.5 - 1	1 - 1.5	0.25 - 0.75	0.75 - 1.25	0.25 - 0.5	0.5 - 1	0.25 - 1	1.5 - 2	0.25 - 0.75	0.75 - 1.25	0.25 - 0.75	0.75 - 1.25	0.25 - 0.75	0.75 - 1.25	0.5 - 1	1 - 1.5	0.5 - 1	1 - 1.5
Material	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil	waste	soil
Metals (mg/kg)																		
Aluminum	11,900	22,200	22,000	17,300	12,300	11,100	17,800	21,500	11,800	9,860	15,500	18,600	11,300	13,000	12,500	9,970	13,900	12,800
Antimony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	11	7.7	73.5	76.4	19.3	6.2	13	4.9	12.5	7.6	10	6.3 J	13.7 J	7.2 J	19.3 J	7.8 J	10.2 J	8.9 J
Barium	177	138	170	129	155	189	162	225	139	136	165	139	156	179	152	142	166	168
Beryllium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.1	--	29.2	10	3.4	1.4	5.7	9.2	2.5	1.2	5.1	4.0 J	4.6 J	2.6 J	3.6 J	5.4 J	2.2 J	0.86 J
Calcium	2,890	4,240	4,700	2,530	2,550	2,250	2,860	2,790	5,070	2,300	2,820	3,510	2,340	2,090	5,070	3,310	9,880	3,970
Chromium	29.8	43.8	51.5	34.2	31.4	27.4	51.3	37.4	26.9	22.2	33.8	30.4	24	24.8	30.3	23.5	45.7	28.8
Cobalt	11.2	5.1 J	20.4	21.7	14.9	10.1 J	7.5 J	19.7	7.3 J	9.5 J	17.5	10.4 J	9.6 J	10.8 J	5.7 J	7.9 J	11.5	9.5 J
Copper	18.0 J	14.7 J	113 J	22.5 J	32.9 J	18.2 J	37.9 J	13.3 J	19.6 J	14.2 J	25.9 J	15.7	25.3	16.3	336	70	34.7	35.6
Iron	17,800	25,600	20,300	20,000	16,100	16,700	17,500	22,800	13,400	12,800	15,100	19,900	13,400	14,200	16,200	13,100	22,500	17,500
Lead	11.1	6.3	21.2	7.7	33.7	8	23.8	7.8	11.9	6.7	14.2	6.1	32.7	10.7	273	53.9	98.8	299
Magnesium	1,740	3,670	1,600	2,200	1,490	1,590	1,280	3,310	1,350	1,420	1,440	2,610	1,380	1,500	1,660	1,530	6,820	2,570
Manganese	288	182	321	1130	429	226	207	886	175	267	522	360 J	347 J	396 J	156 J	227 J	503 J	335 J
Mercury	--	--	--	--	0.69	--	--	--	--	--	--	--	0.76	--	4.3	1.3	--	1.7
Molybdenum	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	19.7	30.9	22.6	45	21.1	19.7	19.2	46.4	18.7	17.1	19	26.7	18.2	17.9	15.2	21.1	43	20.5
Potassium	1110	778 J	2170	1120	1230	945 J	1220	696 J	898 J	739 J	916 J	833 J	746 J	721 J	790 J	637 J	928 J	736 J
Selenium	1.2	--	1.8	1.3	3	--	2.3	--	--	--	1.5	--	2.6	--	20.5	4.6	2.7	9.1
Silver	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	47.4	54.4	82.5	54.4	48.1	44.7	65.6	53.7	38.9	36.2	59.6	47.8	44.8	44.5	51	37.8	41.9	46.4
Zinc	60.5	35.8	305	291	108	73.5	97.8	136	70.7	48.5	95.7	125 J	93.1 J	99.5 J	147 J	246 J	197 J	140 J
Volatile Organic Compounds (µg/kg)																		
4-methyl-2-pentanone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	0.8 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (µg/kg)																		
Benzo(a)anthracene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Benzo(a)pyrene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Benzo(b)fluoranthene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Benzo(k)fluoranthene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Chrysene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Fluoranthene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Phenanthrene	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Phenol	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Pyrene	340	360	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	350	400	NA	NA	NA	NA
Total PAHS	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Pesticides/PCBs																		
4,4'-DDE	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
4,4'-DDT	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Aldrin	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Alpha-chlordane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Aroclor-1248	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Aroclor-1254	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Dieldrin	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA
Gamma-chlordane	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	NA	NA	NA	NA

Notes:
-- = not detected
J = estimated concentration
NA = not analyzed
DL = detection limit
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

APPENDIX B
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 were 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

Tetra Tech EM Inc. (Tetra Tech). 2002. "Draft Sampling and Analysis Plan for Time-Critical Removal Action and Supplemental Action Plan Site 31 (Area of Concern 1), Naval Weapons Station Seal Beach Detachment Concord, Concord, California." May.

U.S. Environmental Protection Agency (EPA). 1983. "Methods for Chemical Analysis of Water and Waste." EPA-600/4-79-020. March.

EPA. 1994a. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review." Document No. EPA-540/R-94-013. February.

EPA. 1994b. "USEPA Contract Laboratory Program Statement of Work for Organic Analysis." Document No. OLM03.1. August.

EPA. 1995. "USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, Multi-media, Multi-concentration." Document No. ILM04.0. September.

EPA. 1996. "Test Methods for Evaluating Solid Waste." SW-846. Volumes IA through IC. Office of Solid Waste and Emergency Response. Washington, DC. Third Edition. Final Update III. December.

EPA. 1997. "EPA Guidance for Quality Assurance Project Plans." EPA QA/G-5. Final.

EPA. 1999. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review." Document No. EPA-540/R-94/012. October.

APPENDIX C
HOT SPOT DELINEATION SAMPLE ANALYTICAL RESULTS

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco. CA 94105
415-543-4880
Fax 415-549-5480

Chain of Custody Record No. 5177

Page 1 of 2

Project name: CONCORD AOCI TCRA	Lab PO#: 022233	Lab: Lauck's Testing Lab. INC.	5177
Project (GTO) number: 267	TtEMI technical contact: Sara Woolley	Field samplers: Caitlin Gorman, Michelle Murphy	No./Container Types
	TtEMI project manager: RIK 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 (8oz)			VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Selenium	Lead	Mercury
001AOC1SS005	~~COMPOSITE 6"-9" D9 2,3,4~~	6/4/02	1500	Soil						1									X	X	X
001AOC1SS004	C9 COMPOSITE 1,2,3,4 (6"-12")		1545							1									X	X	X
001AOC1SS003	B9 COMPOSITE 1,2,3,4 (1.5-2')		1615							1									X	X	X
001AOC1SS002	B8 COMPOSITE 1,2,3,4 (0-.5)		1645							1									X	X	X
001AOC1SS006	D8 COMPOSITE 1,2,3,4 (0"-6")		1730							1									X	X	X
001AOC1SS007	D7 COMPOSITE 1,2,3,4 (0"-6")	6/5/02	0925							1									X	X	X
001AOC1SS008	C7 COMPOSITE 1,2,3,4 (0"-6")		1115							1									X	X	X
001AOC1SS001	B7 COMPOSITE 1,2,3,4 (.5-1')		1140							1									X	X	X
~~001AOC1SS009A~~	~~C7 COMPOSITE C7-1,2,4 (0.5'-1.5')~~		~~1150~~																		
001AOC1SS021	K11 COMPOSITE 1,2,3,4 (0'-1.5')		1310							1									X	X	X
001AOC1SS022	J11 COMPOSITE 1,2,3,4 (0"-12")		1335							1									X	X	X
001AOC1SS015	I11 COMPOSITE 1,2,3,4 ~~(6"-12")~~ (0-6")		1205							1									X	X	X

	Name (print)	Company Name	Date	Time
Relinquished by: Michelle Murphy	MICHELLE MURPHY	TtEMI	6/5/02	1900
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks: 48 HOUR TAT ON ALL SOIL SAMPLES

STANDARD TAT ON WATER

Fed Ex #:

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

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. 5178

Page 2 of 2

Project name: CONCORD AOC I TCRA	Lab PO#: 022233	Lab: LAUCKS TESTING LAB INC.	
Project (CTO) number: 267	TtEMI technical contact: SARA WOOLLEY	Field samplers: CAITLIN GORMAN MICHELLE MURPHY	
	TtEMI project manager: RIK LANTZ	Field samplers' signatures:	

5178

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber (1/2)	500 ml Poly	Sleeve	Glass Jar (8oz.)	VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Selenium	LEAD	MERCURY
001AOC1SS020	K12 COMPOSITE 1-4 (0'-1')	6/5/02	1140	SOIL						1							X	X	X
001AOC1SS016	I12 COMPOSITE (1-4) (0'-1')	6/5/02	1435	SOIL						1							X	X	X
001AOC1SS019	K13 COMPOSITE (1-4) (0-1.5')	6/5/02	1625	SOIL						1							X	X	X
001AOC1SS018	J13 COMPOSITE (1-4) (0-1')	6/5/02	1610	SOIL						1							X	X	X
001AOC1SS017	I13 COMPOSITE (1-4) (0'-1')	6/5/02	1545	SOIL						1							X	X	X
001AOC1RW001*	RINSATE H_2O-Geoprobe shoe	6/5/02	1640	WATER		1											X	X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	MICHELLE MURPHY	TtEMI	6/5/02	1820
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

48 HOUR TAT ON ALL SOIL SAMPLES

*STANDARD TAT ON WATER

Fed Ex #:

WHITE-Laboratory Copy · YEL ample Tracker · PINK-File Copy

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. 5179

Page 1 of 1

5179

Project name: CONCORD AOC1 TCRA	Lab PO#: 02233	Lab: LAUCKS TESTING LAB, INC	
Project (CTO) number: 267	TtEMI technical contact: SARA WOOLLEY	Field samplers: CAITLIN GORMAN MICHELLE MURPHY	
	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 (8oz)	Preservative Added	Analysis Required: VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Selenium	Lead	Mercury
001AOC1SS009	B10 COMPOSITE 1-4(0-.5')	6/20/02	1120	SOIL						1								X	X	X
001AOC1SS010	C10 COMPOSITE 1-4(0-3')	6/20/02	1140	SOIL						1								X	X	X
001AOC1SS011	D10 COMPOSITE 1-4(0.5-1.5')	6/20/02	1205	SOIL						1								X	X	X
001AOC1SS012	E10 COMPOSITE 1-4(0.5-1.5')	6/20/02	1110	SOIL						1								X	X	X
001AOC1SS013	E9 COMPOSITE 1-4(.5-1')	6/20/02	1410	SOIL						1								X	X	X
001AOC1SS014	E8 COMPOSITE 1-4(0-1.5')	6/20/02	[illegible]	SOIL						1								X	X	X

	Name (print)	Company Name	Date	Time
Relinquished by:	[illegible]	[illegible]	[illegible]	[illegible]
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks: 48 HOUR TAT ON ALL SOIL SAMPLES

Fed Ex #:

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

Chain of Custody Record No. 3726

Page ___ of ___

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

Project name:	**Lab PO#:**	**Lab:**	3726
Project (CTO) number:	**TtEMI technical contact:** Sara Worley	**Field samplers:**	**No./Container Types** / **Analysis Required**
	TtEMI project manager: Kik Lantz	**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	VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Preservative Added
[illegible]	E9		12/7	0930	SOIL						X							
[illegible]	E10			1210							X							
[illegible]	E11			1301							X							
[illegible]	D11			1505							X							
[illegible]	E11			1415							X							
[illegible]	WG1	(T)	12/7	0845	SOIL						X	X	X	X		X	X	
[illegible]	WG1	(m)		0915							X	X	X	X		X	X	
[illegible]	WG1	(e)		0945							X	X	X	X		X	X	
[illegible]	WG2	(T)		0900							X	X	X	X		X	X	
[illegible]	WG2	(m)		0930							X	X	X	X		X	X	
[illegible]	WG2	(e)		1005							X	X	X	X		X	X	

	Name (print)	Company Name	Date	Time
Relinquished by:	Taylor Sterling	Tt	12/8	1000
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 3955 1213 1358

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

USEPA - CLP
-1-

B7

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
001AOC1SS001

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-08

Level (low/med): LOW Date Received: 6/6/02

% Solids: 88.8

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	158		*	P
7782-49-2	Selenium	21.2		N*E	P
7439-97-6	Mercury	0.10	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. B8

001AOC1SS002

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-04

Level (low/med): LOW Date Received: 6/6/02

% Solids: 87.7

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	17.2		*	P
7782-49-2	Selenium	3.4		N*E	P
7439-97-6	Mercury	0.10	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. B9

001AOC18S003

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-03

Level (low/med): LOW Date Received: 6/6/02

% Solids: 81.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	63.3		*	P
7782-49-2	Selenium	7.0		N*E	P
7439-97-6	Mercury	1.5			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. B-10

001AOC1SS009

Lab Name: Laucks Laboratories Contract: TTEMI Concord

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC2

Matrix (soil/water): SOIL Lab Sample ID: 0206472-01

Level (low/med): LOW Date Received: 6/21/02

% Solids: 90.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	10.0		N*	P
7782-49-2	Selenium	1.5		N*E	P
7439-97-6	Mercury	0.018	B	*	CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. C7

001AOC1SS008

Lab Name: Laucks Laboratories Contract: Concord ACCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-07

Level (low/med): LOW Date Received: 6/6/02

% Solids: 91.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	36.8		*	P
7782-49-2	Selenium	4.3		N*E	P
7439-97-6	Mercury	0.23			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. C9

001AOC1SS004

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-02

Level (low/med): LOW Date Received: 6/6/02

% Solids: 86.1

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	323		*	P
7782-49-2	Selonium	28.7		N*E	P
7439-97-6	Mercury	8.4			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. C-10

001AOC1SS010

Lab Name: Laucks Laboratories Contract: TTEMI Concord

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC2

Matrix (soil/water): SOIL Lab Sample ID: 0206472-02

Level (low/med): LOW Date Received: 6/21/02

% Solids: 90.3

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	68.0		N*	P
7782-49-2	Selenium	5.3		N*E	P
7439-97-6	Mercury	0.068	B	*	CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

D7

EPA SAMPLE NO.

001AOC1SS007

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-06

Level (low/med): LOW Date Received: 6/6/02

% Solids: 91.1

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	83.6		*	P
7782-49-2	Selenium	6.5		N*E	P
7439-97-6	Mercury	0.70			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. D8

001AOC1SS005

Lab Name: Laucks Laboratories Contract: Concord AOC1 TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-05

Level (low/med): LOW Date Received: 6/6/02

% Solids: 83.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	292		*	P
7782-49-2	Selenium	22.3		N*E	P
7439-97-6	Mercury	2.8			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. D9

001A0C1SS005

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-01

Level (low/med): LOW Date Received: 6/6/02

% Solids: 78.9

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	631		*	P
7782-49-2	Selenium	42.8		N*E	P
7439-97-6	Mercury	20.4			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. D-10

001AOC1SS011

Lab Name: Laucks Laboratories Contract: TTEMI Concord

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC2

Matrix (soil/water): SOIL Lab Sample ID: 0206472-03

Level (low/med): LOW Date Received: 6/21/02

% Solids: 86.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	131		N*	P
7782-49-2	Selenium	12.6		N*E	P
7439-97-6	Mercury	3.1		*	CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

D 11

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SS026

Lab Name: Laucks Laboratories Contract: TCRA & Sup Sampl

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC8

Matrix (soil/water): SOIL Lab Sample ID: 0212264-04

Level (low/med): LOW Date Received: 12/14/02

% Solids: 81.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	197			P
7782-49-2	Selenium	21.9			P
7439-97-6	Mercury	5.1			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Yellow Clarity After: Artifacts:

Comments:

161

USEPA - CLP
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. E-8

001AOC1SS014

Lab Name: Laucks Laboratories Contract: TTEMI Concord

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC2

Matrix (soil/water): SOIL Lab Sample ID: 0206472-06

Level (low/med): LOW Date Received: 6/21/02

% Solids: 90.7

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	33.4		N*	P
7782-49-2	Selenium	3.8		N*E	P
7439-97-6	Mercury	0.28		*	CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. E9

001AOC1SS013

Lab Name: Laucks Laboratories Contract: TTEMI Concord

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC2

Matrix (soil/water): SOIL Lab Sample ID: 0206472-05

Level (low/med): LOW Date Received: 6/21/02

% Solids: 90.5

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	78.1		N*	P
7782-49-2	Selenium	12.1		N*E	P
7439-97-6	Mercury	0.79		*	CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. E-10

001AOC1SS012

Lab Name: Laucks Laboratories Contract: TTEMI Concord

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC2

Matrix (soil/water): SOIL Lab Sample ID: 0206472-04

Level (low/med): LOW Date Received: 6/21/02

% Solids: 88.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	305		N*	P
7782-49-2	Selenium	31.0		N*E	P
7439-97-6	Mercury	0.22		*	CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

E11

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SS027

Lab Name: Laucks Laboratories Contract: TCRA & Sup Sampl

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC8

Matrix (soil/water): SOIL Lab Sample ID: 0212264-05

Level (low/med): LOW Date Received: 12/14/02

% Solids: 83.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	62.9			P
7782-49-2	Selenium	5.6			P
7439-97-6	Mercury	1.6			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Yellow Clarity After: Artifacts:

Comments:

169

F9

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SS023

Lab Name: Laucks Laboratories Contract: TCRA & Sup Sampl

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC8

Matrix (soil/water): SOIL Lab Sample ID: 0212264-01

Level (low/med): LOW Date Received: 12/14/02

% Solids: 86.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27500			P
7440-36-0	Antimony	0.52	U	N	P
7440-38-2	Arsenic	29.4		E	P
7440-39-3	Barium	217			P
7440-41-7	Beryllium	0.93	B		P
7440-43-9	Cadmium	19.3		N	P
7440-70-2	Calcium	6290			P
7440-47-3	Chromium	115		N	P
7440-50-8	Copper	46.1		*	P
7440-48-4	Cobalt	7.2	B	E	P
7439-89-6	Iron	20900			P
7439-92-1	Lead	12.0			P
7439-95-4	Magnesium	3900			P
7439-96-5	Manganese	249			P
7440-02-0	Nickel	24.0			P
7440-09-7	Potassium	3800		*E	P
7782-49-2	Selenium	1.1			P
7440-22-4	Silver	0.52	U		P
7439-97-6	Mercury	0.063	B		CV
7440-23-5	Sodium	1330			P
7440-28-0	Thallium	2.0	B		P
7440-62-2	Vanadium	148		N*	P
7440-66-6	Zinc	172		N	P

Color Before: Brown Clarity Before: Texture: Medium

Color After: Yellow Clarity After: Artifacts:

uments:

1690

FID

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SS024

Lab Name: Laucks Laboratories Contract: TCRA & Sup Sampl

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC8

Matrix (soil/water): SOIL Lab Sample ID: 0212264-02

Level (low/med): LOW Date Received: 12/14/02

% Solids: 90.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	12.9			P
7782-49-2	Selenium	1.4			P
7439-97-6	Mercury	0.052	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Yellow Clarity After: Artifacts:

Comments:

1691

USEPA - CLP

-1-

F11

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SS025

Lab Name: Laucks Laboratories Contract: TCRA & Sup Sampl

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC8

Matrix (soil/water): SOIL Lab Sample ID: 0212264-03

Level (low/med): LOW Date Received: 12/14/02

% Solids: 87.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	19.4			P
7782-49-2	Selenium	2.4			P
7439-97-6	Mercury	0.11	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Yellow Clarity After: Artifacts:

Comments:

1692

USEPA - CLP
-I-
INORGANIC ANALYSES DATA SHEET

I 11

EPA SAMPLE NO.
001AOC18S015

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-11

Level (low/med): LOW Date Received: 6/6/02

% Solids: 90.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	26.9		*	P
7782-49-2	Selenium	2.8		N*E	P
7439-97-6	Mercury	0.078	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-

I / 2

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
001AOC1SS016

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-13

Level (low/med): LOW Date Received: 6/6/02

% Solids: 67.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	31.8		*	P
7782-49-2	Selenium	2.2		N*E	P
7439-97-6	Mercury	0.079			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-
INORGANIC ANALYSES DATA SHEET

I 13

EPA SAMPLE NO. 001AOC1SS017

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-16

Level (low/med): LOW Date Received: 6/6/02

% Solids: 87.8

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	31.8		*	P
7782-49-2	Selenium	2.1		N*E	P
7439-97-6	Mercury	0.079	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-I-
INORGANIC ANALYSES DATA SHEET

J11

EPA SAMPLE NO.

001A0C1SSC22

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-10

Level (low/med): LOW Date Received: 6/6/02

% Solids: 89.8

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	27.0		*	P
7782-49-2	Selenium	2.6		N*E	P
7439-97-6	Mercury	0.026	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-

J13

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SS018

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-15

Level (low/med): LOW Date Received: 6/6/02

% Solids: 88.5

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	26.9		*	P
7782-49-2	Selenium	2.2		N*E	P
7439-97-6	Mercury	0.050	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-
INORGANIC ANALYSES DATA SHEET

K11

EPA SAMPLE NO.
001AOC1SS021

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-09

Level (low/med): LOW Date Received: 6/6/02

% Solids: 91.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	19.4		*	P
7782-49-2	Selenium	3.0		N*E	P
7439-97-6	Mercury	0.071	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

K12

EPA SAMPLE NO.

001AOC1SS020

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-12

Level (low/med): LOW Date Received: 6/6/02

% Solids: 88.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	41.6		*	P
7782-49-2	Selenium	3.3		N*E	P
7439-97-6	Mercury	0.093	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP
-1-

K13

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
001AOC1SS019

Lab Name: Laucks Laboratories Contract: Concord AOCI TCR

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC1

Matrix (soil/water): SOIL Lab Sample ID: 0206122-14

Level (low/med): LOW Date Received: 6/6/02

% Solids: 89.9

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	27.5		*	P
7782-49-2	Selenium	2.8		N*E	P
7439-97-6	Mercury	0.084	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

APPENDIX D
HOT SPOT DELINEATION BORING LITHOLOGIC LOGS

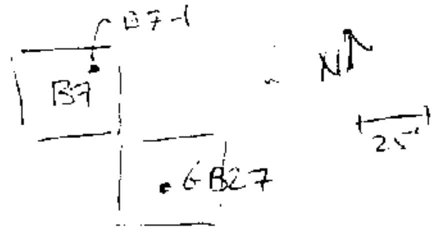
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: B7-1	Date Started: 6/5/02
Drilling Method: (Circle one) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Outer Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: B & Ernesto
Depth to Water (ft./bgs.): NA	Location Sketch:

NE 1/4 OF GRID B7



Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time / Blow count (per 6 inches) / Utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3				SILTY SAND (as in B7-3)	ML		0.0
			001-1	1140	possible trace gypsum sand @ 0.5'			
					~~possible ash material?~~ CG			
1							NA	
2					GYPSUM SAND (2") AT 2.5'			
3					TD = 3.0'			
					Boring backfilled w/ bentonite chips 6/5/02			
					~~No unusual horizons~~ CG			
					COMPOSITE SAMPLE 001A001SS007			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B7-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: COOPMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

SE 1/4 OF GRID B7

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	6.3	6.3	001-2	1140	SILT w/ SAND (as in B7-3). Possible ash material from 0.5-1.0 – very thin layer (~2")	ML	NP	6
1								
2								
3					TD = 3.0' Boring backfilled w/ bentonite Chips 6/5/02 COMPOSITE SAMPLE 001 ACC1SS001 0.5-1.0'			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: B7-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SW 1/4 OF GRID B7

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3				SILT WITH SAND; brown (10YR 5/3), dry, med loose. ~~[illegible]~~	ML	NA	0.0
			001-S		4" LAYER OF GYPSUM SAND @ FROM 0.7-1.0			
			001-A		~~TRACE BRICK FRAGMENTS FROM 1.0-1.3'~~ REDDISH STAIN FROM 1.0-1.5' TRACE BLACK CINDER MATERIAL @ 1.5' ABOUT 2" HORIZON.			6.0
1					DISCONTINUOUS POCKETS OF GYPSUM SAND FROM 1-3'			
2								
3					TD = 3.0' Boring backfilled w/ bentonite chips 6/5/02			
					[COMPOSITE SAMPLE 001 ADC1 SSC01]			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B7-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GOODMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch

NW 1/4 OF GRID B7

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3				SILT WITH SAND (as in B7-3)			
			B7-4		poss trace gypsum sand @ 0.5'			6.0
1			@A			ML	NA	
2								
3					TD = 3.0'			
					~~No soil horizon identified (fill material)~~ Co			
					COMPOSITE SAMPLE CO1ACC1SS001			
					CO1ACC1SS001/A horizon/Cinder material in B7-3 & B7 only			

Boring backfilled w/ bentonite chips 6/5/02

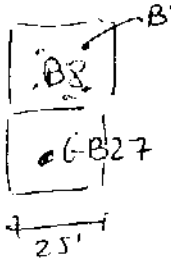
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B8-1	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: ~~6/4/02~~ 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: 2"	Driller: ERNST
Depth to Water (ft./bgs.) N/A	Location Sketch.

NE 1/4 OF GRID B8



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
	0	0-3'	3'	002		~~SILTY~~ SANDY SILT, brown (7.5YR 5/2), dry, stiff to V. stiff, ~20% sand, ~20% clay ~60% SILT, trace gravel, trace organic material.	ML	NA	0.0
	1					BECOMES NEARLY LITHIFIED @ ~2' (gradual)			
	2								
	3					TD = 3.2'			
						No unusual soil horizons identified.			
						001 AOC1 SSC02			
						Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B8-2	Date Started: 4/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SE¼ OF GRID B8

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1625	0	0-5	5/5	002		SEE B8-1 (SANDY SILT)	ML	N/A	0.0
						~~POSSIBLE GYPSUM SAND LENS AT 2.0-2.5'~~			
	2					THIN LAYER OF GYPSUM SAND @ 2.0' (~3" THICK). ~~SAND~~ SILT BECOMES DARK YELLOWISH BROWN (10YR 4/4) AT ~2.5'. BECOMES SLI. MOIST.			
	3					TD = 3.0'			
						Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B8-3	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GOODMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: ~~2"~~ N/A	Driller: ERNEST
Depth to Water (ft./bgs.) N/A	Location Sketch:

SW 1/4 OF GRID B8

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1615	0	0-3		0-2-3		SILT brown (7.5YR5/2), dry, stiff	ML	N/A	0.0
	1					becomes med loose at 1.5'			
						~~Asbestos material x 3" at 1.5' (may be CB~~			
	2					GYPSUM SAND @ ~~1.5~~ to 2.0'			
	3					No unusual soil horizon identified (no waste)			
						Boring backfilled w/ bentonite chips on 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B8-4	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. BOEHMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

NW 1/4 OF GRID B8

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
1635	1	0-3'	0-3'	002		SEE B8-1 (SANDY SILT)	ML	N/A	0.0
	2					GYPSUM SAND @ 2.0' (~4" thick)			
	3					TD = 3.0' Boring backfilled w/ bentonite chips 6/5/02			

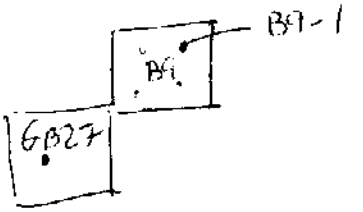
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B9-1	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: 2" N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

NE ¼ OF GRID B9



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1545	0	0-3'				SANDY SILT, brown (7.5YR 5/2), dry, med stiff, ~20% sand, ~10% clay, trace gravel (up to 0.5")	ML		0.0
	1					No unusual soil horizons identified. Up to 5% organic material (roots, etc.) BECOMES V. STIFF AT ~2.0' (NEARLY LITHIFIED).		N/A	
	2			B3-1		Collect sample just above solidified gypsum			
	3					TD = 3.0'			
						Boring backfilled w/ bentonite chips 6/5/02			
						SAMPLE 001 AOC 1 SS 003			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B9-2	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SE 1/4 OF GRID B9

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1550	0	0-3'				SEE B9-1	ML		0.0
	1					No unusual soil horizons identified.		N/A	
	2			B3-2		Collect sample just above lithified gypsum layer.			
	3					TD = 3.0'			
						Boring backfilled w bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B9-3	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: ~~6/4/02~~ 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: ~~2"~~ N/A	Driller: ERNEST
Depth to Water (ft./bgs.) N/A	Location Sketch

SW 1/4 OF GRID B9

Time	Depth (ft) bgs	Drive interval	Recovered interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1005	0	0-3				SEE B9-1 (SANDY SILT)	ML	NA	0.2
	1					POSSIBLE ASH-LIKE MATERIAL FROM ~~1.0 - 1.5~~ 1.5'-2.0' bgs V. FINE light ~~grayish~~ brownish gray (10YR 6/2) ASH? COLLECT SAMPLE FOR ALL GRID B9 LOCATIONS FROM 1.5-2.0' bgs			
	2			B9-3					
	3					TD = 3.0' COLLECT COMPOSITE SOIL SAMPLE OU1 AOC1 SSC03 Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: BG-4	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/4/02 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: 2"	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

NW 1/4 OF GRID BG

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1600	0	0-3'	0-3'			SEE BG-1 (SAND of SILT)	ML	N/A	0.
	1					No unusual soil horizons identified.			
				03-4					
	2					collect sample just above lithified gypsum layer			
	3					TD = 3'			
						COLLECT COMPOSITE SAMPLE @01 AQ155003			
						Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: B10-1	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3	0-3	009		SILT w/ SAND, brown (7.5YR 5/2), dry, med stiff, ~20% sand, no ash. no gypsum. NO waste identified.	ML	NA	0.0
1								
2								
3					TD = 3.0 Boring backfilled w/ bentonite chips ~~4570~~ 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: B10-2	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SE 1/4 OF GRID B10

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1040	0-3	0-3	009		SILT, brown (7.5YR 5/2), dry, med stiff, ~10% sand, ~5% clay, trace gravel.	ML	N/A	0.0
1					NO ash, collect sample 0-0.5. no waste identified			
2								
3					TD = 3.0'			
					Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: B10-3	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3	0.3'	009		SILT, brown, dry, v. stiff no ash, no gypsum	ML	NA	0.0
1								
2								
3					TD = 3.0' Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

ring Number: B10-4	Date Started: 6/20/02
illing Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
ıter Diameter of Boring: 2"	Drilling Subcontractor: Precision
ıer Diameter of Well Casing: NA	Driller: Ernesto
pth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1138	0-3	0-3	009		SILT, brown, dry, v. stiff no ash, no gypsum. no waste identified.	ML		
1								
2								
3					TD = 3.0' Boring backfilled w/ bentonite chips 6/20/02			

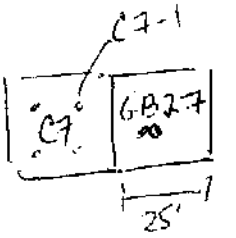
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: C7-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

NE 1/4 OF GRID C7



Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3'		008		SILT WITH SAND, brown (10YR 5/2), dry; Med loose; ~15% sand, ~5% gravel ~10% clay, trace rootlets	ML	NA	0.0
1			008A		Slight rust stain, trace cinder material @ 1.5' (~2" zone).			
2								
3					TD = 3.0' Boring backfilled 6/5/02 (bentonite chips) COMPOSITE SAMPLE 001 AOC 155008 008A = C7-1 + C7-4 only (refused on attempt 2).			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: C7-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

SE 1/4 OF GRID C7

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1	0.8	C08		SILT WITH SAND (ASSM C7-1)	ML	N/A	0.0
1					2" LAYER OF GYPSUM SAND @ 1.0'			
					REFUSAL AT 1.0' ON HARDPAN (x3).			
2					Boring backfilled 6/5/02 (bentonite chips)			
					COMPOSITE SAMPLE 001 AOC 1 SS008			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: C7-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SW ¼ OF GRID C7

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Blow count (per 6 inch int.) / Pocket Pen. (tsf) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1.5'	1.5'	008	11.5	SILT WITH SAND, brown (10YR 5/2), dry; Med loose, ~15% SAND, ~5% GRAVEL (ANGULAR, UP TO 1"), ~10% CLAY, TRACE ROOTLETS.	ML	N/A	0.0
1					3" THICK LAYER OF GYPSUM SAND @ 1.3' BGS			
					REFUSAL AT 1.5' x3			
2					No unusual horizons identified.			
3					Boring backfilled 6/5/02 (bentonite chips)			
					COMPOSITE SOIL SAMPLE 001 ACC15S008			
					~~001 ACC15S008~~			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: C7 - 4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

NW 1/4 OF GRID C7

Depth (ft) bgs	Drive Interval	Recovered interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0940 0	0-3		C08-4	1115	SILT WITH SAND, brown (10YR 5/2), dry, med loose, ~15% SAND, 5% gravel (up to 0.5in) 5% CLAY, trace rootlets	ML		0.0
1			C08A	00	becomes SLI MOIST @ ~1.0' TRACE CINDER @ 1.0' DISCONTINUOUS SMALL POCKETS OF GYPSUM SAND FROM 1.0-3.0		NA	
2					CLAY CONTENT INCREASES TO ~15% BY 2.0'			
3					TD = 3' No unusual horizons (no visible) ~~soil~~ identified. Boring backfilled w/ bentonite chips 6/5/02 COMPOSITE SAMPLE OF ACC155008 C08A (1.25-1.75')			

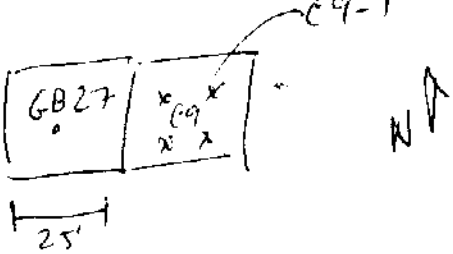
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: C9-1	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: COORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

NE 1/4 of GRID C9



Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. Utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0					GRASS @ Surface			
1	0-3'	0.3	004		Silt with sand, light brown (7.5YR 6/4), dry; med stiff, ~20% sand, ~10% clay, trace gravel. No ash layer.	ML	NA	0.0
2					Small packet of gypsum sand (trace) @ 2.5-3.0'.			
3					TD = 3.0'			
					Collect sample @ 0.5-1.0' (same interval as ~~ash~~ depth to ash in ~~C9 and~~ C9-3 and C9-4).			
					Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: C9-2	Date Started: 6/14/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/15/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SE 1/4 OF GRID C9

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
	0	0-3	0-3			SEE C9-1 (SILT WITH SAND)			
				C9-2		No unusual material identified (no waste) collect soil from horizon where ash was identified in C9-3 + C9-4.	ML	N/A	0.
	1								
	2					Patches of Gypsum sand from 2'-3'.			
	3					TD = 30'			
						COMPOSITE SOIL SAMPLE 001 AOC1 SSC04 COLLECTED (6"-12")			
						Boring backfilled w/ bentonite Chips 6/15/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

E Number: C9-3	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

SW 1/4 OF GRID C9

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
	0	0-3	0-3	004-3		SILTY SANDY brown (7.5YR 5/2), dry; med stiff ~20% Sand, trace gravel, ~~trace clay~~ (up to 10% clay)	ML	NA	0.0
	1					Distinct ash layer from ~6" to 12"			
	2					Gypsum sand starts directly below ash layer ~6" THICK. SANDY SILT BELOW GYPSUM, becomes stiff w/ depth. ~20% clay, sli. plasticity in clayey portions.			
	3					TD = 3' Boring backfilled w/ bentonite chips 6/5/02 COMPOSITE SOIL SAMPLE 001 ACC1 SS004 (6"-12")			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: C9-4	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

NW 1/4 OF GRID C9

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
	0	0-3	0-3	C04-4		see C9-3 possible ash material @ 0.5'	ML	NA	0.
	1								
	2								
	3					TD = 3' Boring backfilled w/ bentonite chips 6/5/02 ~~Composite soil~~			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: ~~C9-1~~ C10-1	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/(GeoProbe)/Hand Auger Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Date Completed: "
	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.): NA	Location Sketch:

NE 1/4 OF GRID C10

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3'	0-3'	0c0		SILT w/ SAND (see C10-2)	ML	NA	0.0
					No ash, no gypsum.			
1								
2								
3					TD = 3.0'			
					Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: ~~SB~~ C10-2	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

SE 1/4 OF GRID C10

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time / Blow count (per 6 inches) / V.O. utility / type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0945 0	0-3'	0-3'	010		SILT & SAND, light brown (7.5YR6/4), dry, med loose ~ 10% clay, trace gravel. No ash layer No gypsum	ML		0
1								
2								
3					TD = 3.0' Boring backfilled w/ bentonite chips 001 AOC 155010 6/20/02			
4								

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: C10-3	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3	0-3	010		SILT w/ SAND (See C10-2) gypsum sand & pockets from 0.5-1.5' (Poss ash mixed w gypsum) Collect sample 0.5-1.0	ML	NA	0.0
1								
2								
3					TD=3.0 Boring backfilled w/ bentonite Chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: C10-4	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GOE-MAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1130	0-3	0-3			SILT, brown, v. dry, v. stiff, trace sand, trace gravel, low 15% clay.	ML	NA	0.0
1					gypsum in pockets Sand @ ~2.5' to 3.0' collect sample 2.5-3.0			
2								
			010					
3					TD = 3.0 Boring backfilled w/ bentonite Chips 6/20/02			

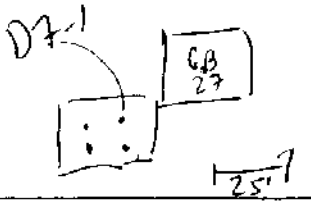
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: D7-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

NE 1/4 OF GRID D7



Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility TIME type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1.5'		D7-1	0925	SILT WITH SAND, brown (10YR 5/3), dry, mod loose, ~15% SAND, 5-10% GRAVEL (UP TO 1") & TRACE ROOTLETS, ~10% CLAY	ML	N/A	0.0
1					REFUSAL AT 1.5' x 3 ON COMPACTED GYPSUM? CONCRETE-LIKE MATERIAL "HARD PAN"			
2					No unusual horizon identified (no waste) Collect sample from 0"-6"			
3					Boring backfilled 6/5/02 (bentonite chips)			
					COMPOSITE SOIL SAMPLE 001-ACC1-SS007			

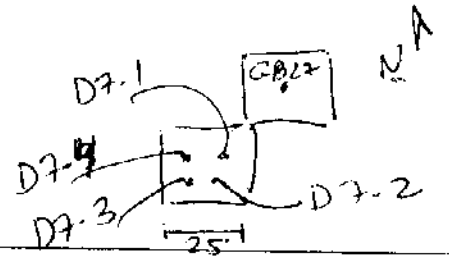
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D7-2	Date Started: 6/5/02
Drilling Method: (Circle one) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SE 1/4 OF GRID D7



Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
0540	0-1.2'	0-1.2'	D7-2	0925	~~SEE D7-1~~ SILT WITH SAND (as in D7-1)	ML	MA	0
1					REFUSAL @ 1.2' x 3 ON LITHIFIED GYPSUM / CONCRETE-LIKE MATERIAL; "HARDPAN" AND GYPSUM SAND IN SHOE.			
3					No unusual horizon identified (no water) Collect sample from 0"-6".			
					Boring backfilled 6/5/02 (bentonite chips)			

001A0C155007

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: D7-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SW1/4 OF GRID D7

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1'	0-1'	0073	0725	SILT WITH SAND (SEE D7-1).	ML	N/A	0.0
1					REFUSAL @ 1.0' x 3 ON "HARD PAN" HARDPAN + GYPSUM SAND IN SHOE. Boring Backfilled 6/5/02 (Bentonite chips) No unusual horizon identified. Collect Sample from 0" - 6" COMPOSITE SOIL SAMPLE OCI ACCI55007			
2								
3								

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D7-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GERMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

NW¼ of GRID B (Ca) D7

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0910 0	0-1	1.0	D7-4	0925	SILT WITH SAND (SEE D7-1)	ML	NA	0
1					REFUSAL @ 1.0' (x3) ON HARDPAN. HARDPAN + GYPSUM SAND IN SHOE. Boring backfilled 6/5/02 (bentonite chips) No unusual horizon identified (no waste) Collect Sample from 0"-6" COMPOSITE SOIL SAMPLE COLLECTED @ SS002			
2								
3								

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D8-1	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. BORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: 2" N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

NE¼ OF GRID D8

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
17	0	0-3	0-3	D8-1		SANDY SILT with clay, dark brown (10YR 3/3), dry, Med Stiff ~ 10% Sand, ~ 15% clay, trace gravel, trace organic material.	ML	NA	0.0
	1					GYPSUM SAND (patchy) @ ~1.0' to 1.5' = LIGHT GRAY (10YR 7/2) to GRAY (10YR 6/1)			
	2					SILT BECOMES MORE STIFF WITH DEPTH			
	3					TD = 3.0 No unusual soil horizon identified (no waste) Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D8-2	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: 2"	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

SE 1/4 of GRID D8

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1700	0	0-3	0-3	D8-2		See D8-1 (SANDY SILT)	ML	N/A	0.0
	1					GYPSUM SAND MIXED W SILT @ ~1.0 (~3" interval) NO ASH			
	2								
	3					TD - 3.0' No unusual soil horizons identified (No Waste) Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D8-3	Date Started: ~~7~~ am 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SW 1/4 OF GMD D8.

Time	Depth (ft) bgs	Drive interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
17[illegible]	0	0-3'	0-3'	D8-3		SEE D8-1 (SANDY SILT)	ML	N/A	0.0
	1					GYPSUM ~~ASH~~ SAND (~4") FROM 1.0-1.3' NO ASH			
	2								
	3					TD = 3.0 No unusual soil horizons identified. Boring backfilled of bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: DS-4	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GERMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

NW 44 of GRID D8

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0.3'	0.3'	DS-4		SEE DS-1 (SANDY SILT)	ML	N/A	1
1					REFUSAL @ 1.5' x 1 X2 = FULL RECOVERY			
2					No unusual horizons (no waste)			
3					TD = 3.0 REFUSAL IN CONCRETE-LIKE MATERIAL @ 1.5' - POSS HAND PACK			

Boring backfilled w/ bentonite chips 6/5/02

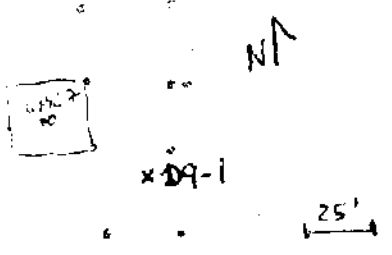
TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO- 267
Bldg./Site: AOC 1 / CONCORD
Project Name: NWS CONCORD

Boring Number: D9-1	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GERMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: 2"	Driller: ERNESTO
Depth to Water (ft./bgs.)	Location Sketch:

~~NE CORNER OF GRID~~
NE 1/4 OF GRID D9



Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inch int) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1417	0	0-2'		005	5" / 7"	GRASS AT SURFACE SILT, reddish gray to brown (7.5YR 5/2), dry, mid loose, ~20% sand, trace gravel very fine powdery gray/brown ash material from ~5" to 7"	ML		0.0
	1					Becomes SANDY SILT @ 1.0', brown (7.5YR 5/2) dry, stiff, ~~transition decreases with depth,~~ ~~trace fragments~~, up to Hard packed ~~SC~~ silt in shoe	ML / SM		
	2					REFUSAL AT 2' ~~0.1~~ TIGHT SILTY ~~CLAY~~			
						X3			
	3					Boring backfilled w/ bentonite Chips 6/5/02			
1417						COLLECT SAMPLE 001AOC1SS005			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D9-2	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

SE 1/4 OF GRID D9

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count / (per 6 inches) / type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1430	0	0-3'	3'			LOOSE SILTY GRAVEL W/ GRASS AT SURFACE			
						SANDY SILT, dry; brown (7.5YR 5/2), med loose	ML		
						v. distinct fine ash layer ~~often~~ from 7" to 10" bgs (Sampled).	ASH		6.0
	1					SANDY SILT BECOMES v. SOFT just below ash; CLAY CONTENT INCREASES TO ~20%, ~20% SAND, 60% SILT, TRACE GRAVEL.	ML	N/A	
				D9-2	6" 8"	6" GYPSUM SAND LAYER JUST BELOW/~~IN~~ ASH LAYER. HARD PAN MATERIAL IS WITHIN GYPSUM ~~MAT~~ LAYER.			
	2								
	3					TD=3.0'			
						Boring backfilled w/ bentonite chips 6/5/02			
						SAMPLE COLLECTED 1SS005			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Bo Number: D9-3	Date Started: 6/14/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/15/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: CGORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
nner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1500	0	0-1.5	0-1.5			SILT ~~with SAND~~ (as in D9-2.)			
						LOOSE SILTY SAND AT SURFACE			
				DC3	6" 8"	ASH LAYER (REPLY DEPLACED) FT ~ 6" - 8" (SAMPLED)	ML	N/A	0.0
						REFUSAL AT 1.5 ON "HARDPAN" x 2			
						REFUSAL AT 1.5 ON SAME x 1			
						TD=1.5'			
						BORING BACKFILLED W/ BENTONITE CHIPS 6/15/02			
						COMPOSITE SOIL SAMPLE 001A0C155005			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D9-4	Date Started: 6/4/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed:
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

NW 1/4 OF GRID D9

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
440	0	0-3'	0-3'	D9-4	6" 9"	SEE D9-2 (SILT) ASH LAYER FROM 6"-9" GYPSUM SAND JUST BELOW ASH	ML	N/A	0.
	1								
	2								
	3					TD = 3.0' Boring backfilled w/ bentonite chips 6/5/02 COMPOSITE SOIL SAMPLE COMPOSITED			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: D-10-1	Date Started: 6/20/02
Drilling Method: (Circle one) HSA Continuous Core/GeoProbe/Hand Auger Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Date Completed: "
	Logged By: C Gorman
Outer Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.): NA	Location Sketch:

NE1/4 OF GRID D10

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, d/a.	Description	USCS soil symbol	Well construction	OVM (ppm)
1002	0	0-3	0-3	~~0~~		SILT w/ SAND, light brown (7.5YR 6/4), dry, med loose, ~ 20% sand, trace gravel, trace clay.	ML		0.0
	1					~~Possible rock (? fine, light brown) @ ... from 0.25-1.0~~		NA	
	2								0.0
				011		gypsum sand in pockets 2.5-3.0			
	3					Collect sample 2.5-3.0'			
						TD = 3.0			
						Boring backfilled bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: DO-2	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
(1023) (1028)	0-1.5	0-1.5			SILT w/ SAND, brown, dry, med loose.			
0			011		sample becomes v. powdered @ 0.5' to 1.5' pass ash material. Collect sample 0.5 - 1.0.	ML	NA	0.0
					TD = 1.5' refusal on hardpan ("concrete") @ 1.5' X3			
					Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: D10-3	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/12
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Borman
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
	0-3	0-2.5'			SILT w/ SAND (see D10-1)	ML	N/A	0.0
1			D11		Sample becomes v. pebbled @ 0.5-1.5' poss ash? ~~(Ref #5)~~ Collect sample 1.0-1.5			
2								0.0
3					TD = 3.0 Refusal x1 @ 1.5 on hardpan (got through on 2nd try). Boring backfilled w/ bentonite chips			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: D10-4	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger (GeoProbe circled)	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Outer Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3	~~[illegible]~~ 2.0'			SILT w/ SAND (see D10-1)	ML		0.0
1			011		gypsum sand in pockets @ 0.75-1.25' poss trace ash @ 1.0'. Collect sample 0.75-1.25		NA	
2								0.0
3					TD = 3.0'			
					~~Refusal x 1 @ 1.5' [illegible] [illegible] got [illegible] on 2nd try. photo [illegible]~~			
					Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: D11 Quad A	Date Started/Completed: 12/2002
Drilling Method: Geoprobe	Location Sketch:
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring D11 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
				Top Soil			
				Clayey Silt med brown dry Stiff ~15% sand ~30% clay			
2	Sample			Silty. Ash, med grey white inclusions			
3				~~Sandy Silt~~ Clayey silt med brown dry stiff ~ 10% sand 35% clay			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: D11 Quad B	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: A B C D
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Starling	

Soil Boring D11

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
	Sample			Top Soil med brown			
1				silty sand tan, dry stiff, 5% sand			
2							
3				clay silt dark brown			
				No observed Ash or Contamination			
				Deployed 36" BSS - 36" Recovery			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

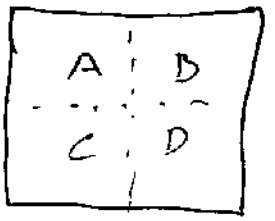
Boring Number: D11 Quad C	Date Started/Completed:
Drilling Method:	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring D11 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
				Top Soil			
	Sample			Silty Ash, dark brown or light grey Ash, dry, stiff. Random Intergration 30% Ash			
2				Same as above ~~less~~ 5-7% Ash.			
3				Deployed 36" BSS -38 Recovery			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: D11 Quad D	Date Started/Completed:
Drilling Method:	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring D11 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
				Top Soil			
1	Sample			Clayey ~~Clayey~~ Silt dark reddish brown light to med gray Ash deposites random intergrated stiff, dry trace gravel fine	ML		
2							
3				Deployed 3' BSS 39" recovery			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: E8-1	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

NW 1/4

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-2	0-2	014	1345	SILT W/SAND (see E8-4)	ML	NA	0.0
1					poss. ash material @ 0.5-1.5 collect sample 0.5-1.0			
2					TD = 2.0			
3					refusal on hardpan @ 2.0' x3			
					Boring backfilled w/ bentonite Chips on 6/20/02.			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: E8-2	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

SE 1/4

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1330	0-3	0-3	E8-4	1345	SILT & SAND (see E8-4)	ML	NA	1.0
1					poss ash 0.5-1.0 (collect sample) (trace)			
2								
3					TD = 3.0			
					Boring backfilled & bentonite chip 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: E8-3	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

SW 1/4 of Grid E8

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
	0-3	0-3			SILT & SAND (see E8-4)	ML	NA	0.0
1			~~014~~	1345				
2					Sample becomes powdered @ ~~2.5~~ 1.0 - 1.75' poss ash (trace) collect sample ~~1.25 - 1.75~~ 1.0 - 1.5			
3					TD = 3.0 Boring backfilled w/ bentonite Chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: E8-4	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

NW1/4 of Grid E8

	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time (Blow count; (per 6 inches))	Description	USCS soil symbol	Well construction	OVM (ppm)
1317	0	0-3	0-3	014	1345	SILT w SAND dark brown, dry, med loose ~15% sand, trace gravel, trace clay. NO ash. no gypsum. no waste identified.	ML	NA	0.0
	1					becomes v. stiff w depth (@ 2.0') + clay content increases to ~15%.			
	2								
	3					TD = 3.0' Boring backfilled w bentonite Chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: E9-1	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time / Blow count (per 6 inches) / V.O. Utility type, etc.	Description	USCS soil symbol	Well construction	OVM (ppm)
13'	0-3	0-3	013		SILT w/ SAND, brown, dry, med loose, ~20% Sand, trace gravel, trace clay. poss ash mixed w/ gypsum 0.5-1.5'	ML	NA	0.0
1								
2					becomes v. stiff (hard) w/ depth Clay Content incr. to ~~10%~~ 15%-20%			
3					TD = 3.0 Boring backfilled w/ bentonite Chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: E9-2	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / Y.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0								
1400 —	0-3	0-3			SILT w/ SAND, brown, dry, med loose	ML	NA	0-0
1			013	1410	poss trace ash @ 0.5-1.0 (trace gypsum) gypsum continues in pockets to 2.0'.			
2								
3					TD = 3.0			
					Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: E9-3	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

SW 1/4 OF GRID E9

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time / Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
13"	0-3	0-3	013		SILT ~~w/ Gravel~~ brown, dry, med stiff, ~5-10% Clay, trace gravel. poss ash mixed w/ gypsum @ 1.0' collect Sample 0.5-1.5'	ML	NA	0.0
3					TD=3.0 Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: E9-4	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1347	0-3	0-3	013		SILT & SAND, brown, dry, med loose, trace gravel, trace clay. Poss ash mixed w gypsum from 0.5-1.5 becomes ce (discontinuous pockets).	ML	NA	0.0
1								
2								
3					TD = 3.0 Boring backfilled w bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: E10-1	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

NE ¼ of GRID E10

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
10	~~0-5~~ 0-1.5'	0-1.5	02	1110	SILT w/ SAND, brown ( ), dry, med loose ~ 20% sand, trace gravel, trace clay. Sample v. powdered @ ~~0-1.0'~~ 0.5-1.0' (poss ash, poss from refusal). Collect 0.5-1.0'. Trace cinder (1 piece ~2") @ 0.5'	ML	NA	0.0
1								
2					TD=1.5' Refusal on hardpan @ 1.5' X3 "concrete"			
3					Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

ring Number: E10-2	Date Started: 6/20/02
illing Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
ter Diameter of Boring: 2"	Drilling Subcontractor: Precision
ter Diameter of Well Casing: NA	Driller: Ernesto
pth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1055 0	0-1.5	0-1.5			See E10-1 (SILT w SAND).			
1			012	1110	Sample becomes v. pebbled @ 0.5-1.5' (Poss ~~shoe~~ auger) collect 0.5-1.0' hardpan in shoe	ML	NA	0.0
2					TD = 1.5' Refusal @ 1.5' on hardpan ("Concrete") X3			
3					Boring backfilled w/ bentonite chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: E10-3	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3	0.3	012	1110	SILT w/ SAND trace clay poss. ash material @ 0.5-1.0' mixed w/ gypsum sand in pockets (to 1.5'). clay content increases w/ depth to ~15% @ 2.0' becomes V. Stiff @ 2.0	ML	NA	0.0
1								
2								
3					TD = 3.0' Boring backfilled w/ bentonite Chips 6/20/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: E10-4	Date Started: 6/20/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/20/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / Type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1105 0	0.3	0.3			SILT w/ SAND	ML	NA	0.0
1			012	1/1/0	poss ash @ 0.5-1.0' trace gypsum (in pockets) 0.5-2.0 sand.			
2								
3					TD = 3.0' Boring backfilled w/ bentonite chips 6/20/02 001 AOC1 55012			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: E11 Quad A	Date Started/Completed:
Drilling Method:	Location Sketch: A B C D
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Starling	

Soil Boring E11

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
				Top Soil / Silt dark brown dry, stiff, organic matter			
	Sample			Ash dark grey white inclusion dry sand 15%			
				~~Clayey Silt, dk grey w/ white inclusions~~ Clayey Silt stiff dry 10% sand			
2				Ash Long. - same as above			
				Same as above ~~clayey silt~~ Increased clay and sand			
3							
				Deploy 3' BSS - 38" Recovery			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

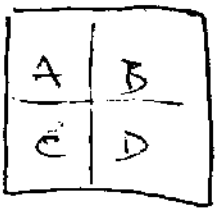
Boring Number: E11 · Quad B	Date Started/Completed:
Drilling Method:	Location Sketch: A B C D
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring E11 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		0-36" drive		Top Soil			
	Sample			High dark gray white inclusions			
1		Rec 41"		Clayey silt sand. light to dark brown. dry, stiff, 15% sand			
2				Increased clay to 6 fm			
3				~ 30 - 40% silts			
				Deployed 36" BSS - 41" recovery			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

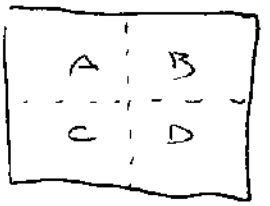
Boring Number: E11 Quad C	Date Started/Completed:
Drilling Method:	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Starling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring E11 Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
				Top soil Silt orange brown dry stiff black inclusions organic matter 10% sand			
				Silty Gravel Ash. Grey brown. dry loose, gravel fray			
	sample			Gravelly Ash w/ silt light gray			
2							
3				Gravel = brown concrete			
				Note: Deploy 8" BSS - 8" recovery Deploy 10" BSS - 8" recovery same table Step out 2ft Deploy 8" BSS - 8" recovery discard second boring			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: E11 Quad D	Date Started/Completed:
Drilling Method:	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

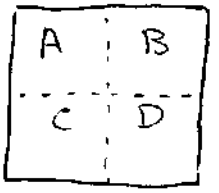
Soil Boring E11

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		0-36 drive		Top Soil dark brown silt			
1		Rec 34"		Ash material light to dark gray w/white inclusions	refer to photo		
2				S: Silty Sand light yellow tan to med brown dry soft to firm Progression 15% sand			
3							

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

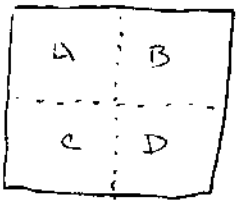
Boring Number: F9 Quad B	Date Started/Completed:
Drilling Method:	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Doug Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring F9 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
1		Drive 0-3		Silt dark brown dry soft 15% clay 5% sand organic matter	ML		
2		Rec 15" / 20"		Gravel angular frag Sandy silt, light yellowish brown 20% sand			
3				Clayey silt, light yellowish brown dry, stiff, trace fine gravel 10% sand			
				No observed Ash or contamination			
				Gravel = brown frag concrete			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

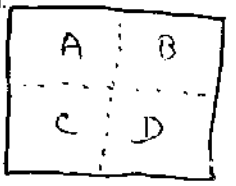
Boring Number: F9 Quad B	Date Started/Completed:
Drilling Method:	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Starling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring F9 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
0–2		Drive 0-3		Silt dark brown, dry, Stiff, organic matter ~ 30% clay, 5% sand Changes ~~Increases~~ to light brown increase sand	ML		
2–3		Rec 36"		~~Silty Sand~~ Sandy Silt light brown, dry loose 10% clay, 15% sand, organic matter, trace coarse gravel No observed ash or contamination			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: F9 Quad C	Date Started/Completed: 12/9/02
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Doug Sterling	

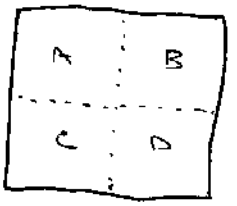
Soil Boring F9

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		Drive 0-3		Top soil silts dark brown, veg.			
				Ash fine gravel angular			
1		Rec		Silts, med. brown, dry, soft sand, ~~fine~~ gravel, angular ~~gravel~~			
	Sample	~~2~~ 2		Ash material, light gray, dry soft. with a layered of ang. gravel			
3							
				Relocate unable to pass 1.0' on 3 locations. Each stepout is ~1.5' out from orig. sample location.			
				Gravel = brown concrete			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: F9 Quad D	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring:	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

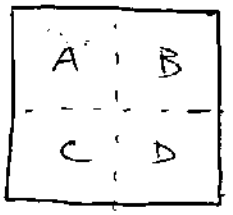
Soil Boring F9

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		Drive 0-3		Top soil silt dark brown, veg gravel frag			
		Rec 1.5		Silt sand med to dark brown dry, soft, ~25% clay, 15% sand			
1	Sample			Gravel, ~~Asb~~ 9x material, light gray, dry ~~Bo~~ hard, ~20% sand.			
2							
3				Gravel at 0.5' & 1.25 brown concrete			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

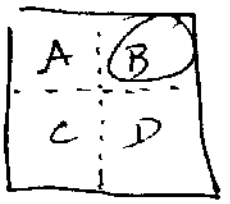
Boring Number: F10 Quad A	Date Started/Completed:
Drilling Method: ~~Geoprobe~~ Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing: N/A	
Depth to Water (ft. bgs., date) N/A	
Driller:	
Logged By: Doug Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring F10 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		Drive 0-3		Top soil Silt, drk brown loose, organic matter			
	Sample	Rec 8"		~~As~~Gravelly Ash, drk blue gray, frag gravel Gravelly Ash material light gray, 5% sand, frags brown concrete			
2				Note: Relocate — ~~[redacted]~~ Step out 2' unable to pass 16" — Second attempt ∅ recovery			
3							

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: F10 Quad B	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

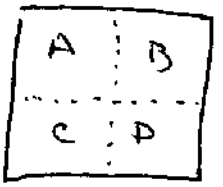
Soil Boring F10

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		drive 16" Rec 24"		Top Soil Silt drk grey brown black mottled, 20% clay 15% sand organic matter			
				Gravelly Sand, med gray, frag gravel	mL		
1				Silty sand med brown, dry, soft, ~20% sand. - consistent sand in interval.	SM		
2	Sample			Gravelly Ash material light gray, dry, loose, frag of concrete			
3				B			
				Boring Attempts 1- delpoy 16" BSS- 24" recovery 2- 4" recovery			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

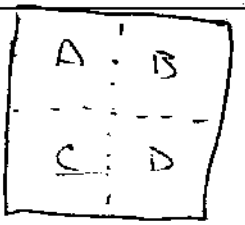
Boring Number: F10 Quad C	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2	
Inner Diameter of Well Casing: N/A	
Depth to Water (ft. bgs., date) N/A	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring F10 C Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		0-3		Top Soil Silt, brown, dry fine gravel, organic matter	ML		
	Sample	Rec 13"	6-10"	Ash, light gray, fine gravel			
7							
3							

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: F10 Quad D	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Doug Sterling	

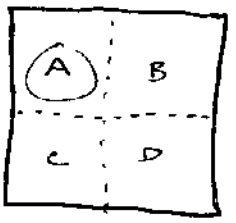
Soil Boring F10 D

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
0		0-3 Rec 13"		Topsoil silt drk brown organic matter			
				Gravelly silt med brown ang. frag			
1		6"		Silt Sand med brown, dry, med. dense, 20% sand, low plas	SM		
	sample			sand contents decreases increase density drk brown			
2				Gravelly Ash light gray, dry, loose, 10% silt. Frag brown concrete (Gypsum)			
3							

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

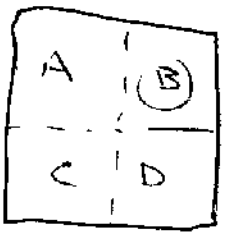
Boring Number: F11 Quad A	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring F11 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
				Top Soil Silt dark brown, sand inclusion, dry, stiff, organic matter			
	sample			Gravelly Ash, light to med gray, dry, loose, concrete frags.			
2							
3				Note: Deploy 6" BSS - 4" recovery ~ 2" Ash Deploy 7" BSS - 6" recovery ~ 3" Ash Gravel = brown concrete			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: F11 Quad B	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

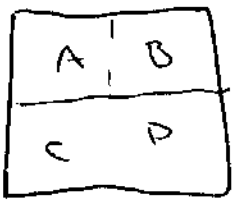
Soil Boring F11

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		0-3' drive		Top Soil Silty sand, drk brown Stiff, organic matter			
1	sample	Rec 45"		Gravelly Sandy Ash light gray, dry			
2				Clayey Silts - med brown, dry, Stiff, 15% sand, 20% clay			
3							

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

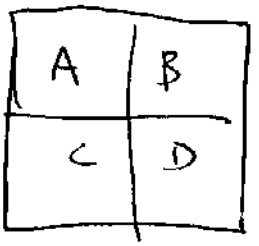
Boring Number: F11 Quad C	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring F11 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
				Topsoil do Silt, ~~dark~~ brown, dark inclusions, mottling, organic matter			
	Sample			Gravelly Silty Ash, med gray, dry, loose, frag Concrete			
2							
3				Note Deployed 8" BSS - 8" recovery Deployed 12" BSS - 4" recovery			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION LOG

DO:
Site:
Project:

Boring Number: F11 Quad D	Date Started/Completed:
Drilling Method: Geoprobe	Location Sketch: 
Outer Diameter of Boring: 2"	
Inner Diameter of Well Casing:	
Depth to Water (ft. bgs., date)	
Driller:	
Logged By: Douglas Sterling	

Depth (ft) bgs	Sample Number	Drive Interval/ Recovered Interval	Blow Count (per 6 inches)	Soil Boring F11 — Lithologic Description	USCS Soil Symbol	Well Construction	OVM (ppm)
		0-3		Top Soil			
	Sample 1			Gravelly Silt med gray fine gravel. dry loose			
1				Clayey Silt med brown. dry Stiff 10% sand, trace gravel			
2		Rec 41					
3							

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: J11-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernest
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.S. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1	0-3		0.5		SILT w/ CLAY (as in J11-1). poss ash material @ 0.5'- directly above gypsum. v. hard drilling @ 0.75' - 1.25' POWDERED ~~GYPSUM SAND IN SLEEVE~~ @ SAMPLE IN SLEEVE. ~~POSSIBLE ASH MATERIAL~~ → GYPSUM SAND @ 1.0'		N/A	0.0
2								
3					TD = 3.0. ~~NO WATER~~ Boring backfilled w/ bentonite chips. Collected material directly above gypsum sand - poss ash (?)	6/5/02		

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: ~~I11-2~~ Co I11-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. BOWMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.A. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
(260	0-3	~~0.3~~	0115		SILT w/ SAND, ~~brown etc.~~ (as in SJ11-1). No unusual horizon identified (no waste).	ML	NA	0.4
1			~~0115~~					
2								
3					TD = 3.0' Boring backfilled w/ bentonite chips on 6/5/02 ~~No unusual material identified (no waste)~~ Co			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: ~~FD~~ I 11-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Boorman
Outer Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Al Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1140	0	0-3	0-3	005		SILT w/ SAND (~~Hick~~ J 11-1). See	ML	NA	0.0
	1								
	2								
	3					TD=3.0' No unusual horizons (or waste) identified. Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: I11-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive interval	Recovered interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1145 0	0-3'	~~0-3'~~	015		SILT with clay (see J11-1).			
1					very hard drilling @ 1.0' Drill through, sample is powdered. Material looks like gypsum sand (glints in light, pale gray color). from 0.5 - 1.0' Collect sample from horizon just above this material	ML	NA	0.0
2								
3					TD = 3.0' Boring backfilled w/ bentonite chips on 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: ~~K12-5~~ I12-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GOODMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

SAMPLE TIME

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.S. utility type, etc.	Description	USCS soil symbol	Well construction	OVM (ppm)
1	0-1	~~2.1~~	016	1425	SILT w/ SAND + CLAY, brown, med loose, trace gravel, trace rootlets. trace gypsum sand @ 1.0'	ML	NA	0.0
					~~No recovery~~ Collect sample from 0.5-1.0' Boring backfilled w/ bentonite chips 6/5/02 refusal @ 1.0' (x 3) ON gypsum "hard pan".			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: ~~I12-10~~ I12-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/~~GeoProbe~~/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C BOARMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1				SILT w/ SAND (as on I12-1)	ML	NA	0
		0.6	016	1429	trace gypsum Sand in Bottom of Sleeve (@1.0)			
1					Refusal @ 1.0' (x3) on "hard pan"			
2					Boring backfilled w/ bentonite chips 6/5/02			

016

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: I12-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: "
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1	0.6	1425		SLT & SAND (as in I12-1). trace ash-like material just below grass/roots	ML	NA	0.0
1					refusal @ 1.0' on "hard pan" (x3) Collect Sample 0.0-0.5			
2					Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: I12-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C BOARMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1400	U-1				GRASS + SILT IN SLEEVE			
					trace gypsum sand @ bottom of interval	ML	NA	
			016	1435				
1								
					collect sample from 0.5-1.0			
2					recovery = 0.5-1.0' bgs			
					REFUSAL ON "HARDPAN" @ 1.0' (x3) POOR RECOVERY.			
					Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: I13-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time / Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1.5'	X		017	1545	SILT WITH SAND + CLAY, dry; brown (10YR 5/3) ~20% clay, ~15% sand (med - fine), trace gravel	ML	NA	0.0
					Refusal @ 1.0' on "hardpan" (x3) poor recovery. Boring backfilled w/ Bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: I-13-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time (Blow count / V.O. utility / (per 6 inches) / type, dia.)	Description	USCS soil symbol	Well construction	OVM (ppm)
0	X	1.0	017	1545	SILT, brown (10YR 5/3), dry, med loose, ~15% Sand, ~15% clay, trace gravel. Trace gypsum sand @ 0.5'	ML	NA	0.0
1					Refusal @ 1.0 (x3) (Hardpan) Sample collected from 0.25-0.75'			
					Boring backfilled w bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

I13-3

Number: I13-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

SAMPLE TIME

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1	X	~	017	1545	SILTY SAND AND CLAY (as in I13-1). GYPSUM MIXED W/SOIL + POSS ASH FROM 0.5-1.0.	MC	NA	0.0
2					REFUSAL ON HARDPAN @ 1.0' (x3) Boring backfilled w/ bentonite Chips 6/5/02			
3								

017

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: ~~I13-3~~ I13-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GOODMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Time / Blow count (per 6 inches) / V.S. utility type, etc.	Description	USCS soil symbol	Well construction	OVM (ppm)
1625 0	X	~~~	017	1545	SILT (as in I13-1) No unusual horizons identified	ML	NA	0.0
1					Refusal on "hardpan" @ 1.0' (x3) Boring backfilled of bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: SB1-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Eneco
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1	0-3'	3'	6"2		SILT w/ SAND, brown (10YR 5/3), dry, med toSF, ~15% sand ~ 35% clay, trace gravel, trace rootlets. Trace gypsum sand @ 1.0'	ML	NA	0.0
2								
3					TD = 3.0' Boring backfilled w/ bentonite ~~ROUNDS~~ chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

ring Number: J11-2	Date Started: 6/5/02
illing Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Goodman
ıter Diameter of Boring: 2"	Drilling Subcontractor: Precision
ıer Diameter of Well Casing: N/A	Driller: Ernesto
pth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1220	0-3				SILTY w/ SAND (as in J11-1)	ML		
			022	1235	trace Gypsum @ 1.0', trace poss ash-like material		NA	0.0
1								
2								
3					TD = 3.0'			
					Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: J11-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: P GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
(12")	0-1.5'	~~0-1.5'~~			SILT y ~~CLAY~~ SAND (as in J11-1).	ML	NA	0.0
(12")			022		trace Possible ash material @ 0.5'			
1					trace gypsum sand @ 1.0'			
					Refusal @ 1.5' (x3) "hardpan."			
					Boring backfilled w/ bentonite Chips 6/5/02			
					~~No recovery~~			
					~~SAMPLER~~			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: J11-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GOODMAN
Diameter of Boring: 2"	Drilling Subcontractor: Precision
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1135	0-3	~~0.9~~	022		SILT with SAND (as in J11-1) no unusual horizons (or waste).	ML	NA	0.0
1			~~022~~	~~4~~	~~AAAA~~			
2			~~AAAA~~					
3					TD = 3.0' ~~No unusual horizon~~ Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: SJ3-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	SAMPLES TIME (Blow count / V.B. Utility / Geotechnical / Type, dia.)	Description	USCS soil symbol	Well construction	OVM (ppm)
0		0'9	1610		SILT w/ SAND, brown, dry, med loose, trace gravel, rootlets to 1.0' becomes finer grained from 0.5 - 1.0, poss. ash? ~~No other unusual materials~~ Trace, dispersed gypsum sand from ~ 0.5 - 1.5, fragments of "hardpan" 0.5 - 1.0 (angular, up to 2")	ML	NA	0.0
					Hole			
					Refusal on v. hard "hard pan" @ 1.5' (x 3)			
					Driller lost shoe in hole			
					Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: ~~J13-2~~ J13-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / PID / V.O. utility type, other	Description	USCS soil symbol	Well construction	OVM (ppm)
1600 0								
			018	1610	SILT with SAND (as in J13-1) No unusual horizons or waste identified	ML	MA	0.-
1								
					Refusal @ 1.5' on "hardpan" (x3) Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC. J13-3

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: J13-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1.8		J13	1610	SILT w/ SAND (as in J13-1)	ML	NA	0.0
1					trace gypsum sand @ 0.5'			
2					TD = 1.8'			
					Collect Sample from 0.25'-0.75'			
					Boring backfilled w/ bentonite Chips 6/5/02			
					~~refusal x1 on hard pan @ 1.0'~~			
					refusal (x3) on "hard pan" Best recovery = 1.8'			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: J13-4	Date Started: 6/5/02
Drilling Method: (Circle one) HSA Continuous Core/GeoProbe/Hand Auger Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum (GeoProbe circled)	Date Completed: 6/5/02
	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample time / Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1510	0	0-3'		018	1610	SILTY SAND (as in J13-1). 0.25-0.75 - collect sample of pcss ash + gypsum sand, mixed (gypsum sand from ~0.5-1.0')	ML	NA	0.0
	1					SILT becomes v. firm with depth			
	2								
	3					TD = 3.0' Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: K11-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. Conway
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: E. Neko.
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow counts (per 6 inches) / Type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0					SILT & SAND, brown (10YR 5/3), dry, med loose, ~~about~~ ~~20%~~ 15% sand, 10% clay, trace gravel, trace ~~roots~~.	ML	N/A	0.0
1			021		POSSIBLE ASH MATERIAL @ 1.0'			
2					Refusal @ 1.5' on "hard pan" x 3			
3					Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: KII-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum (GeoProbe circled)	Date Completed: 6/5/02
	Logged By: COORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.): NA	Location Sketch:

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1230	0–3	0-3'	~~0-3~~	021		SILT w/ SAND (see KII-1). ~~[illegible] Sand @ 0.5', poss. ash w/ [illegible]~~ No ash or other waste identified.	ML	NA	0.0
	3					TD = 3.0' ~~No unusual horizons~~ Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: K11-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C Gorman
Inner Diameter of Boring: 2.11	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	~~0-3"~~ 0-3"	~~0-3"~~ 0-3"	021		HARDPAN + GRASS AT SURFACE. REFUSAL AT 3" ON HARDPAN (x2) SAMPLE V. POWDERED - Incl. gypsum sand collect ~~0.5-0.7'~~ 0-0.5' interval (3" recovery).	ML	N/A	0.0
1					REFUSAL @ 1' ON HARDPAN (x1) - last time ACC			
2					No unusual horizons identified (no waste)			
3					Boring backfilled w/ bentonite chips 6/5/02			

021

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

ring Number: K11-4	Date Started: 6/5/02
illing Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C BOWMAN
ıter Diameter of Boring: 2"	Drilling Subcontractor: Precision
ıer Diameter of Well Casing: NA	Driller: ERNESTO
ıpth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
					SILT & SAND (MIN K11-1)	ML	NA	0.0
			021		Refusal @ 1.5' on HARDPAN x3 Gypsum Sand in Shoe.			
					TD = 1.5			
					Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: K12-1	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.) NA	Location Sketch:

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Sample Type (Blow count (per 6 inches) / V.S. utility type, dia.)	Description	USCS soil symbol	Well construction	OVM (ppm)
1427	0	0-1	1.0'	020	1440	SILT w/ SAND, brown (10YR 5/3), dry, med loose.	ML	N/A	0.0
	1					trace gypsum sand in bottom of sleeve			
						Refusal on hard pan material @ 1.0'			
						Boring backfilled w/ Bentonite chips 6/5/02			

020

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: K12-2	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: 4" N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	PID (ppm) / V.B. utility type, dia. / Blow count (per 6 inches)	Description	USCS soil symbol	Well construction	OVM (ppm)
1432 0	0-3				SILTY SAND, brown, dry, med loose (as in K12-1)	ML		
			020	1440	POSS ASH LAYER @ 0.5' ~ 3" thick GYPSUM SAND FROM ~ 0.8' – 1.0' continues to 3' as discontinuous pockets WITHIN SILT. SILT becomes very stiff below 1.0' (below gypsum layer).		N/A	0.0
1								
2								
3					TD = 3.0' Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: K12-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/**GeoProbe**/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Outer Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: NA	Driller: ERNESTO
Depth to Water (ft./bgs.): N/A	Location Sketch: ~~SE 1/4~~ SW 1/4 of GRID K12

Time	Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description (0-0.5 = sample interval)	USCS soil symbol	Well construction	OVM (ppm)
1315	0–3	0-3	~~0-5~~	020	1440	SILT w/ SAND, brown (~~2.5Y~~ 10YR 5/3), dry, loose, ~~20% sand~~ ~15% sand, trace gravel trace clay.	ML	NA	0.0
						becomes hard with depth. v. hard @ 1.5'			
	3					no unusual horizons identified (no waste) Collect sample 0-0.5 Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: K12-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: Precision
Inner Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.E. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1330 0	0-2	020	020	8" / 12" K40	SILT & SAND, brown (10YR 5/3), dry; loose to med loose, trace gravel, trace Clay. Poss. ASH @ ~~0-7"~~ ~~or 2" THICK~~ 8" bgs ~ 4" THICK	ML	N/A	0.0
1								
2					Refusal @ 2.0' x3 Boring Backfilled w/ bentonite Chips 6/5/02			
3					Collect Sample 0.5-1.0' (incl. poss ash layer)			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: K13-1	Date Started: 6/5/02
Drilling Method: (Circle one) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: N/A	Driller: Ernesto
Depth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive interval	Recovered interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-3	3	019	1625	SILT w/ SAND, brown, dry, med loose to med stiff by ~1.0' Trace gypsum sand @ 0.25-0.5' becomes v. stiff w/ depth. ~~No [illegible] material~~	ML	NA	0.0
1								
2								
3					TD = 3.0' Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

ring Number: K13-2	Date Started: 6/5/02
illing Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: COORMAN
iter Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
ner Diameter of Well Casing: NA	Driller: Ernesto
pth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0								
1620			019	1625	SILT & SAND (as in K13-1). No unusual horizons or waste identified.	ML	NA	0.0
1								
					TD = 1.5' Refusal X3 @ 1.5' ~~to unmarked~~			
2					Boring backfilled w/ bentonite Chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Number: K13-3	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C. GORMAN
Inner Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Inner Diameter of Well Casing: N/A	Driller: ERNESTO
Depth to Water (ft./bgs.) N/A	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.O. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
0	0-1.5'				SILT w/ SAND (as in K13-1)	ML	N/A	0.0
1			1625 0129	1625	NO ASH IDENTIFIED. GYPSUM SAND IN BOTTOM OF SLEEVE			
2					refusal @ 1.5' on hard pan. Boring backfilled w/ bentonite chips 6/5/02			

TETRA TECH EM INC.

SOIL BORING AND WELL INSTALLATION AND VISUAL CLASSIFICATION LOG

CTO-
Bldg./Site:
Project Name:

Boring Number: K13-4	Date Started: 6/5/02
Drilling Method: (*Circle one*) HSA Continuous Core/GeoProbe/Hand Auger	Date Completed: 6/5/02
Air Rotary/Mud Rotary/Dual Tube Percussion/Sonic/Vacuum	Logged By: C GORMAN
Diameter of Boring: 2"	Drilling Subcontractor: PRECISION
Diameter of Well Casing: NA	Driller: Ernesto
Depth to Water (ft./bgs.) NA	Location Sketch:

Depth (ft) bgs	Drive Interval	Recovered Interval	Sample ID	Blow count (per 6 inches) / V.B. utility type, dia.	Description	USCS soil symbol	Well construction	OVM (ppm)
1455	0-3'		0.0	1625	SILT w/ SAND, brown (10YR 5/3), dry, med loose	ML		0.
					ASH-LIKE MATERIAL @ ~~0.5-1.0'~~ 0.25-0.75'			
1					GYPSUM sand from ~~1.0'~~ 0.75-1.25'		NA	
					STIFF ~~HARD~~ SILT w/ INCR. CLAY CONTENT (~15%) BELOW GYPSUM			
2								
3					refusal on "hardpan" @ 1.0' (x2) got through on 3rd try. Sample collected from 0.25-0.75' bgs. Boring backfilled w/ bentonite chips 6/5/02			

APPENDIX E
DATA SET USED TO CALCULATE UCL_{95} SOIL CONCENTRATIONS

APPENDIX E: DATA SET USED TO CALCULATE UCL_{95} SOIL CONCENTRATIONS

Time-Critical Removal Action Summary Report

Location	Depth interval (ft)	Sample ID	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)
B7	0.5 - 1	001AOC1SS001	158	0.1 J	21.2 J
B8	0 - 0.5	001AOC1SS002	17.2	0.1 J	3.4 UJ
B9	1.5 - 2	001AOC1SS003	63.3	1.5	7 J
B10	0 - 0.5	001AOC1SS009	10 J	0.018 UJ	1.5 J
C7	0 - 0.5	001AOC1SS008	36.8	0.23	4.3 UJ
*C9**	*0.5 - 1*	*001AOC1SS004*	*323*	*8.4*	*28.7 J*
C10	0 - 3	001AOC1SS010	68 J	0.068 UJ	5.3 J
D7	0 - 0.5	001AOC1SS007	83.6	0.7	6.5 J
*D8**	*0 - 0.5*	*001AOC1SS006*	*292*	*2.8*	*22.3 J*
*D9**	*0.5 - 0.75*	*001AOC1SS005*	*631*	*20.4*	*42.8 J*
D10	0.5 - 3	001AOC1SS011	131 J	3.1	12.6 J
E8	0 - 1.5	001AOC1SS014	33.4 J	0.28	3.8 J
E9	0.5 - 1	001AOC1SS013	78.1 J	0.79	12.1 J
*E10**	*0.5 - 1.5*	*001AOC1SS012*	*305 J*	*0.22*	*31 J*
I11	0 - 0.5	001AOC1SS015	26.9	0.078 J	2.8 UJ
I12	0 - 1	001AOC1SS016	31.8	0.079	2.2 UJ
I13	0 - 1	001AOC1SS017	31.8	0.079 J	2.1 UJ
J11	0 - 1	001AOC1SS022	27	0.026 J	2.6 UJ
J13	0 - 1	001AOC1SS018	26.9	0.05 J	2.2 UJ
K11	1 - 1.5	001AOC1SS021	19.4	0.071 J	3 UJ
K12	0 - 1	001AOC1SS020	41.6	0.093 J	3.3 UJ
K13	0 - 1.5	001AOC1SS019	27.5	0.084 J	2.8 UJ
*AOC1SB01**	*0.6 - 1*	*267AOCSB001*	*11400*	*54.8*	*875 J*
*AOC1SB01**	*1 - 1.5*	*267AOCSB002*	*39.5*	*0.062 U*	*3.3 J*
*AOC1SB02**	*0.25 - 0.5*	*267AOCSB004*	*4300*	*2.8*	*215 J*
AOC1SB05	0.25 - 0.5	267AOCSB005	18.1	1.2	0.85 J
*AOC1SB03**	*0 - 0.5*	*267AOCSB006*	*114*	*0.088 U*	*14.4 J*
*AOC1SB03**	*1 - 1.5*	*267AOCSB007*	*170*	*3.5*	*20.5 J*
*AOC1SB08**	*0 - 0.5*	*267AOCSB009*	*895*	*113*	*44.7 J*
AOC1SB06	0.25 - 0.75	267AOCSB010	1.9	1.1	0.47 U
AOC1SB06	0.75 - 1.25	267AOCSB011	8	0.063 U	0.5 U
AOC1SB04	0.5 - 1	267AOCSB014	47.2	0.1 J	2.6 J
AOC1SB04	1 - 1.5	267AOCSB015	29.7	0.069 U	9.3 J
AOC1GB23	0 - 0.5	267AOCSS001	25	0.2 UJ	1.7

APPENDIX E: DATA SET USED TO CALCULATE UCL_{95} SOIL CONCENTRATIONS

Location	Depth interval (ft)	Sample ID	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)
AOC1GB23	0.5 - 1	267AOCSS002	7.9	0.1 U	0.57 UJ
AOC1GB24	0 - 0.5	267AOCSS004A	35.1	0.094 U	3.6
AOC1GB24	1 - 1.5	267AOCSS005A	12.9	0.098 U	1.4
AOC1GB25	0 - 0.5	267AOCSS007A	45	0.16 UJ	12.9
AOC1GB25	0.75 - 1.25	267AOCSS008A	7.7 J	0.096 U	3.5 J
*AOC1GB27**	*1 - 1.5*	*267AOCSS010A*	*933*	*21.4*	*68.3*
*AOC1GB27**	*1.5 - 2*	*267AOCSS062*	*354*	*9.8*	*27.3 J*
AOC1GB29	0 - 0.5	267AOCSS011A	18.7	0.16 UJ	3.3
AOC1GB29	0.75 - 1.25	267AOCSS012A	17.7	0.098 UJ	1.5
AOC1GB30	0.75 - 1	267AOCSS014	7.3	0.1 U	1.3
AOC1GB30	1.5 - 2	267AOCSS015	26.5	0.1 U	3.4
AOC1GB34	0.25 - 0.5	267AOCSS017A	25.9 J	0.19 UJ	1.9
AOC1GB34	0.5 - 1	267AOCSS018A	8.6 J	0.091 U	0.58 J
AOC1GB35	0.5 - 1	267AOCSS020A	51.5 J	0.14 UJ	4.7
AOC1GB35	1 - 1.5	267AOCSS021A	27.8 J	0.21 UJ	4.2
AOC1GB36	0.5 - 1	267AOCSS023A	10.6 J	0.093 U	0.81 J
AOC1GB36	1 - 1.5	267AOCSS024A	6.8 J	0.096 U	0.61 J
AOC1GB37	0.75 - 1.25	267AOCSS026A	17.4 J	0.092 U	1.8
AOC1GB37	1.25 - 1.75	267AOCSS027	7.9	0.1 U	0.93 UJ
AOC1GB39	0.5 - 1	267AOCSS029A	28.3 J	0.22 UJ	3.6
AOC1GB39	1 - 1.5	267AOCSS030A	9.1 J	0.1 U	1.3 J
AOC1GB42	0.5 - 1	267AOCSS032	11.1	0.087 U	1.2
AOC1GB42	1 - 1.5	267AOCSS033	6.3	0.094 U	1 UJ
AOC1GB43	0.25 - 0.75	267AOCSS035	21.2	0.16 UJ	1.8
AOC1GB43	0.75 - 1.25	267AOCSS036	7.7	0.094 U	1.3
AOC1GB44	0.25 - 0.5	267AOCSS038	33.7	0.69	3
AOC1GB44	0.5 - 1	267AOCSS039	8	0.092 U	0.75 UJ
AOC1GB45	0.25 - 1	267AOCSS041	23.8	0.31 UJ	2.3
AOC1GB45	1.5 - 2	267AOCSS042	7.8	0.13 U	1.1 UJ
AOC1GB46	0.25 - 0.75	267AOCSS044	11.9	0.09 U	0.79 UJ
AOC1GB46	0.75 - 1.25	267AOCSS045	6.7	0.092 U	0.69 UJ
AOC1GB47	0.25 - 0.75	267AOCSS047	14.2	0.14 UJ	1.5
AOC1GB47	0.75 - 1.25	267AOCSS048	6.1	0.11 U	1 UJ
AOC1GB48	0.25 - 0.75	267AOCSS050	32.7	0.76	2.6
AOC1GB48	0.75 - 1.25	267AOCSS051	10.7	0.1 U	1.1 UJ

APPENDIX E: DATA SET USED TO CALCULATE UCL_{95} SOIL CONCENTRATIONS

Location	Depth interval (ft)	Sample ID	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)
AOC1GB49	0.5 - 1	267AOCSS053	273	4.3	20.5
AOC1GB49	1 - 1.5	267AOCSS054	53.9	1.3	4.6
AOC1GB52	0.5 - 1	267AOCSS056	98.8	0.086 U	2.7
AOC1GB52	1 - 1.5	267AOCSS057	299	1.7	9.1
AOC1GB28	0.5 - 1	267AOCSS059	45.9 J	0.16 UJ	3.4 J
AOC1GB28	1 - 1.5	267AOCSS060	7.6	0.11 UJ	0.42 J
AOC1GB26	1.5 - 2	267AOCSS065	11.2	0.092 U	0.28 U
AOC1GB32	0.5 - 1	267AOCSS069	32.5	0.25 UJ	2.4
AOC1GB32	1 - 1.5	267AOCSS070	43.5	0.8	3.3
AOC1GB33	0.5 - 1	267AOCSS071	8.7	0.091 U	0.58 J
AOC1GB33	1 - 1.5	267AOCSS072	7.2 J	0.1 U	0.95 J
AOC1GB35	1.5 - 2	267AOCSS074	8.4 J	0.096 U	2.5 J
AOC1GB38	0.5 - 1	267AOCSS075	15.2 J	0.09 U	1.4
AOC1GB38	1 - 1.5	267AOCSS076	8 J	0.091 U	0.61 J

Notes: * Shaded and italicized rows represent data from areas that were subsequently excavated. These data were removed from the data set to calculate the post-removal UCL_{95}.

J Estimated
mg/kg Milligram per kilogram
U Not detected
UJ Not detected, estimated

APPENDIX F
FOCUSED ASSESSMENT PRE- AND POST-TCRA FOOD CHAIN MODEL FOR THE WESTERN MEADOWLARK

APPENDIX F

FOCUSED ASSESSMENT FOOD CHAIN MODEL FOR THE WESTERN MEADOWLARK
AREA OF CONCERN 1, NWSSBD CONCORD

COPEC	Total Ingestion Rate[1] (kg/day)	Soil Ingestion Rate[1,2] (kg/day)	Soil Concentration[3] (mg/kg)	Soil Daily Dose[4] (mg/day)	Total Prey Ingestion Rate[1,5] (kg/day)	Plant Concentration Dry Weight (mg/kg)[6]	Tissue Bioavailability Factor	Plant Concentration Adjusted for Bioavailability	Plant Ingestion Rate[5,7] (kg/day)	Plant Daily Dose[8] (mg/day)	Invertebrate Concentration Wet Weight (mg/kg)[9]	Invertebrate Concentration Dry Weight (mg/kg)[10]	Tissue Bioavailability Factor	Invertebrate Concentration Adjusted for Bioavailability	Invertebrate Ingestion Rate[5,11] (kg/day)	Invertebrate Daily Dose[12] (mg/day)	SUF	Body Weight[13] (kg)	Total Daily Dose[14] (mg/kg/day)	TRV[15] (mg/kg/day)	Test Species Body Weight (kg)	Allometrically Adjusted TRV[16] (mg/kg/day)	HQ[17] (based on adjusted TRV)
Pre-TCRA Removal (presented in PA Addendum [Table 19, Tetra Tech 2001])																							
Lead																							
Dose/High TRV	0.017	1.68E-06	186.59	3.14E-04	0.017	15.78	0.10	1.58	0.0062	0.010	5.60	37.32	0.10	3.73	0.011	0.040	1.00	0.098	0.51	8.75	0.80	5.75	0.09
Mercury																							
Dose/High TRV	0.017	1.68E-06	6.76	1.14E-05	0.017	0.22	NA	NA	0.0062	0.0013	0.27	1.80	NA	NA	0.011	0.019	1.00	0.098	0.21	0.18	1.00	0.11	1.85
Selenium																							
Dose/High TRV	0.017	1.68E-06	16.70	2.81E-05	0.017	13.80	0.60	8.28	0.0062	0.052	3.67	24.49	0.60	14.70	0.011	0.16	1.00	0.098	2.12	0.93	1.11	0.57	3.71
Pre-TCRA Removal (with additional delineation samples [see Section 2.2])																							
Lead																							
Dose/High TRV	0.017	1.68E-06	173.0	2.91E-04	0.017	15.78	0.10	1.58	0.0062	0.010	5.19	34.60	0.10	3.46	0.011	0.037	1.00	0.098	0.48	8.75	0.80	5.75	0.08
Mercury																							
Dose/High TRV	0.017	1.68E-06	2.30	3.87E-06	0.017	0.07	NA	NA	0.0062	0.0005	0.09	0.61	NA	NA	0.011	0.007	1.00	0.098	0.07	0.18	1.00	0.11	0.63
Selenium																							
Dose/High TRV	0.017	1.68E-06	15.40	2.59E-05	0.017	13.80	0.60	8.28	0.0062	0.052	3.39	22.59	0.60	13.55	0.011	0.14	1.00	0.098	2.00	0.93	1.11	0.57	3.49
Post-TCRA Removal																							
Lead																							
Dose/High TRV	0.017	1.68E-06	43.30	7.29E-05	0.017	1.95	0.10	0.19	0.0062	0.001	1.30	8.66	0.10	0.87	0.011	0.009	1.00	0.098	0.11	8.75	0.80	5.75	0.02
Mercury																							
Dose/High TRV	0.017	1.68E-06	0.32	5.38E-07	0.017	0.01	NA	NA	0.0062	0.0001	0.01	0.09	NA	NA	0.011	0.001	1.00	0.098	0.01	0.18	1.00	0.11	0.09
Selenium																							
Dose/High TRV	0.017	1.68E-06	4.20	7.07E-06	0.017	0.07	0.60	0.04	0.0062	0.000	0.92	6.16	0.60	3.70	0.011	0.04	1.00	0.098	0.40	0.93	1.11	0.57	0.71

Notes: Highlighted cells indicate HQs greater than 1.0.
Pre-TCRA removal soil concentrations presented in PA Addendum do not match those used to assess risk for TCRA because additional delineation samples were collected after PA Addendum but before TCRA.

UCL95 95 percent upper confidence limit on the arithmetic mean
COPEC Chemical of potential ecological concern
HQ Hazard quotient
kg Kilogram
kg/day Kilogram per day
mg/kg Milligram per kilogram
mg/day Milligram per day
mg/kg/day Milligram per kilogram per day
SUF Site use factor
TRV Toxicity Reference Value

1 Total ingestion rate was calculated with body weight using the Nagy and others (1999) metabolic rate equation for passerines and the food requirement conversion for omnivores. The soil and prey ingestion rates are expressed as a percentage of the total ingestion rate.

2 Soil ingestion rate based on Western Meadowlark soil ingestion rate in EPA (1999). The soil ingestion rate is expressed as a 0.01 percent of the total ingestion rate.

3 Soil concentration equals the UCL95 of all site soil samples collected within 2 feet of the surface from AOC 1.

4 Soil daily dose was calculated by multiplying the soil ingestion rate (see note 2) by soil concentration (see note 3).

5 Total prey ingestion rate was 99.99 percent of the total ingestion rate, based on the soil ingestion rate (see note 2). The prey was assumed to consist of 37 percent plant and 63 percent invertebrates.

6 Pre-TCRA removal plant tissue concentrations for lead and selenium are UCL95 of all measured plant tissue samples from RASS 4. Post-TCRA plant concentrations for lead and selenium and pre- and post-TCRA concentrations for mercury were derived by multiplying the recommended BAF in dry weight cited in EPA (1998, 1999) and Sample and Areanal (1999) by the post-TCI

7 Plant ingestion rate was calculated by multiplying the total prey ingestion rate (see note 5) by 0.37.

8 Plant daily dose was calculated by multiplying plant ingestion rate (see note 7) by the plant concentration (see note 6).

9 Pre-TCRA removal invertebrate concentration equals the soil concentration of lead and selenium measured in invertebrate tissue samples from RASS 4. Mercury and all post-TCRA removal invertebrate concentrations were derived by multiplying UCL95 soil concentrations by the recommended BAF in wet weight cited in EPA (1999) for invertebrate tissue samples.

10 Invertebrate concentrations were converted to dry weight using the formula: dry weight concentration = (wet weight concentration)/(1-percent moisture in media). Average percent moisture for earthworm tissue equals 85 percent (EPA 1993). Plant BAFs and site-collected concentrations were origina

11 Invertebrate ingestion rate was calculated by multiplying the total prey ingestion rate (see note 5) by 0.63.

12 Invertebrate daily dose was calculated by multiplying invertebrate ingestion rate (see note 11) by the maximum invertebrate concentration (see note 9).

13 Average weight of males and females from Dunning (1993).

14 Total daily dose is calculated using the following equation: total daily dose = (plant daily dose + invertebrate daily dose + soil daily dose)*SUF)/receptor species body weight.

15 The derivation of TRVs is described in EFA WEST (1998). These TRVs are adjusted to incorporate uncertainty factors.

16 Allometrically adjusted TRVs were calculated using the following equation: receptor species TRV = (test species TRV) x (test species body weight / receptor species body weight)$^{(1-1.2)}$

17 The HQ was calculated using total daily dose / allometrically adjusted TRV.

APPENDIX G
CINDER EXCAVATION CONFIRMATION SAMPLE ANALYTICAL RESULTS

VD

Tetra Tech EM Inc.
San Francisco Office

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

2624

Chain of Custody Record

Page 1 of 2

Project name: CONCORD NWS AREA 1 CONFIRMATION SAMPLING	PO#	Lab: LAUCKS TESTING LAB
Project number: G9016.0001030302071	TtEMI technical contact: CATLIN GORMAN	Field samplers: ROY GLENN
	TtEMI project manager: RICK LANTZ	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: None	Analysis Required: CLP VOA	CLP SVOA	CLP Pest./PCBs	CLP Metals	TPH Purgeables	TPH Extractables	Pb, Se, Hg
CEB01		7-30-02	1130	Soil					1								X
CEB02			1135						1								X
CEB03			1140						1								X
CEB04			1150						1								X
CEB05			1155						1								X
CEB06			1200						1								X
CEB07			1210						1								X

	Name (print)	Company Name	Date	Time
Relinquished by:	ROY GLENN	TETRA TECH EMI	7-31-02	1300
Received by: FED EX AIRBILL # 8330 0110 5369				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

WHITE–Laboratory Copy YELLOW–Project Office Copy

Tetra Tech EM Inc.
San Francisco Office

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

3596

Chain of Custody Record

Project name: CONCORD NWS AREA 1 CONFIRMATION SAMP	PO#	Lab: LAUCKS TESTING LAB	
Project number: G9016.0011.03.02.0711	TtEMI technical contact: CATLIN GORMAN	Field samplers: ROY GLENN	
	TtEMI project manager: RICK LANTZ	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: None	Analysis Required: CLP VOA	CLP SVOA	CLP Pest/PCBs	CLP Metals	TPH Purgeables	TPH Extractables	Pb, Se, Hg
CEP01		7-30-02	1225	Soil					1								X
CEP02			1230						1								X
CEP03			1240						1								X
CEP04			1245						1								X
CEP05			1250						1								X
CEP06			1300						1								X
CEP07			1305						1								X
CEP08			1310						1								X
CEP09			1320						1								X

	Name (print)	Company Name	Date	Time
Relinquished by:	ROY GLENN	TETRA TECH EMI	7-31-02	1300
Received by: FED EX AIRBILL # 8330 0110 5306 9				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

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. 5638

Page 1 of 1

5638

Lab PO#: 022246	Lab: Laucks Testing Lab, Inc.
Project name: Site 31 (AOC 1)	TtEMI technical contact: Sara Wadley
Project (CTO) number: DO 001	TtEMI project manager: Rik Lantz
	Field samplers: Johanna Gregory and Stephanie Williams
	Field samplers' signatures: Johanna Gregory and Stephanie Williams

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: None	Analysis Required: VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Pb (lead)	Hg (mercury)	Se (Selenium)
001AOC15B056	CEB 8	3.0' bgs	9/11/02	10:23	50:1						X								X	X	X
001AOC15B057	CEB 9	3.0' bgs		10.26																	
001AOC15B058	CEB 10	2.0' bgs		10.36																	
001AOC15B059	CEB 11	2.0' bgs		10.31																	
001AOC15B060	CEB 12	2.0' bgs		10.33																	
001AOC15B061	CEB 13	2.0' bgs		10.39																	
001AOC15B062	CEB 14	2.0' bgs		10.43																	
001AOC15B080	CEP 11	0.5' bgs		10:30																	
001AOC15B066	CEP 12	1.5' bgs		10:33																	
001AOC15B067	CEP 13	0.5' bgs		10:35																	
001AOC15B068	CEP 14	1.0' bgs		10:40																	
001AOC15B069	CEP 15	1.0' bgs		10:43																	

	Name (print)	Company Name	Date	Time
Relinquished by: Stephanie Williams	Stephanie Williams	TtEMI	9/11/02	4:00 pm
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 8359 2746 4786

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

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. 5637

Page 1 of 1

Project name: Site 31 (AOC 1)	Lab PO#: 022246	Lab: Laucks Testing Lab, Inc.	5637
Project (CTO) number: DO 001	TtEMI technical contact: Sara Woolley	Field samplers: Johanna Gregory and Stephanie Williams	
	TtEMI project manager: Rik Lantz	Field samplers' signatures: Johanna Gregory, Stephanie Williams	

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	Pb (lead)	Hg (mercury)	Se (selenium)
001AOC15B079	CEP 10 0.5-1.0 ft	9/9/02	11:10 am	Soil						X							X	X	X

No./Container Types

Preservative Added: none

Analysis Required

	Name (print)	Company Name	Date	Time
Relinquished by: Johanna Gregory	Johanna Gregory	Tetra Tech EM Inc	9/9/02	5:05 pm
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 8 2 7 2746 4157

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

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEB01

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-01

Level (low/med): LOW Date Received: 8/1/02

% Solids: 96.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	10.0			P
7782-49-2	Selenium	4.0			P
7439-97-6	Mercury	0.057			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEB02

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-02

Level (low/med): LOW Date Received: 8/1/02

% Solids: 94.8

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	7.4			P
7782-49-2	Selenium	1.3	B		P
7439-97-6	Mercury	0.048	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEB03

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-03

Level (low/med): LOW Date Received: 8/1/02

% Solids: 97.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	22.0			P
7782-49-2	Selenium	4.2			P
7439-97-6	Mercury	0.076			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEB04

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-04

Level (low/med): LOW Date Received: 8/1/02

% Solids: 96.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	10.4			P
7782-49-2	Selenium	2.2			P
7439-97-6	Mercury	0.029	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEB05

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-05

Level (low/med): LOW Date Received: 8/1/02

% Solids: 95.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	9.5			P
7782-49-2	Selenium	6.5			P
7439-97-6	Mercury	0.090			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEB06

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-06

Level (low/med): LOW Date Received: 8/1/02

% Solids: 91.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	26.4			P
7782-49-2	Selenium	5.3			P
7439-97-6	Mercury	0.22			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEB07

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-07

Level (low/med): LOW Date Received: 8/1/02

% Solids: 94.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	11.9			P
7782-49-2	Selenium	2.0	B		P
7439-97-6	Mercury	0.13			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

~~CEB~~ CEB8

EPA SAMPLE NO.

001AOC1SB056

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-01

Level (low/med): LOW Date Received: 9/12/02

% Solids: 94.8

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	14.6		*	P
7782-49-2	Selenium	1.8		N	P
7439-97-6	Mercury	0.54			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEB9

EPA SAMPLE NO.

001AOC1SB057

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-02

Level (low/med): LOW Date Received: 9/12/02

% Solids: 95.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	1040		*	P
7782-49-2	Selenium	78.4		N	P
7439-97-6	Mercury	21.5			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEB10

EPA SAMPLE NO.

001AOC18B058

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-03

Level (low/med): LOW Date Received: 9/12/02

% Solids: 93.9

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	459		*	P
7782-49-2	Selenium	37.3		N	P
7439-97-6	Mercury	12.6			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEB 11

EPA SAMPLE NO.

001AOC1SB059

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-04

Level (low/med): LOW Date Received: 9/12/02

% Solids: 95.1

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	7.3		*	P
7782-49-2	Selenium	1.5		N	P
7439-97-6	Mercury	0.070			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEB12

EPA SAMPLE NO.

001AOC1SB060

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-05

Level (low/med): LOW Date Received: 9/12/02

% Solids: 90.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	13.6		*	P
7782-49-2	Selenium	2.5		N	P
7439-97-6	Mercury	0.19			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-I-

INORGANIC ANALYSES DATA SHEET

CEB13

EPA SAMPLE NO.

001AOC1SB061

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-06

Level (low/med): LOW Date Received: 9/12/02

% Solids: 86.5

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	13.7		*	P
7782-49-2	Selenium	3.1		N	P
7439-97-6	Mercury	0.32			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEB14

EPA SAMPLE NO.

001AOC1SB062

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-07

Level (low/med): LOW Date Received: 9/12/02

% Solids: 86.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	6.8		*	P
7782-49-2	Selenium	2.7		N	P
7439-97-6	Mercury	0.025			CV

Color Before: Grey Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP01

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-08

Level (low/med): LOW Date Received: 8/1/02

% Solids: 95.1

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	82500			P
7782-49-2	Selenium	6140			P
7439-97-6	Mercury	4740			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Black Clarity After: Artifacts:

Comments:

USEPA - CLP
-I-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP02

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-09

Level (low/med): LOW Date Received: 8/1/02

% Solids: 93.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	58900			P
7782-49-2	Selenium	5540			P
7439-97-6	Mercury	1600			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Black Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP03

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-10

Level (low/med): LOW Date Received: 8/1/02

% Solids: 98.3

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	106000			P
7782-49-2	Selenium	8540			P
7439-97-6	Mercury	2580			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Black Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP04

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-11

Level (low/med): LOW Date Received: 8/1/02

% Solids: 92.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	96500			P
7782-49-2	Selenium	7540			P
7439-97-6	Mercury	2670			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Black Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP05

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-12

Level (low/med): LOW Date Received: 8/1/02

% Solids: 97.3

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	78900			P
7782-49-2	Selenium	6660			P
7439-97-6	Mercury	1600			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Black Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP06

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-13

Level (low/med): LOW Date Received: 8/1/02

% Solids: 87.7

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	94600			P
7782-49-2	Selenium	6370			P
7439-97-6	Mercury	3140			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP07

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-14

Level (low/med): LOW Date Received: 8/1/02

% Solids: 95.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	30300			P
7782-49-2	Selenium	2420			P
7439-97-6	Mercury	1560			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP08

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-15

Level (low/med): LOW Date Received:

% Solids: 98.5

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	3340			P
7782-49-2	Selenium	220			P
7439-97-6	Mercury	92.9			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

CEP09

Lab Name: Laucks Laboratories Contract: Concord NWS Area

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC3

Matrix (soil/water): SOIL Lab Sample ID: 0208004-16

Level (low/med): LOW Date Received: 8/1/02

% Solids: 97.5

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	2660			P
7782-49-2	Selenium	145			P
7439-97-6	Mercury	50.5			CV

Color Before: Black Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEP 10

EPA SAMPLE NO.

001A0C1SB079

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209179-01

Level (low/med): LOW Date Received: 9/10/02

% Solids: 92.6

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	330		*	P
7782-49-2	Selenium	43.0		N	P
7439-97-6	Mercury	9.0			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEP11

EPA SAMPLE NO.

001AOC1SB080

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-08

Level (low/med): LOW Date Received: 9/12/02

% Solids: 96.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	180		*	P
7782-49-2	Selenium	4.6		N	P
7439-97-6	Mercury	0.54			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEP12

EPA SAMPLE NO.

001AOC1SB066

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-09

Level (low/med): LOW Date Received: 9/12/02

% Solids: 95.1

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	169		*	P
7782-49-2	Selenium	19.9		N	P
7439-97-6	Mercury	1.8			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEP 13

EPA SAMPLE NO.

001AOC1SB067

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-10

Level (low/med): LOW Date Received: 9/12/02

% Solids: 93.7

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	448		*	P
7782-49-2	Selenium	40.9		N	P
7439-97-6	Mercury	7.1			CV

Color Before: Grey Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEP 14

EPA SAMPLE NO.

001AOC1SB068

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-11

Level (low/med): LOW Date Received: 9/12/02

% Solids: 96.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	245		*	P
7782-49-2	Selenium	32.3		N	P
7439-97-6	Mercury	3.4			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

CEP 15

EPA SAMPLE NO.

001AOC1SB069

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC4

Matrix (soil/water): SOIL Lab Sample ID: 0209236-12

Level (low/med): LOW Date Received: 9/12/02

% Solids: 89.9

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	971		*	P
7782-49-2	Selenium	103		N	P
7439-97-6	Mercury	14.0			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

APPENDIX H
HOT SPOT EXCAVATION CONFIRMATION SAMPLE ANALYTICAL RESULTS

12

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. 5635

Page 1 of 1

5635

Project name: Site 31 (AOC 1)	TtEMI technical contact: Sara Woolley	Lab: Lawks Testing Lab, Inc.
Project (CTO) number: DO ØØ1	TtEMI project manager: Rik Lantz	Field samplers: Johanna Gregory and Anita Teo
		Field samplers' signatures: Johanna Gregory and

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	Pb, Se, Hg
ØØ1AOC1SBØ29	HSNB1	2 ft bgs	09/27/02	11:41AM	SOIL						1							X
ØØ1AOC1SBØ3Ø	HSNB2	1 ft bgs		11:46AM							1							X
ØØ1AOC1SBØ31	HSNP1	1 ft bgs		11:39AM							1							X
ØØ1AOC1SBØ32	HSNP2	1 ft bgs		11:43AM							1							X
ØØ1AOC1SBØ33	HSNP3	1 ft bgs		11:40AM							1							X
ØØ1AOC1SBØ34	HSNP4	1 ft bgs		11:49AM							1							X
ØØ1AOC1SBØ35	HSNP5	1 ft bgs		11:50AM							1							X
ØØ1AOC1SBØ36	HSNP6	1 ft bgs		11:50AM							1							X
ØØ1AOC1SBØ37	HSNP7	1 ft bgs		11:47AM							1							X
ØØ1AOC1SBØ38	HSNP8	1 ft bgs		11:46AM							1							X
~~ØØ1AOC1SBØ39~~																		
ØØ1AOC1SBØ4Ø	HSNB3	2 ft bgs	↓	11:48AM	↓						1							X

	Name (print)	Company Name	Date	Time
Relinquished by: Johanna Gregory	Johanna Gregory	TtEMI	9.27.02	3:30 pm
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Preservative Added: none

Analysis Required

Turnaround time/remarks:

Fed Ex #: 8313 Ø397 8618

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

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

HSNB1

EPA SAMPLE NO.

001AOC1SB029

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-01

Level (low/med): LOW Date Received: 9/30/02

% Solids: 90.1

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	507		*	P
7782-49-2	Selenium	46.2		*E	P
7439-97-6	Mercury	7.8			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

H5NB2

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SB030

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-02

Level (low/med): LOW Date Received: 9/30/02

% Solids: 91.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	282		*	P
7782-49-2	Selenium	18.6		*E	P
7439-97-6	Mercury	6.1			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

HSN B3

EPA SAMPLE NO.

001AOC1SB040

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-11

Level (low/med): LOW Date Received: 9/30/02

% Solids: 90.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	41.6		*	P
7782-49-2	Selenium	5.9		*E	P
7439-97-6	Mercury	0.40			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

HSNP1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SB031

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-03

Level (low/med): LOW Date Received: 9/30/02

% Solids: 85.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	198		*	P
7782-49-2	Selenium	16.9		*E	P
7439-97-6	Mercury	28.2			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

HSNP2

EPA SAMPLE NO.

001AOC1SB032

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-04

Level (low/med): LOW Date Received: 9/30/02

% Solids: 88.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	1970		*	P
7782-49-2	Selenium	185		*E	P
7439-97-6	Mercury	21.6			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

HSNP3

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SB033

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-05

Level (low/med): LOW Date Received: 9/30/02

% Solids: 88.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	78.0		*	P
7782-49-2	Selenium	6.2		*E	P
7439-97-6	Mercury	1.2			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

HSNP4

EPA SAMPLE NO.

001AOC1SB034

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-06

Level (low/med): LOW Date Received: 9/30/02

% Solids: 91.0

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	852		*	P
7782-49-2	Selenium	55.4		*E	P
7439-97-6	Mercury	7.2			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

HSNPS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SB035

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-07

Level (low/med): LOW Date Received: 9/30/02

% Solids: 89.9

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	81.4		*	P
7782-49-2	Selenium	6.3		*E	P
7439-97-6	Mercury	1.2			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

HSNP6

EPA SAMPLE NO.

001AOC1SB036

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-08

Level (low/med): LOW Date Received: 9/30/02

% Solids: 92.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	22.8		*	P
7782-49-2	Selenium	2.2		*E	P
7439-97-6	Mercury	0.18			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

HSNP2

EPA SAMPLE NO.

001AOC1SB037

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-09

Level (low/med): LOW Date Received: 9/30/02

% Solids: 92.3

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	29.1		*	P
7782-49-2	Selenium	2.1		*E	P
7439-97-6	Mercury	0.22			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

ITSNPS

EPA SAMPLE NO.

001AOC1SB038

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC6

Matrix (soil/water): SOIL Lab Sample ID: 0209582-10

Level (low/med): LOW Date Received: 9/30/02

% Solids: 93.7

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	18.9		*	P
7782-49-2	Selenium	2.6		*E	P
7439-97-6	Mercury	0.40			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

12.

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. 5634

Page 1 of 1

5634

Lab PO#:	Lab:
022246	Lauks Testing Lab, Inc.

Project name:	TtEMI technical contact:	Field samplers:
Site 31 (AOC 1)	Sara Woolley	Johanna Gregory

Project (CTO) number:	TtEMI project manager:	Field samplers' signatures:
DO 001	Rik Lantz	Johanna Gregory

Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar	No./Container Types: VOA	SVOA	Pest/PCBs	Metals	TPH Purgeables	TPH Extractables	Preservative Added: none	Analysis Required: Pb lead	Hg mercury	Se Selenium
001 AOC 1 SB 039	HSSB1 2.0 ft bgs	9/23/02	12:41 pm	Soil						X								X	X	X
001 AOC 1 SB 041	HSSP1 1.0 ft bgs	↓	1:09 pm	↓						↓								↓	↓	↓
001 AOC 1 SB 042	HSSP2 ↓		1:00 pm																	
001 AOC 1 SB 043	HSSP3		1:03 pm																	
001 AOC 1 SB 044	HSSP4		1:06 pm																	

	Name (print)	Company Name	Date	Time
Relinquished by: Johanna Gregory	Johanna Gregory	Tetra Tech EM Inc	9-23-02	4:00 pm
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #: 8359 2746 4293

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

USEPA - CLP

-1-

HSS B1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

001AOC1SB039

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC5

Matrix (soil/water): SOIL Lab Sample ID: 0209449-01

Level (low/med): LOW Date Received: 9/24/02

% Solids: 94.4

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	19.6			P
7782-49-2	Selenium	2.0			P
7439-97-6	Mercury	0.034	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

HSSP1

EPA SAMPLE NO.

001AOC1SB041

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC5

Matrix (soil/water): SOIL Lab Sample ID: 0209449-02

Level (low/med): LOW Date Received: 9/24/02

% Solids: 87.3

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	6.8			P
7782-49-2	Selenium	1.6			P
7439-97-6	Mercury	0.026	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

H55P2

EPA SAMPLE NO.

001AOC1SB042

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC5

Matrix (soil/water): SOIL Lab Sample ID: 0209449-03

Level (low/med): LOW Date Received: 9/24/02

% Solids: 91.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	22.2			P
7782-49-2	Selenium	2.5			P
7439-97-6	Mercury	0.059			CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

USEPA - CLP

-1-

INORGANIC ANALYSES DATA SHEET

H55P3

EPA SAMPLE NO.

001AOC1SB043

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC5

Matrix (soil/water): SOIL Lab Sample ID: 0209449-04

Level (low/med): LOW Date Received: 9/24/02

% Solids: 94.7

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	9.4			P
7782-49-2	Selenium	1.5			P
7439-97-6	Mercury	0.020	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

H55P4

EPA SAMPLE NO.

001AOC1SB044

Lab Name: Laucks Laboratories Contract: Site 31 (AOC 1)

Lab Code: LAUCKS Case No.: 07092 SAS No.: N5735 SDG No.: CONC5

Matrix (soil/water): SOIL Lab Sample ID: 0209449-05

Level (low/med): LOW Date Received: 9/24/02

% Solids: 92.2

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

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	8.6			P
7782-49-2	Selenium	1.8			P
7439-97-6	Mercury	0.031	B		CV

Color Before: Brown Clarity Before: Texture: Medium

Color After: Brown Clarity After: Artifacts:

Comments:

APPENDIX J
RESPONSE TO PUBLIC COMMENTS ON THE AOC 1 SOIL REMOVAL FACT SHEET

RESPONSE TO PUBLIC COMMENTS ON THE

AREA OF CONCERN 1 SOIL REMOVAL FACT SHEET AND

DRAFT ACTION MEMORANDUM

NAVAL WEAPONS STATION
SEAL BEACH DETACHMENT, CONCORD, CALIFORNIA

August 28, 2002

On March 6, 2002, the U.S. Department of the Navy mailed approximately 650 fact sheets describing the time-critical removal action (TCRA) to be conducted at Area of Concern 1, Naval Weapons Station, Seal Beach Detachment, Concord, CA to members of the public and the Concord Restoration Advisory Board. Additionally, the Navy published a public notice announcing the TCRA and the availability of the administrative record for the TCRA (the draft action memorandum and related documents) at the public information repository at the Concord Public Library in the March 10, 2002, issue of the Contra Costa Times.

The Navy received three sets of public comments on the fact sheet and draft action memorandum: (1) comments from Mr. Scott Etzel of Concord, CA (via electronic mail), (2) comments from Mr. Gregory G. Baatrup of the Delta Diablo Sanitation District (via electronic mail), and (3) comments from Mr. Robert Mihalovich of Chevron Environmental Management Company of San Ramon, CA (via letter dated April 2, 2002). This document presents the U.S. Department of the Navy's responses to public comments on the fact sheet and draft action memorandum.

RESPONSES TO COMMENTS BY MR. SCOTT ETZEL

1. **Comment:** **What was the plant name(s) and/or corporate name(s) of the former fertilizer plant referenced in the "Site Background" portion of this fact sheet?**

   Response: The facility was owned and operated by the Collier Carbon and Chemical Company (CCCC), a subsidiary of Union Oil Company of California. The ownership of the site has been complicated by a series of mergers and acquisitions and the purchase of small adjacent plots, which are described in more detail in Section 2.1 and 2.2 of the preliminary assessment (PA) report (Tetra Tech EM Inc. 1999).

2. **Comment:** **Have the former owners of this parcel contributed (or will contribute to) the costs of this soil removal action?**

   Response: The former owners of the property have not contributed to the costs of the soil removal action, and there are currently no plans to attempt cost recovery from the former owners.

3. **Comment:** **Where does the Navy intend to dispose of the soil and waste removed from this site? (please provide the state, county (if in CA, and city or area)**

   Response: The removal action is expected to generate both hazardous wastes, as defined by Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and nonhazardous wastes. The disposal of the wastes will be the responsibility of Mendelian Construction, Inc., the contractor that will perform the removal action. The Navy will require the contractor to dispose of the hazardous substances at a Resource Conservation and Recovery Act (RCRA) Subtitle C (Class I) hazardous waste landfill; the contractor currently plans to dispose of the hazardous portion of the waste at the Chemical Waste Management Kettleman Hills Landfill in Kettleman Hills, California. The wastes that are classified as nonhazardous may also be disposed of at the Kettleman facility, or at a different RCRA Subtitle D (Class II) facility, such as the Altamont Landfill in Livermore, California. The contractor has not yet determined which landfills it will use.

4. **Comment:** **Where will the "clean soil" that the Navy intends to backfill the areas with come from? (please provide the state, county (if in CA, and city or area)**

   Response: The clean fill soils will consist of sandy or silty clay, similar to existing site soils. The fill soils will be analyzed to ensure that they are free of organic contaminants and do not contain metals at concentrations above previously defined ambient concentrations.

5. **Comment:** **Has the Navy evaluated the "clean soil" that they intend to use as backfill for any exotic plants and/or animals (including microbes) so as to avoid any future issues with the existing native plants and animals?**

   Response: The fill soils will not be analyzed for exotic plants, animals, or microbes. The removal area currently has poor-quality habitat dominated by exotic or invasive species such as star thistle. The Navy has required the removal contractor to establish vegetation to en hance habitat for species at the site, and requires a habitat restoration plan. The contractor plans to hydroseed the site with a mix of fast-growing hybrid grass and native plant species to inhibit weed germination.

6. **Comment:** **Regarding the increase in traffic during this planned soil removal action, has the Navy assessed the impact of the increased traffic in the area? Specifically, would you please provide the estimated number of increased vehicle trips, hours of their planned operation, and impact analysis data on existing traffic flows? Would you please also attach a copy of the traffic plan filed with the Contra Costa County Public Works Department in your reply to this inquiry at the address listed below, or mail it via USPS to my residence.**

   Response: The removal contractor estimates that 250 truckloads of material will be transported to and from the site during the removal action. The trucks will operate during normal working hours, at a rate of slightly more than one truck per hour during an average working day. The Contra Costa Public Works Department originally indicated that a traffic control plan might be needed, but when details of the project became available, the Public Works Department determined that no permit or traffic control plan was required.

RESPONSE TO COMMENT BY MR. GREGORY G. BAATRUP, DELTA DIABLO SANITATION DISTRICT

Comment: **I received your notice and would like to know the depth of soil to be removed. We operate a sewage pump station for the Concord Naval Weapons Station and I think the forcemain crosses Area of Concern. We want to make sure there is adequate protection of that pipe. Please contact me at your earliest convenience.**

Response: Soils will be excavated to the bottom of the waste material or to 2 feet below grade, whichever is deeper. The Navy has contacted Mr. Baatrup and determined that a sanitary sewer force main runs along the northern fence line of AOC 1 and the hot spot excavation could impinge on the force main. Navy subcontractors will contact Underground Service Alert (USA), an underground utility damage prevention service funded by the utilities, before drilling or excavating in the area. Additionally, Mendelian Construction, Inc., the excavation contractor, will employ a private utility locator to precisely determine the location of all utilities in the areas of the proposed excavations.

RESPONSE TO COMMENT BY MR. ROBERT MIHALOVICH, CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY

Comment: **Chevron Environmental Management Company (ChevronTexaco) has reviewed the Draft Action Memorandum regarding the proposed removal action at Area of Concern 1 of the Naval Weapons Station Seal Beach Detachment Concord. A fact sheet describing this project was provided to Chevron Pipeline Company (CPL). Based on our review of the available documents at the Concord Library and our historical files, it is possible that the proposed removal activities could encounter petroleum-affected soil associated with ChevronTexaco's historic pipeline operations.**

<u>Potential Environmental Issues - Historic Pipeline Operations</u>
ChevronTexaco's historic pipelines transported crude oil and Bunker C fuel oil from the early 1900 to the early 1960s. The historic right-of-ways are coincidental with the CPL active pipeline right-of-way that parallels Port Chicago Highway. To the best of our ability, ChevronTexaco has identified one documented historic leak/release location to the east of Area of Concern 1; specific information regarding the exact locations of the release is not known. Based on our experience along other portions of the historic pipeline right-of-way, there is a potential that subsurface soil and groundwater along and in the vicinity of the historic right-of-way could be impacted by residual weathered crude oil.

Based on our experience, residual weather crude oil associated with ChevronTexaco's historic pipeline operations can be observed visually; however analytical laboratory testing is necessary to confirm that the likely source of the affected material is the historic pipelines. Based on analytical results and human health risk assessments performed at known historic pipeline release sites, governing agencies have concurred with ChevronTexaco's findings that the presence of the residual weathered crude oil material does not pose an unacceptable risk to human health.

ChevronTexaco requests to review any detailed work plans for the Task 1: Investigative Sampling portion of the Removal Action Plan that pertain to work in the vicinity of Port Chicago Highway.

In the event that petroleum-affected soil is encountered in the vicinity of the historic pipeline right-of-way during future investigation or site activities, ChevronTexaco requests to be contacted and to be provided with a reasonable opportunity to collect samples of the affected soil to perform its own evaluation of the nature of the material. If the Navy and ChevronTexaco agree that the identified material is associated with ChevronTexaco's historic pipeline operations and no other potential responsible parties are in question,

ChevronTexaco will coordinate with the Navy and its contractors to address concerns encountering affected soil.

Response: The sampling described under Task 1, investigative sampling, in the draft action memorandum is focused on the hot spots in the northern part of the site and on potential new sources in the vicinity of the former buildings in the north-central and northeast parts of the site. Since no investigative sampling is proposed in the vicinity of Port Chicago Highway, detailed work plans have not been forwarded to ChevronTexaco. The Navy will provide these plans to ChevronTexaco on request.

In the event that petroleum-affected soil is encountered in the vicinity of the Port Chicago Highway right-of-way, the Navy will contact ChevronTexaco promptly and afford ChevronTexaco the opportunity to collect and analyze samples of the material.

REFERENCE

Tetra Tech EM Inc. 1999. "Naval Weapons Station Seal Beach Detachment Concord, Area of Concern 1, Pump Station Area, Preliminary Assessment Report." May 20.